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Strengthening Early Intervention Ecosystems in Rural Assam: Evidence from Goalpara and Karbi Anglong Districts

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Abstract
Background: Early Intervention (EI) programs provide aid to children from zero to six years old who have disabilities or experience some delays in the areas of cognitive, motor, language, and socio-emotional development. Inaccessibility to Early Intervention programs is a problem in the rural areas of the North-Eastern region of India in connection with poor infrastructure, lack of awareness among community members, socio-economic factors, lack of professionals, and cultural barriers. **Objectives:** The present study aims to analyse obstacles to the accessibility of Early Intervention Programs in rural areas of Rangjuli Block of Goalpara District, and Manja Block of Karbi Anglong District of Assam, and suggest measures to develop early intervention programs in such areas. **Methods:** A qualitative review approach and contextual field analysis were chosen for data synthesis based on the literature and research findings. Relevant studies and policies relating to disabilities and early intervention were reviewed for information about various challenges and proposed solutions for better access to EI programs. **Findings:** The study reveals that the inadequate infrastructure, poor socio-economic status, and cultural stigmatization negatively affect the access and acceptance of the EI service. Community-based rehabilitation, intersectoral coordination, training of frontline workers, and engagement of families through culturally sensitive approaches became the key approaches for strengthening the EI program. **Conclusion:** This study underscores the importance of developing sustainable and inclusive EI interventions in rural areas. The promotion of coordinated action involving various sectors can contribute to improved developmental outcomes in children living in rural Assam.

Keywords: Early Intervention, Developmental Delay, Rural Assam, Community-Based Rehabilitation, Disability Services.

Introduction

The early childhood stage is an important period during human development when rapid neurological development and brain plasticity occur. Environmental stimuli affect development in significant ways because experiences from birth to six years shape cognitive, linguistic, motor, social, and emotional abilities. Hence, early intervention (EI) is crucial in minimizing developmental risks and optimizing developmental outcomes (Guralnick, 2020).

Early intervention includes multidisciplinary services provided by professionals such as paediatricians, psychologists, occupational therapists, physiotherapists, speech therapists, special education teachers, and social workers. The interventions assist in addressing developmental delays while building the family's capability and increasing their child's participation in the natural environment (Guralnick, 2020; Haring & Lovett, 2010). Evidence shows that family-centred approaches to EI have a positive impact on development and education, especially among children with disabilities (Barnard-Brak et al., 2021).

Educational philosophies in ancient India also stressed the significance of early childhood development. In this case, Yajnavalkya emphasized the point that learning begins very early as a result of family relationships and discipline, as well as hands-on experience.

Despite acknowledging the significance of EI, accessibility challenges persist, especially in underdeveloped and remote areas. Delayed diagnosis and intervention are prevalent among children growing up in underserved regions due to geographical remoteness, unavailability of professionals, difficulties in reaching the area concerned, and ignorance on the part of the caregiver (Barnard-Brak et al., 2021; Decker et al., 2021). This becomes even more challenging in low-resource settings where there are no adequate facilities in place.

There have been several government interventions in India for the early identification and intervention for EI of infants. These include the Rights of Persons with Disabilities Act, 2016 (RPwD Act), Rashtriya Bal Swasthya Karyakram (RBSK), and Integrated Child Development Services (ICDS). Community-based screening and referral to DEICs form part of these programs (Mukherjee et al., 2021). But, still, there are huge gaps in implementation in rural and tribal areas.

India's Assam faces many such difficulties owing to its difficult topography, scattered rural population, and socioeconomic conditions. Rangjuli and Manja are examples of rural blocks which do not have any special provision or developmental screening process (Das, 2018; Centre for Rehabilitation and Training for Multiple Disabilities, 2023).

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Theoretical Framework
Three interrelated theories underpin the research design for the study.

Ecological Theory of Early Childhood Development
From an ecological theory of child development, the importance of families, communities, institutions, and policy settings in shaping child development cannot be overemphasised. Caregivers' lack of knowledge about child development, limited institutional support, and poor infrastructural development have implications for child development and delay EI services (Kaul et al., 2017; Guralnick, 2020).

Community-Based Rehabilitation Theory
The Community-Based Rehabilitation (CBR) model underscores social inclusion, participation, and empowerment through utilization of local resources and community participation (World Health Organization, 2021). Where professional service providers are few, community-based rehabilitation offers a workable framework for EI service delivery.

Socio-Ecological Model of Disability
According to the socio-ecological disability model, disability results from impairment and interaction with the environment. Lack of transportation, poverty, geographical isolation, and weak institutional support compound the problem of disability in rural Assam (Das, 2018; Centre for Rehabilitation and Training for Multiple Disability, 2022).

