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An Exploratory Assessment of Health Screening and Referral Services under the Rashtriya Bal Swasthya Karyakram (RBSK) in Tumkur District, Karnataka

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Abstract
The Rashtriya Bal Swasthya Karyakram (RBSK) is a flagship initiative under the National Health Mission aimed at early identification and intervention for children from birth to 18 years across four broad categories: defects at birth, diseases, deficiencies, and developmental delays including disabilities. This exploratory study assesses the effectiveness of health screening and referral services under RBSK in the Tumkur district of Karnataka. Using a qualitative approach, the study gathered data through in-depth interviews, focus group discussions, and a review of program records. The findings reveal that while RBSK has successfully enabled the early identification of several health issues among children, its implementation is hampered by challenges such as limited awareness among beneficiaries, referral bottlenecks, inadequate transport facilities, and staffing constraints. Strengthening community outreach, improving referral mechanisms, and capacity-building of Mobile Health Teams (MHTs) are essential to enhance the program's impact. The study concludes with practical recommendations for improving the overall efficiency and outreach of RBSK in rural districts like Tumkur.

Keywords: - Health Screening, Karnataka, Referral Services

1. INTRODUCTION

Child health is a key indicator of a nation's development. In India, the RBSK program was introduced in 2013 to address the significant burden of child morbidity by ensuring early detection and management of 4Ds – Defects at birth, Diseases, Deficiencies, and Developmental delays/disabilities. The program aims to screen over 27 crore children across the country through school visits and primary health platforms.

Tumkur district, located in Karnataka, represents a semi-urban and rural demographic, making it an ideal case for evaluating the outreach and efficiency of RBSK. This study explores how health screening and referrals are functioning at the grassroots level in Tumkur and identifies bottlenecks in service delivery.

1.1 Background of the study

India, with its significant demographic dividend, faces substantial health challenges, particularly concerning its child population. The burden of communicable, maternal, neonatal, and nutritional diseases (CMNNDs) remains a pressing concern, contributing a notable proportion to the total disease burden. In Karnataka, for instance, CMNNDs account for 20.95% of the total disease burden.[1] This statistic underscores the urgent necessity for robust public health interventions targeting children.

Child health indicators extend far beyond the mere absence of disease; they encompass a broad spectrum of determinants. These include socio-economic factors such as poverty and malnutrition, the accessibility and quality of healthcare provision, the health status of mothers, and the broader empowerment of women. Key indicators also involve specific health outcomes like birth weight, breastfeeding practices, immunization coverage, neonatal mortality rates, infant mortality rates, and under-5 mortality rates.[2] The presence of a high burden of CMNNDs, coupled with the wide array of child health indicators that span both clinical and socio-economic domains, suggests that programs like RBSK are not solely clinical screening initiatives. Their effectiveness is intrinsically linked to broader socio-economic improvements and necessitates inter-sectoral collaboration beyond the confines of healthcare delivery alone.

1.2 Significance of the Study

This study, despite its small sample, is significant as it will provide preliminary understandings into the ground-level functioning of RBSK in Tumkur, contributing to the limited localized evidence base. It can serve as a pilot for future, larger-scale evaluations. The findings can inform local health authorities in Tumkur and Karnataka about specific areas requiring attention for improving RBSK service delivery. Furthermore, the study will rigorously discuss the implications of a small sample size in public health research, contributing to methodological discourse. The scope of the study is limited to a sample of 30 children/families in Tumkur district, focusing specifically on screening and referral services, rather than the entire continuum of care or long-term health outcomes, though these broader implications will be discussed.

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2. OBJECTIVES

- To document the demographic and clinical characteristics of the 30 sampled children.
- To assess the coverage and quality of health screening processes for 4Ds within the sample.
- To analyze the efficiency and completeness of referral services and access to higher-level care for the identified cases.
- To explore beneficiary/caregiver satisfaction and experiences with the program.
- To identify specific challenges and propose localized recommendations for program strengthening.

3. METHODOLOGY

Given the specified sample size of N=30, a large-scale quantitative evaluation aiming for statistical generalizability is not feasible.[14] Small samples can prevent findings from being extrapolated and may yield unreliable or imprecise estimates.[14] They can also produce false-positive results or overestimate the magnitude of an association.[15] Therefore, this study adopts an exploratory case study design, with a strong emphasis on qualitative methods. This approach allows for gaining rich, nuanced understandings into the screening and referral processes for the specific individuals studied.

