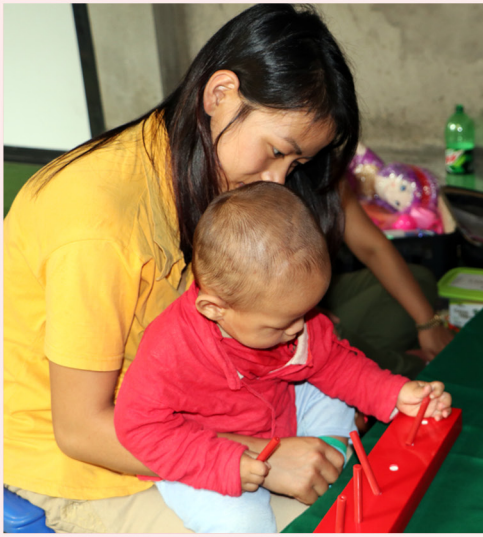
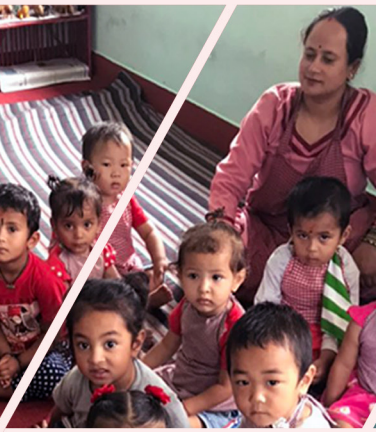
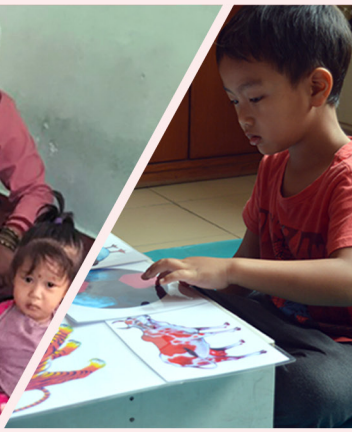
Rapid Neurodevelopmental Assessment Report







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Esha Thapa Dhungana
Director

Abbreviations

BPF	Bangladesh Protibondhi Foundation
CC	Childcare Center
FCW	Frontline Community Workers
MPT	Multi-professional team
NDD	Neurodevelopmental disability
NDI	Neurodevelopmental impairment
RBF	Rato Bangala Foundation
RNDA	Rapid Neurodevelopmental Assessment
ToT	Training of Trainers
TQ	Ten Questions
SDG	Sustainable Development Goals
WHO	World Health Organisation