Research Gap
Existing literature on EI in India largely focuses on national and state-level perspectives, with limited micro-level evidence from rural Assam. Studies examining EI accessibility in underserved blocks such as Rangjuli and Manja remain scarce despite the influence of geographical and socio-cultural factors on service delivery. Furthermore, limited attention has been given to the grassroots implementation of programmes such as RBSK and ICDS in remote contexts. Current research also lacks an integrated analysis of socio-cultural, economic, and infrastructural barriers affecting EI accessibility.

Objectives of the Study
The study aims to:
1. To examine the current status of early intervention access and awareness in Manja and Rangjuli blocks.
2. To examine challenges of early intervention related to the system, including human resources, socio-economic conditions, infrastructure and cultural factors.
3. To examine the role of stakeholders- families, local organisations or institutions, NGO's and frontline workers of early intervention.
4. Identifies contextual and affordable strategies for strengthening early intervention services in underserved and rural areas of Assam.

Methods
The current paper has used a review methodology that focused on analyzing the issues and opportunities relating to Early Intervention (EI) services in rural areas of Assam, with a specific emphasis on Rangjuli Block of Goalpara District and Manja Block of Karbi Anglong District of Assam. The use of the narrative review methodology helped to understand the issues relating to socio-cultural, infrastructure, and policy barriers to accessing EI services among the underserved communities living in rural areas.
Peer-reviewed journals on topics such as early intervention, disability studies, CBR, telemedicine, and rural children's development have been analyzed within the scope of the study. Governmental policies and reports, namely, Rashtriya Bal Swasthya Karyakram (RBSK), Integrated Child Development Services (ICDS), and the WHO guidelines on community-based rehabilitation (CBR), have been used in the study. Academic dissertations and regional studies addressing the topic of disability and healthcare in Assam and Northeast India (Devi, 2022; Das, 2018; Baruah & Sarma, 2020) have also been considered.
Field reflections from the community mental health interventions undertaken in Rangjuli and Manja blocks were considered in order to make the study contextually relevant. The field reflections consisted of field experiences and observations made from conversations with the parents, caregivers, ASHA workers, Anganwadi workers, teachers, and other community members in relation to developmental issues, stigma, transport difficulties, and lack of therapy and rehabilitation services. Field experiences obtained from community interventions brought about a deeper understanding of the socio-cultural and structural issues that impact EI accessibility in rural Assam. Thematic analysis was carried out on various issues such as accessibility issues, cultural stigma, human resource limitations, policy implementation challenges, involvement of parents, and tele-intervention services.

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Results and Discussion:

Results-

The thematic analysis, field observations, secondary literature, and policy documents reveal a complex interplay of structural, socio-economic, and cultural barriers influencing the delivery and utilisation of early intervention (EI) services in rural Assam. The findings are organised into key thematic areas reflecting the lived realities of families in Rangjuli (Goalpara district) and Manja (Karbi Anglong district).

A. Limited Infrastructure and Uneven Service Distribution

One of the primary issues hindering EI among the Rangjuli and Manja communities is that there are no specialised centres for early intervention therapies at the block level. The people are compelled to go a long distance of between 30 and 100 kilometres to seek assistance at District Early Intervention Centres (DEIC) in either Goalpara or Diphu. There are no facilities at rural centers, including infrastructure and trained professionals like physiotherapists, speech-language pathologists, and special educators. The study findings are supported by national and international evidence on the continuing gap between rural and urban areas with respect to EI (Haring & Lovett, 2010; Patra et al., 2021).

B. **Shortage of Trained Human Resources**

The paper highlights a crucial gap in the availability of professional staff who deal with EI in rural areas of Assam, such as speech-language pathologists, occupational therapists, clinical psychologists, rehabilitation specialists, and early childhood educators. Posts for specialists are still available only in urban centers, as there is little motivation to work in the countryside. Primary care workers and Anganwadi workers, who play an important role in recognizing signs of delay in child development and diagnosing disabilities, may lack knowledge related to the matter. Lack of trained staff in rural areas was also mentioned in previous research (Forest, 1995; Jephson et al., 2001).

C. **Socio-Economic Constraints and Financial Burden**

The concept of socio-economic vulnerability became an important factor in determining EI services. Since most families in Rangjuli and Manja rely on either agriculture or daily wage employment, it becomes difficult for them to afford regular visits for treatment. The lost wages due to such visits, along with costs associated with transport, food, aids, and medical consultations, become an important reason to stop participating in EI services. These results confirm Chakraborty & Boro's (2022) research where they found that poverty impacts the attendance in programs for young children.