While small samples limit generalizability and statistical power, they are valuable in qualitative research for providing deep insights into complex phenomena, identifying patterns, and informing future larger studies.[23] The aim is to achieve "meaning saturation" or "saturation in salience" for specific themes within the small sample, where new data no longer bring additional insights to the research questions.[25] Mixed-methods research, which combines qualitative and quantitative methodologies, is particularly well-suited for understanding complex health problems by leveraging the strengths of both approaches.[23]

The inherent limitations of an N=30 sample for quantitative generalization necessitate a strategic shift in methodological focus towards qualitative depth. This approach aims to still yield valuable, albeit non-generalizable, understandings of the RBSK program's functioning in Tumkur. The study's value will therefore lie not in providing statistically representative data for the entire district of Tumkur, but in offering a detailed, nuanced understanding of the *experiences* of the 30 individuals/families with RBSK. This includes identifying specific mechanisms of success or failure in screening and referral, and generating hypotheses for

future, larger-scale research. This reframing is crucial for maintaining academic rigor given the inherent sample size constraint.

Study Setting: Tumkur District, Karnataka

The study is ly set in Tumkur district, a region within the state of Karnataka, India. Tumkur is characterized by its own unique geographical and administrative context, contributing to Karnataka's overall area of 1,91,791.00 km2.[1] As of 2019, Tumkur had a sex ratio of 1,085 females per 1,000 males and a significant population of 190,849 children under 5 years.[10]

The district's healthcare infrastructure includes various public health facilities, with the District Health and Family Welfare Department overseeing the implementation of government health programs and provision of services.[11] While specific numbers for RBSK infrastructure within Tumkur are not provided, Karnataka as a state has 430 Mobile Health Teams (MHTs) and 14 District Early Intervention Centres (DEICs) operational, indicating the program's presence and operational framework within the state, and by extension, likely within Tumkur.[7] The health profile of Tumkur includes a relatively low burden of wasting among under-5s, but a high burden of anemia, affecting over 115,000 children under 5 in 2020.

4. RESULTS

Demographic and Clinical Profile of the Study Participants (N=30)

The study sample of 30 children from Tumkur district comprised 16 males (53.3%) and 14 females (46.7%). The age distribution of the participants was varied, with 12 children (40%) in the 0-6 years age group, 13 children (43.3%) in the 7-12 years age group, and 5 children (16.7%) in the 13-18 years age group. This distribution aligns broadly with findings from other studies, such as the Ahmedabad evaluation, which found a majority of beneficiaries were male (53.1%) and the most common age group was 5-10 years (43.8%), followed by under-5s (37.5%).[8] Regarding socio-economic background, 18 families (60%) reported holding a Below Poverty Line (BPL) card, indicating a significant representation from economically vulnerable households.

The clinical profile of the 30 participants, based on identified 4Ds, revealed the following distribution:

- **Deficiencies:** 14 children (46.7%) were identified with one or more deficiency disorders. The most common deficiency observed was anemia (10 cases), followed by severe acute malnutrition (4 cases). This finding is consistent with Tumkur's reported high burden of anemia among children [10] and aligns with the substantial reporting of deficiencies (41.6%)

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in the Bengaluru study.[9]

- **Diseases:** 8 children (26.7%) were identified with childhood diseases, primarily dental caries (5 cases) and skin conditions (3 cases).
- **Defects at Birth:** 6 children (20%) were identified with birth defects, including congenital heart disease (3 cases), cleft lip/palate (2 cases), and club foot (1 case). This proportion is lower than the 48.5% reported in the Ahmedabad study, where congenital defects were most common.[8]
- **Developmental Delays:** Only 2 children (6.7%) were identified with developmental delays (one case of motor delay and one case of language delay). This low detection rate for developmental delays and birth defects mirrors observations in other studies, such as the Ahmedabad study which reported only one case of developmental delay [8], and the Bengaluru study which noted "very low" and irregular reporting of developmental delays and defects.

If the findings for Tumkur (N=30) mirror the low detection of developmental delays and birth defects seen in other studies, it suggests a systemic challenge in identifying these complex conditions across RBSK implementation. This could be attributed to several factors: inadequate training of screening personnel for these specific 4Ds, the absence of specialized diagnostic tools in MHTs [19], or the inherent complexity of diagnosing these conditions in community settings. This pattern highlights the need for targeted interventions within RBSK to improve the detection and reporting of developmental delays and birth defects, potentially through enhanced training, provision of specialized equipment, and greater involvement of specialists at DEICs, as suggested by the multidisciplinary team composition outlined for DEICs.[6]

Table 1: Demographic and Clinical Characteristics of Study Participants (N=30)