Table of Contents

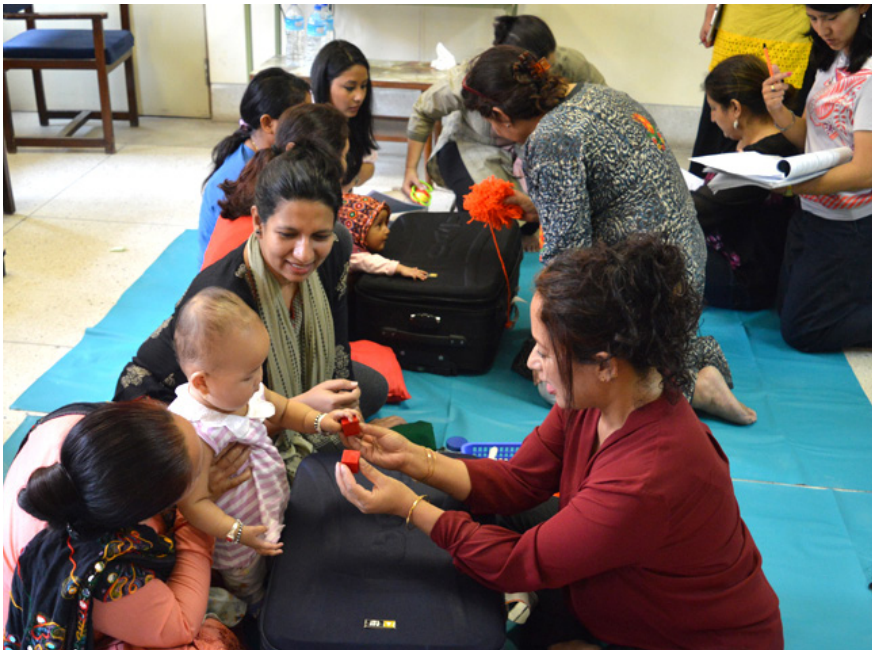
I. Summary

In 2019, RBF launched a new endeavour to train a group of educators in ways to use the RNDA tool, a tool new to Nepal. RNDAs assess eight neurodevelopment domains, primitive reflex for children upto one month and plus two nutritional domains of stunting and wasting, of children spanning in age from birth to 16 years. The RNDA was developed in Bangladesh by Dr. Naila Zaman Khan and Ms. Humaira Muslima of the BPF in collaboration with other professionals in an effort to provide disadvantaged and marginalised children with better life chances. This tool allows for the early identification of children with Neurodevelopmental Impairments (NDIs) and Neurodevelopmental Disabilities (NDDs) so that early intervention can be initiated, and, in most cases, normalcy restored.

To understand this tool so that it can ultimately be implemented across Nepal, RBF trainers participated in an initial six-day training in which they conducted RNDA in all the Childcare Centres (CCs) that Lalitpur Metropolitan City runs in order to gather data on the prevalence of neurodevelopmental impairments among the children these centres serve. Of the total 167 children served, 136 were assessed, 63 boys and 73 girls. The remaining children were absent on the day the test was administered.

This report presents the objectives, methods and findings of the Lalitpur CC assessment and RBF's recommendations based on its findings. Determining the state of neurological development of the children aged 0-7 who attended the CCs was the first step. Four RBF trainers assessed the children using the RDNA protocol. Age-specific information on eight neurodevelopment domains—gross motor skills, fine motor skills, vision, hearing, speech, cognition, behaviour and seizures—as well as on stunting and wasting was collected

as prescribed. A simple statistical analysis of the data collected was then conducted. The findings, as reported below, show that children suffer from different levels of impairment. With this report, RBF aims to open this important field for discussion among relevant stakeholders and work together to change the state of child development in Nepal.



II. Background and Context

IIA. History of RNDA

Almost three decades ago, BPF was part of an international team that developed Ten Questions (TQ) which allow Frontline Community Workers (FCWs) to conduct screenings to identify children at risk for NDIs and NDDs. After carrying out extensive work in the field, facilitators recognised the need for a second stage of assessment to identify functional limitations, but they knew that carrying out such an assessment would require a multi-professional team. Realising that such a requirement would be a major limitation, especially in developing countries, a diverse and extensive team of committed researchers and education professionals simplified the assessment so that a single professional, such as a teacher, would be able to conduct it.

Drawing on past work such as the TQ and the international classification of function, this team developed the RDNA, an age-specific set of tools used to assess universal functional abilities in children. The RDNA was developed for Bangladesh but can be adapted for use anywhere in the world. It is particularly relevant to Nepal.

The RNDA tests eight specific developmental domains and measures the nutritional status of children. These domains as they apply to the context of disability in Nepal are described below.

II.A.1. Developmental Domains

1. Gross Motor

Gross motor skills are the skills related to the ability to control large muscles in the legs, arms, and torso. Such skills are observed through walking, running, throwing, lifting, and other large actions (Children's Hospital of Richmond, 2019).

Gross motor impairments fall under the category of physical disability. Physical disability, at 36.3% of the overall disabled population, is the most commonly reported form of disability in Nepal (UNICEF, 2018, p. 6).

2. Fine Motor

Fine motor skills are the skills involved in the manipulation of small objects with the hands and fingers. These skills are observed through grasping, holding, and pinching (Victoria State Government, 2019).

In Nepal, fine motor impairments also fall under the 36.3% of disabilities classified as physical disabilities (UNICEF, 2018).

3. Vision

Vision is the sense by which one perceives the qualities of an object constituting its appearance (such as colour, luminosity, shape, and size). It is both the most complex sensory system in the body and the least mature at birth. If caught early, most visual impairments can be treated with exercises, corrective glasses, contact lenses, or surgery (WHO, 2013).

Visual impairments are the second most common disability in Nepal. A study conducted with a group of 440 school children aged 7-15 years from urban and rural areas found that uncorrected refractive error — the inability of the eye to bring into focus the images of the outside world — is the leading cause of visual impairment in Nepal. Interestingly, students from urban settings are more likely to have refractive error than their rural counterparts (Adhikari et. al, 2010).