D. Low Awareness and Cultural Misconceptions

However, the lack of awareness among parents about the developmental markers and the advantages of early intervention continues to be an important obstacle. Many parents view developmental delays as temporary or see them as acts of destiny and the workings of some supernatural force. Additionally, fear of social stigma plays an important role in the reluctance of people to disclose any disabilities, thus delaying their attempts to seek help. This idea is echoed by Baruah and Sarma (2020).

E. Weak Intersectoral Coordination

Despite the commonality of roles between the sectors of health, education, and social welfare, inter-sector collaboration in the rural areas of Assam is quite disjointed. The children who are screened by frontline health workers like ASHAs and Anganwadi workers are not referred to special schools or rehabilitation programs through the DEICs. This is indicative of the failure of the existing EI policies and interventions, which have also been highlighted by other researchers (Mukherjee et al., 2021; Mondal, 2023).

F. Inadequate Screening and Early Identification Mechanisms

Although growth assessment is done by Anganwadi Centres on a regular basis, the developmental screening process is not adequate, as these activities require proper training and standardized screening techniques. The early screening activity carried out by RBSK health mobile teams is seldom conducted in far-flung villages, causing problems with late identification of developmental issues. Inefficient policy implementation hampers the early detection feature of EI programs, especially in inaccessible blocks (Kumari, 2023; Khound et al., 2025).

G. Technological and Digital Divide

Tele-intervention and use of technology for service provision as alternatives for rural EI programs, however, cannot be effective solutions in Rangjuli and Manja considering inadequate mobile connection, smartphone ownership, and digital literacy among parents. It is important to note from findings by Rooks-Ellis et al. (2020) and Howe et al. (2023) that for telehealth programs to be effective, they should be adjusted to suit rural areas.

H. Limited Parental Empowerment and Capacity Building

Parental involvement remains one of the crucial factors that ensure success in early intervention; yet, studies suggest that there is a lack of parental guidance and training in rural areas of Assam. A great number of parents are not able to carry out interventions at home due to the absence of confidence and adequate skills.

I. Policy Analysis: Alignment Between Policy Intent and Rural Implementation

A review of policies related to EI, including the ICDS, RBSK, NEP 2020, and Rights of Persons with Disabilities Act, indicates a very clear policy direction in favor of early detection, inclusion, and service provision in an equitable

manner. Nevertheless, the execution of such policies in rural Assam is limited due to infrastructure gaps, staffing issues, and lack of coordinating mechanisms. There appears to be a huge gap between the policy design and its implementation at the ground level.

Discussion

A. Context-Specific and Culturally Appropriate EI Approaches

From the results obtained, it can be clearly noted that there is a need for culturally sensitive EI methods and approaches in rural parts of Assam. The people in Karbi Anglong and Goalpara communities vary in terms of language, culture, child-rearing practices, and their perception of disabilities. It was found that there was a problem for most caregivers in understanding the explanation given regarding medical terms and intervention measures in a language not known to them. Also, there were cases where developmental problems were believed by most to be temporary conditions or fate and hence, no prompt action could be taken.

Field observations from Rangjuli Block indicated that many families have fear when it comes to seeking health services due to fear of social judgment from neighbours and relatives. From the parents' view, developmental disabilities are misconceived in the community, and therefore, parents find it better to keep children at home than visit health centres.

B. Community-Led Models for Service Expansion

It is worth mentioning that there is an urgent need for developing decentralised models of service provision to provide for more widespread EI services in areas of poor accessibility where institutional services are scarce. Community-Based Rehabilitation approaches can play an important role in enhancing community involvement and minimizing dependence on urban areas. It is possible to organize volunteer groups, self-help groups, and local organizations to facilitate early detection and referrals, as well as guidance of families from their villages. Community participation fosters trust in the provision of services and ensures the sustainability of programs.

Field observations suggest that most villages in both districts lacked regular provision of rehabilitation or therapy services. Many families depended on medical camps and district hospitals for assessing children and providing them with assistance. While discussing the issue with a local community member in Rangjuli Block, it was said that parents are often unaware about available government schemes due to lack of information in remote areas.

C. Strategic Use of Frontline Personnel

The frontline workers, such as Anganwadi Workers, ASHAs, and ANMs, were seen as valuable assets for improving EI services due to their constant engagement with families, which gives them an advantage of identifying issues related to development early on. However, several frontline workers expressed concerns about not receiving adequate training on developmental screening, milestone tracking, and disability management. The competence of frontline workers could be increased through capacity-building programs for EI.