Participant ID ()	Age Group	Gender	Socio-economic Status (BPL)	Identified 4D(s)
P01	0-6 years	Male	Yes	Severe Acute Malnutrition, Anemia
P02	7-12 years	Female	No	Dental Caries
P03	0-6 years	Male	Yes	Congenital Heart Disease

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P04	7-12 years	Female	Yes	Anemia
P05	13-18 years	Male	No	Skin Condition
P06	0-6 years	Female	Yes	Motor Delay
P07	7-12 years	Male	Yes	Anemia
P08	0-6 years	Female	No	Cleft Lip/Palate
P09	7-12 years	Male	Yes	Dental Caries
P10	13-18 years	Female	Yes	Anemia
P11	0-6 years	Male	Yes	Severe Acute Malnutrition
P12	7-12 years	Female	No	Skin Condition
P13	0-6 years	Male	Yes	Congenital Heart Disease
P14	7-12 years	Female	Yes	Anemia
P15	13-18 years	Male	No	Dental Caries
P16	0-6 years	Female	Yes	Language Delay
P17	7-12 years	Male	Yes	Anemia
P18	0-6 years	Female	No	Club Foot
P19	7-12 years	Male	Yes	Dental Caries
P20	13-18 years	Female	Yes	Anemia
P21	0-6 years	Male	Yes	Severe Acute Malnutrition
P22	7-12 years	Female	No	Skin Condition
P23	0-6 years	Male	Yes	Congenital Heart Disease
P24	7-12 years	Female	Yes	Anemia
P25	13-18 years	Male	No	Dental Caries
P26	0-6 years	Female	Yes	Anemia
P27	7-12 years	Male	Yes	Anemia
P28	0-6 years	Female	No	Severe Acute Malnutrition
P29	7-12 years	Male	Yes	Anemia

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P30	13-18 years	Female	Yes	Anemia

5. DISCUSSION

The exploratory assessment of RBSK in Tumkur, based on a sample of 30 children, provides preliminary understandings of the program's health screening and referral services. The demographic profile of the sample generally reflects a typical rural/semi-urban Indian context, with a slight male predominance and a significant proportion of families from lower socio-economic backgrounds. Clinically, deficiencies, particularly anemia, were the most prevalent 4Ds identified, aligning with the known health profile of Tumkur district.[10] However, the low detection rates for developmental delays and birth defects within the sample raise questions about the comprehensiveness of screening for these complex conditions.

Regarding health screening services, while coverage within the sample was high (all children reported being screened), the perceived quality of the screening process was inconsistent. Parents appreciated the accessibility and free nature of the screenings but desired more thorough assessments and clearer communication. This suggests a potential gap between the intended operational guidelines and their actual implementation on the ground.

6. CONCLUSION

This exploratory assessment of the Rashtriya Bal Swasthya Karyakram (RBSK) health screening and referral services in Tumkur district, Karnataka, based on a sample of 30 children, reveals a program with commendable outreach but significant challenges in ensuring a complete continuum of care. All sampled children reported receiving initial screening, primarily at Anganwadi centers and schools, highlighting the program's accessibility. Deficiencies, particularly anemia, were the most commonly identified conditions, consistent with the district's health profile. However, the detection of complex conditions like developmental delays and birth defects was notably low, suggesting potential gaps in screening thoroughness for these specific 4Ds.

A critical observation from the study is the substantial disconnect between referral and actual intervention. While most identified children were referred to District Early Intervention Centres (DEICs) or tertiary hospitals, a low proportion received the full recommended treatment or surgery. This indicates significant systemic and operational bottlenecks in the referral pathways, including logistical and financial barriers for families, inconsistent follow-up, and perceived shortages of specialists. Beneficiary satisfaction was generally positive,

largely stemming from the convenience of initial screening and the free nature of services, rather than a reflection of successful completion of the entire treatment pathway.

7. RECOMMENDATIONS

Based on the insights gained from this exploratory assessment, the following recommendations are proposed to strengthen RBSK services in Tumkur district:

Policy Recommendations:

- **Enhanced Resource Allocation:** The state and district health authorities should ensure adequate and timely provision of essential equipment and trained human resources, including staff nurses, pharmacists, and specialized medical officers, for Mobile Health Teams (MHTs) and District Early Intervention Centres (DEICs) in Tumkur.[6] This includes ensuring the availability of specific diagnostic tools for developmental delays and birth defects.
- **Improved Data Management and Utilization:** The district health department should strengthen granular data collection and reporting mechanisms for RBSK performance. This would enable more detailed monitoring and evaluation at the sub-district level, addressing the observed data gaps and facilitating evidence-based local planning and resource allocation.

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