4. Hearing

Hearing is the ability to perceive sounds. Hearing impairment is categorised by conductive and sensory-neural hearing loss in both or one of the ears (Byanju & Saha, 2017). Among children, difficulty in hearing can impact speech and language acquisition, thus negatively impacting cognition and academic performance and, later, participation in the workforce.

Hearing impairments are the third most common disability in Nepal, with 15.4% of the population affected. A study conducted in the Kaski region found that public schoolchildren were more likely to be impacted by hearing impairments than private schoolchildren. Hearing loss can be a result of various factors, including poor personal hygiene or health, swimming in ponds, and repeated untreated ear infections (Byanju & Saha, 2017).

5. Speech

Speech entails the communication or expression of thoughts in spoken words. Clinical diagnoses of speech disorders include stuttering, apraxia, and dysarthria. There are many possible causes of these disorders, including muscle weakness, brain injury, degenerative disease, autism, and hearing loss (Eske, 2019). If identified early, they can be treated with therapy, hearing aids, and, in some cases, medication.

Speech impairments are the fourth most common category of disability in Nepal, at 11.5% of the total (UNICEF, 2018).

6. Cognition

Cognition is mental action or the process of acquiring knowledge and understanding through thought, experience, and the senses. Cognition is considered impaired when a person has trouble learning, remembering, and making decisions. Clinical diagnoses of cognitive impairment include mental and intellectual disabilities such as Autism, Down Syndrome, traumatic brain injury, Attention-Deficit Disorder (ADD), Dyslexia, Dyscalculia, and a number of others.

Mental disabilities make up 6.04% of the disabled population in Nepal, while intellectual disabilities account for 2.9%. A study conducted by Tribhuvan University that focused exclusively on mathematics-related disabilities among children in the central region of Nepal reported that the main causal factors were poor instruction, parents' behaviour toward children, and teachers' negligence (Pandit, 2006). This report did not discuss neurological impairment of children as the study indicates that reported impairments were due to external forces.

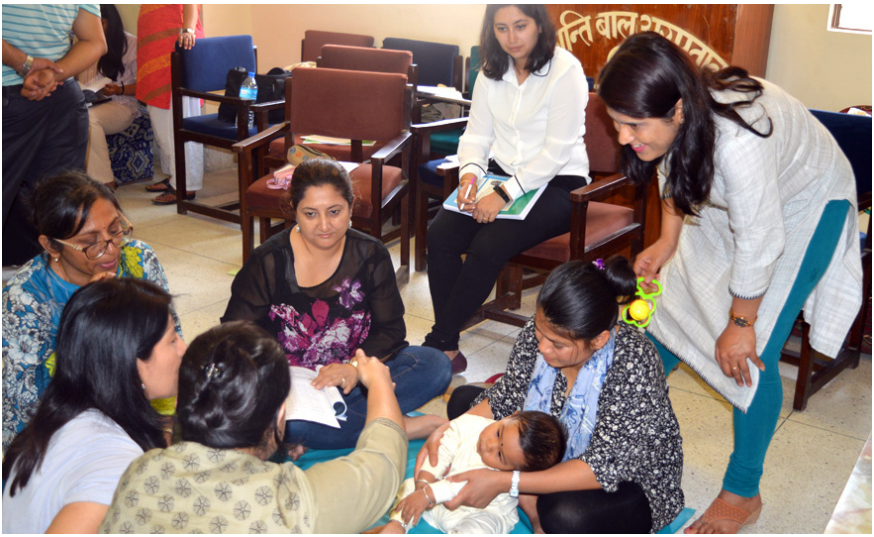
7. Behaviour

Behaviour is the way in which children conduct themselves, particularly in the presence of others. Behaviours considered impaired include any repeated actions that affect the child's ability to operate socially and academically.

A study conducted in Chitwan District consisting of 72 free-list interviews and 30 key informant interviews found that addictive behaviour, lack of attention, aggression, disobedience, and stealing are the most reported behavioural impairments among Nepali children. Participants identify the family, community, and school environments as the main source of these behaviours (Adhikari et. al, 2015). Again, this study did not address the influence of neurological impairment.

8. Seizure

Seizure occurs when the brain functions abnormally, resulting in a change in movement, attention, or level of awareness. A small percentage of children have at least one seizure before they turn 15 years old. Half of these are febrile seizures, which can be brought on by illnesses such as infection, chickenpox, and even the common cold. Two to five percent of children will experience a febrile seizure, whereas only one of every 100 children has recurring seizures due to epilepsy (Christopher, 2019).