Several Anganwadi workers informed that parents consult them after problems relating to children become serious. This is because they are not aware of developmental milestones and tend to visit frontline workers only after children reach school-going age. Further, the lack of manpower and difficulty in transportation were seen as major obstacles in conducting timely follow-ups.

D. Digital and Remote Intervention Strategies

Technology-based interventions became a promising solution for ensuring continuity in EI interventions among communities living in distant and remote areas. Mobiles and computer technologies may be used to facilitate home-based EI interventions through giving simple instructions for caregivers on how to conduct therapy and follow up on EI progress. Despite the inconsistency in Internet availability in many villages, basic mobile phones were widely available and acceptable to the community.

In one case, a parent from the district of Karbi Anglong said that seeking assistance in the EI centres is highly challenging since there are no proper transport facilities in the area. The parent highlighted that there are no regular therapy centres or other specialized facilities near their community. Therefore, they have to travel far to reach either Diphu Medical College or the LGBRIMH for their child's evaluation and therapy sessions. One of the parents said that when going to these centres, there is a loss of income in addition to transport costs of around ₹500 to ₹700 each time. In such a case, tele-interventions will play an important role.

E. Awareness Generation and Social Acceptance

Low awareness of developmental disorders, coupled with prevailing stigma in society, was seen as a primary constraint for timely identification and EI interventions. In most rural communities, developmental delay was considered a usual practice among children, coupled with cultural myths, which led to late identification and low uptake of interventions. Awareness programs carried out in villages using meetings, mothers' groups, schools, and Panchayat-based activities can help raise awareness on child development and disability inclusion.

In discussions held with caregivers during visits to Rangjuli Block, it came out clearly that parents do not report developmental issues due to fear of being stigmatized by other members of the community. Other respondents stated that,

before consulting medical or rehab services, they sought help from traditional healers first. This finding indicates that community leaders, teachers, and influential persons should be involved in awareness programs aimed at discouraging stigma and seeking timely assistance.

F. Strengthening Systems and Governance Mechanisms

Furthermore, the study underscores the existence of major systemic and infrastructural challenges related to the implementation of EI interventions in rural Assam. Lack of availability of qualified professionals, inefficient referral procedures, inadequate transportation facilities, and ineffective monitoring and evaluation structures hinder the successful implementation of the current programs. While frameworks like ICDS and RBSK lay out strategies for timely identification and intervention, implementation becomes difficult in rural areas owing to logistical constraints and inadequate coordination.

According to field data, several families had to undertake long travel journeys in order to seek specialized assessment and therapy programs. It was also noted that many Anganwadi centres did not have sufficient teaching materials and screening tools for assessing the developmental needs of children. Health staff also indicated problems with coordination between health, education, and rehabilitative services. Such findings demonstrate the necessity of developing governance mechanisms and decentralized delivery of services with the cooperation of health, educational, and social welfare ministries.

Recommendations

A. Policy-Level Recommendations

This study emphasizes the pressing necessity for better mechanisms for policy implementation for EI services in rural Assam. The DEICs need to be strengthened by forming multidisciplinary teams with members like psychologists, speech therapists, occupational therapists, physiotherapists, special educators, and social workers. The rural outreach programs through RBSK need to be made more widespread to ensure that developmental screening and referral services can be provided regularly even in distant villages. Developmental screening programs on a quarterly basis need to be implemented in all Anganwadi Centres in order to achieve the objective of early detection of any developmental delays or disability.

B. Community-Level Strategies

It is important that community involvement be seen as a key element in the rural EI system. Voluntary workers from villages can be trained as assistants in EI to assist in developmental screening, parent guidance, and referrals. Parents' groups may be formed in villages as an attempt to provide emotional support, share knowledge and advocate collectively. Public awareness campaigns through the use of the local language can also assist in demystifying developmental disorders and lowering any associated stigma.

C. Service Delivery Improvements

Service delivery infrastructure development is an important requirement to ensure access and continuity of interventions. Mobile therapy and rehabilitation centres can be established in regions that are difficult to reach geographically to alleviate the problems faced by the family during transportation. The tele-intervention model in low-bandwidth areas would facilitate at-home therapy sessions and parental education programs. Such services could consist of video demonstrations, mobile-based developmental guidance, teleconsultation, and online follow-up methods. Collaboration between government bodies, NGOs, medical facilities, and universities needs to be improved in this regard.