In Nepal, the prevalence rate of epilepsy is 7.3 per 1000 population, but there is a treatment gap of over 80%. People with low socioeconomic status who live in rural areas are found to be more affected by seizures than upper-class, urban populations (Kafle, 2014).

Additional Domain: Primitive Reflex

Primitive reflexes are reflex actions originating in the central nervous system that are exhibited by normal infants in response to particular stimuli. These primitive reflexes are also called infantile, infant or newborn reflexes as they are tested in less than first month of life. Examples are rooting, sucking, swallowing, palmar grasp, placing, and stepping. This domain was not tested in the Lalitpur CCs study as all the children were over six months of age.

In Nepal, 57% of newborns do not receive a check-up within two days of delivery and 40% do not receive a check-up within 41 days of delivery (Ministry of Health, 2017, p. 7). Outside of paediatric check-ups, primitive reflex impairments are often not identified.

IIA.2. Nutritional Domains

1. Stunting

Stunting, or low height for age, is caused by malnutrition and frequent infections. Stunting usually occurs before age two, and the (largely irreversible)

effects include delayed motor development and impaired cognitive function. In 2016, over one-third (35.8%) of children under five in the developing world were considered stunted. Although stunting has been reduced over the years in Nepal, the gap between stunting rates among the richest and the poorest populations has not reduced (Nepali, Simkhada & Davies, 2019).

2. Wasting

Wasting, or low weight for height, is a strong predictor of mortality among children under five. It is usually the result of food shortage and/or disease. There are 24 developing countries with wasting rates of 10% (USAID, 2018).

According to groundbreaking research conducted by Helen Keller International, children under the age of two in Nepal are getting a quarter of their calories from junk food, a diet linked to both stunting and wasting. The study was carried out in the Kathmandu Valley among the families of 745 children aged between 12 and 23 months (Boseley, 2019).

II.B. Legal Framework of Nepal

The Act Relating to the Rights of Persons with Disabilities, of 2017 defines a "person with disability" as "a person who has long-term physical, mental, intellectual or sensory disability or functional impairments or existing barriers that may hinder his or her full and effective participation in social life on an equal basis with others" (GoN, 2017, p. 1). The national census report of Nepal-2011 classified disability into seven different categories:

- physical disability;
- vision-related disability;
- hearing-related disability;
- deaf-blind;
- voice and speech-related disability;
- mental disability; and
- multiple disabilities

While the Act Relating to the Rights of Persons with Disabilities guarantees children with disabilities equal rights, including access to a good-quality education, the fact that no nationwide survey has been conducted and that reporting is poor has meant that the need for services for disabled children is greatly underreported (GoN, 2017, p. 9). If the government is to be able to provide the services required by the 2017 Act, it must carry out an accurate assessment of people living with disabilities in Nepal.

II.C. Disability in Nepal

Based on the seven classifications outlined above, the World Health Organization's (WHO) 2011 World Report on Disability estimated that, globally, 120–150 million children (defined as individuals under 18 years old) are currently living with disabilities. The report also estimated that more than 90% of them live in developing countries and do not attend school (WHO, 2011).

When it comes to the accuracy of statistics, it is important to note that disabilities are severely underreported in South Asian countries due to lack of access to information and health services. Furthermore, according to a report titled "Accessing Health Care for People with Disability in the South Asian Context," "the projected magnitude depends on whether an impairment focus is highlighted (approximately 1.6–2.1%) or functionality is given precedence (3.6–15.6%)" (Gudlavalleti, 2018, p. 5). Therefore, not only are disabilities underreported in the region, but the numbers we do have are often arbitrary because of differences in classification.

According to the UN Economic and Social Commission for Asia and the Pacific (ESCAP) Disability Survey in 2015, the percent of persons living with a disability in Nepal is 1.9%. This rate is lower than the rates of other South Asian countries, including India (2.2%), Bhutan (3.4%) and Bangladesh (9.1%). In Australia and New Zealand, the rates of disability are far higher — at 24% and 18.5%, respectively — a fact that underscores the considerable reporting gap that exists in underdeveloped countries, particularly in Nepal (ESCAP, 2015, p. 4). Furthermore, existing research does not consider the overall neurological development of children.

According to UNICEF's "Disability in Nepal" report (2011), the breakdown of disability reported in Nepal is as follows:

- Physical disability: 36.3%
- Blindness/Low vision: 18.5%
- Deaf/Hard-of-hearing: 15.4%
- Speech problem: 11.5%
- Multiple disabilities: 7.5%
- Mental disability: 6%
- Intellectual disability: 2.9%
- Deaf-Blind: 1.8%

III. Objectives

Many children growing up in today's world, especially in urban settings, lack access to opportunities for holistic growth and development. The busy lifestyles of both parents — due, in part, to hectic work schedules — can result in young children not receiving proper care at home or in daycare centres. Furthermore, inadequately stimulating school environments can negatively affect a child's neurodevelopment, thus causing long-term developmental delays. It was within this context that this assessment set out to explore the current status of children's neurodevelopment on a small scale. It employed the RNDA tool to assess 136 children aged 0-7 years in CCs in Lalitpur Metropolitan City. The objectives of the study were as follows:

1. To record the status of neurodevelopment among children aged 0-7 years;
2. To spread awareness to caregivers about the neurological development of children;
3. To make Lalitpur Metropolitan City aware of the current neurological development status of children attending their CCs.

IV. Methodology

IV.A. Study Site and Population

The targeted participants were all 167 children enrolled in the 8 community-based CCs currently functioning under the supervision of Lalitpur Metropolitan City. However, of this population, only 81% (136 children) were available at the time the RNDA tool was administered. There were 63 boys and 73 girls, all aged from 0 to 7 years. The majority of the children were between the ages of 2 and 3, the actual age for attendance at the CCs.

RBF mobilised four trainers who had participated in a six-day ToT to assess the children using the RNDA tool. They took 10 days to conduct the assessments in the selected CCs.

Information about each child's neurodevelopment was collected using the RNDA's age-specific guidelines for eight different domains described in section II — gross motor skills, fine motor skills, vision, hearing, speech, cognition, behaviour, and seizures — as well as stunting, and wasting. Primitive reflex, conducted in neonates, was excluded from this study as no child was under six months of age. To analyse the information collected, RBF used simple descriptive statistics and the field reflections of those involved in the assessment. This data enabled RBF to share the findings of the study and its recommendations with stakeholders. No overall neurodevelopmental assessment of 0-16 year olds has been hitherto been conducted in Nepal to figure out the prevalence of neurodevelopment impairment among young children. If similar studies such as the RNDA are replicated across the nation, accurate statistics of all ten development domains will be available.

IV.B. Rapid Neurodevelopmental Assessment

The RNDA is a set of unique tools for assessing a child's neurodevelopment developed by a team of Researchers, Developmental Paediatricians, Child Neurologists, Development Therapists and other child health specialists to simplify the work usually done by an multi-professional team so that a single teacher is able to conduct an assessment on his or her own. The tool monitors a child's functional abilities in order to assess age-appropriate development and potential impairments. The time at which development impairment is identified impacts a child's participation in society; early identification can lead to interventions which can mitigate or reverse impairments. On the other hand, lack of attention to or knowledge of impairment in a child can eventually lead to long-term disabilities. The RNDA tool determines functional status and accuracy across the eight neurodevelopmental domains and two nutritional domains (See section II). Since assessment is age-sensitive and there are several components to each domain, accurate assessment is possible. As a result, proper planning can be carried out and appropriate intervention provided.

The RNDA is not a screening instrument but an assessment tool. Through assessment, children at risk for developmental delays and disabilities receive a profile of their functional strengths and limitations. This profile includes the grade of severity of any neurodevelopmental impairment identified. All children from birth until 16 years of age can be assessed using the RNDA tool.

The RNDA focuses on children's universal abilities, and its implementation has been facilitated by the WHO together with professors from the School of Public Health at Columbia University in New York. After many years of work to improve the tool, what started as a screening tool consisting of ten questions used by FCWs to identify children with neurodevelopmental impairments or disabilities has led to the more elaborate and age-specific RNDA, a tool applied across the globe. The RNDA is currently being used in Australia, Bangladesh, Bhutan, Guatemala, Haiti, and the United States. Bhutan, in particular, has institutionalised this tool in its schools and has trained at least one teacher in every school to conduct RNDAs and identify children with impairments for early intervention.