D. Family Empowerment Strategies

The family is an integral part of the EI programme's success; thus, parent empowerment programmes should also form part of such projects. A home-based therapy kit that includes basic tools that will aid in learning and stimulating the child can be given to families living in rural areas. Monthly parent training programmes will ensure increased knowledge among the caregivers about milestone achievement, communication, managing behavior, and even home-based stimulation. There should also be emotional and psychological assistance for the parents in their EI programmes.

E. Research and Capacity Building Recommendations

There is a need for future research to concentrate on extensive field trials looking into the access, effectiveness, and outcomes of the EI services in various districts in Assam. Comparative analysis with various populations like the tribals, rural, and urban populations may help identify any discrepancies between them. Also, studies looking at how effective adoption of telemedicine services is, along with other intervention approaches, are necessary. There must be capacity building programs for front line personnel, teachers, and rehabilitation therapists on a regular basis.

Limitations of the Study

There are some limitations in the current study that need to be considered in the interpretation of the results obtained.

First, the research relied heavily on the secondary sources of information, policy papers, regional reports, and the context obtained from the field, but no systematic collection of field data through primary measures, such as structured interviews

or surveys, was employed. Thus, the results of the study can be treated only as exploratory and conceptual, but not statistically generalizable.

Second, the lack of reports at the district level, as well as relevant policies and guidelines in relation to early interventions in rural Assam, became apparent. Often, updated data concerning developmental assessment, referral, and rehabilitation programs at the block level could not be found.

Third, Assam is highly diverse in terms of its geographical features, linguistic peculiarities, cultural specifics, and socio-economic conditions. The two blocks under consideration, Rangjuli and Manja, are just examples of those characteristics, and thus the findings obtained might not be generalised to other regions within the state of Assam.

Fourth, the study concentrated more on access to service, socio-cultural barriers, and problems associated with policy implementation. The study did not explore much regarding the results obtained from the use of EI services, the effectiveness of interventions and the developmental progress achieved through the interventions. Further research should incorporate methodologies such as mixed-method studies and intervention studies.

Conclusion

The Early Intervention (EI) is a crucial developmental tool that helps address issues faced by children with developmental delays and disabilities, especially during the critical period between birth and six years of age. This study assessed the situation, difficulties, and opportunities for EI intervention programs in the rural areas of Assam, focusing on the development of EI programs in Rangjuli Block of Goalpara District and Manja Block of Karbi Anglong District. The results show that despite the significant policy measures adopted by the Government of India, including the RPwD Act, RBSK, ICDS, and NEP 2020, there are inconsistencies in their implementation in remote rural areas. Inequalities, remoteness, poor transport, and inadequate infrastructural facilities limit access to EI intervention services for children with developmental problems.

The findings further show that socio-economic factors play an important role in access to and sustainability of services. Poverty-stricken families find it difficult to afford travel costs, therapy charges, and regular visits to district hospitals and specialised centers. Most parents cited losses of their daily incomes when traveling far away from their homes for assessment and therapy services, thus making the process non-sustainable and resulting in discontinuation of interventions. Lack of availability of trained personnel such as speech therapists, occupational therapists, psychologists, and special educators in rural communities makes the problem worse. In several communities, parents rely entirely on Anganwadi Centres and primary health workers, whose training is also limited with regard to developmental screening and early intervention processes.

Another significant finding of the study is that socio-cultural perceptions play a major role in the help-seeking behavior of families affected by developmental disorders. Developmental disabilities are often misunderstood, taken for granted, or attributed to fate and other superstitious beliefs in most rural and tribal areas. These perceptions hinder the early detection of problems and limit community acceptance of the issue. Therefore, culturally appropriate and community-specific strategies must be developed with consideration of existing traditional practices and education about child development.

It is also revealed in the present study that community-oriented and decentralised approaches for intervention hold a transformative promise for EI service improvement in rural Assam. Various CBR interventions, inclusion of ASHA, ANM, and Anganwadi workers along with higher parental engagement can help improve early identification and intervention service delivery. Likewise, various digital and tele-intervention strategies could make a significant difference in geographically remote locations where there is no availability of specialist intervention services. Mobile-based interventions and teleconsultations can facilitate the process of home-based EI intervention service delivery among others.

In conclusion, the study finds that effective enhancement of EI services in rural Assam requires a comprehensive approach. This may include the involvement of communities and use of culturally appropriate practices, capacity building among frontline workers, decentralisation of services, and better governance. Finally, it is clear from the conceptual framework proposed in this paper that child development happens due to the interplay of several factors including family environment, communities, policy framework, socio-economic context, and culture. Therefore, a holistic and ecosystem-based approach seems necessary for ensuring positive developmental outcomes.

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