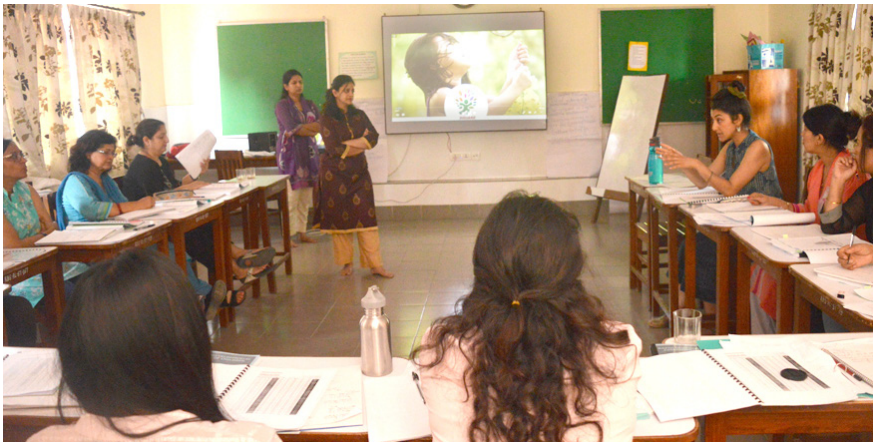
IV.C. Training the Assessors: RNDA Training at RBF

BPF, at the request of RBF, arranged for Nasrin Sultana, Developmental Therapist and Project Coordinator of the Clinical Neurosciences Center for the BPF, and Asma Begum Shilpi, Development Therapy Specialist of the

Child Development Centre, Square Hospitals Ltd. from Bangladesh, to come to Nepal and conduct ToT on RNDA from 26–31 May, 2019.

Fourteen participants (including teachers, psychologists, and educationists) were trained to conduct RNDAs with children from birth to 16 years of age using the extensive tool manual. The training integrated theoretical and practical sessions. While most of the theory was taught at the RBF headquarters, the testing of young children aged 0 to 7 was conducted at Kanti Children's Hospital and CCs in Lalitpur as well as at RBF. The children's performances across eight developmental and two nutritional domains were assessed. The first two days of the training provided theoretical knowledge through lectures and videos so that participants would understand the different dimensions of a child's neurodevelopment, the assessment tool itself, and the implications of that tool. The next four days were devoted to hands-on practical sessions. Parents that accompanied their children were briefed on the nature of the assessment and the benefits to the child from the assessment. Each assessment took roughly 30 minutes. Trainers were certified not only to assess children but also to train others to use the RNDA tool in their schools.

After the six-day intensive training, participants were equipped to implement this technology in the field. RBF believes that this training has great potential to improve the health and lives of children living with neurodevelopmental delays. The most reassuring and useful feature of the assessment is that it identifies largely reversible impairments which, through intervention, can be sufficiently countered to enable most children to proceed with normal growth and development. Intervention depends mostly on conscientious and informed parenting, a balanced diet, limited use of tablets and phones, and increased play with others. Impairments that need specific medical attention



are referred to an appropriate health professional. In the long run, the RNDA, accompanied by intervention, can be an important tool for Nepal to achieve its goal of quality education for all and to support (Sustainable Development Goals (SDG) 4, and particularly SDG 4.2, which states that "by 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education." With timely interventions in impairments, Nepali children will be ready not only for primary education but for lifelong success. In addition to Goal 4.2, proper implementation of the RNDA with adequate follow-up and timely support will help Nepal achieve half of the 17 SDGs.

IV.D. Ethical Considerations

The study was conducted at CCs under the aegis of Lalitpur Metropolitan City while the centres were providing service to the children. Before assessing the children, the primary focus of the study, RBF got permission from the Lalitpur Metropolitan City, which has authority over these centres. The children were under the supervision of teachers and caregivers who, after receiving orientation to the RNDA and the objective of the study, permitted RBF to apply the RNDA tools to the children in their care.

Children who did not cooperate during the assessment were not forced to continue. During the assessment, the assessors made sure that children had the freedom to play and take breaks. Similarly, during the questioning sessions about children's behaviour, the facilitators gave information freely. Offensive, discriminatory, and other unacceptable language was avoided during the process. The privacy of the respondents is respected, so information is confidential and no identities will be revealed.

We use the APA referencing system in this report and would like to explicitly acknowledge all those authors whose documents we have used as references.

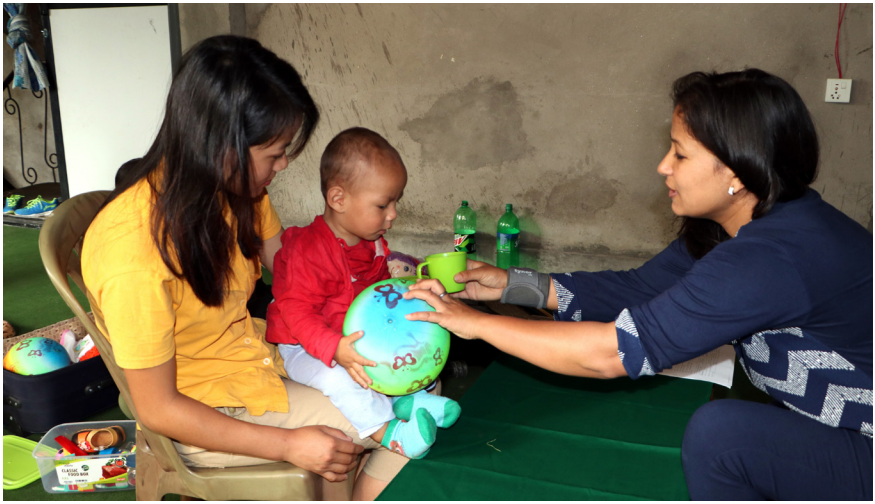
IV.E. Limitations

1. During the initial assessments, we found that some children exhibited anxiety in the presence of the assessors and did not participate fully in the assessment process. The assessors quickly learnt to encourage cooperation and responsiveness by taking time before and during the assessments to engage with children and make them feel comfortable. After reading with them and playing with them, the children became much more cooperative.

2. The behavioural domain is ordinarily observed during the assessment and reported on by the parents of the children assessed. However, since our study was conducted in CCs, parents were not available and CC facilitators provided information in their stead. The question about seizures was also asked to facilitators and, for the most part, not to parents. One CC, however, had informed parents ahead of time, so some parents were able to join and provide information. Lack of engagement with parents was a major limitation of this study as conducting RNDAs in the presence of parents helps orient parents to better parenting. While this opportunity was missed during this round of assessment, we will take advantage of it our future work.

3. The assessors spoke in Nepali and in Newari, the mother tongue of most of the children residing in Lalitpur Metropolitan City. However, there were a few cases where language could have been a barrier. One CC, where them majority of the children were Tamang speaking, had invited the mothers, so the mothers did the translating and explaining.

4. The study was conducted in CCs under Lalitpur Metropolitan City. Children frequenting these centres were from low-income local families as well as migrant families. Therefore this may not be a representative sample of all the children in Lalitpur Metropolitan City, let alone another city or the country as a whole. However, the data does represent the statuses of children at these CCs, and the findings do warrant a population-based study. Such a study can provide accurate data on the prevalence and degree of impairments on a wide scale.



V. Results

V.A. Key Findings

The findings are organised according to the domains of the RNDA and levels of severity of impairment. There are four categories of severity: normal, mild, moderate and severe. The level of impairment denotes the varying abilities of children to perform specific activities in a particular domain. The findings, laid out in Table 1, shows that 120 (88%) out of 136 children had some form of impairment. This is an overwhelming and concerning rate.

Table 1

RNDA Area	Level of Impairment				
	Normal	Mild	Moderate	Severe	Total
Gross Motor	125	5	3	3	136
Fine Motor	117	11	5	3	136
Vision	126	7	1	2	136
Hearing	119	9	2	6	136
Speech	71	13	27	25	136
Cognition	70	35	16	15	136
Behaviour	67	46	16	7	136
Seizure	135	0	0	1	136

V.A.1. Levels of Impairments in Specific Developmental Domains

1. Gross Motor

Gross motor skills are the abilities required to control the large muscles of the body.

Abilities assessed included walking, running, sitting, crawling, sitting with head held high, sitting supported on two hands, standing while holding on to furniture, standing alone, climbing stairs, descending stairs, standing on one leg for 2 seconds, running, and kicking a ball.

Table 1 above presents the status of the gross motor skills of the 136 children assessed. Of them, 125 children were normal (i.e. have no impairments). The remaining 11 children were impaired, 5 mildly and 3 each moderately and severely.

2. Fine Motor

Fine motor skills generally refer to the small movements of the hands, wrists, fingers, feet, toes, lips, and tongue.

Abilities assessed included drawing a circle, grasping for objects, feeding oneself, drinking water from a glass, holding objects placed in hands, screwing a bottle, scribbling, throwing a ball, lacing, unscrewing a lid, and drawing a line, a cross and a square.

Table 1 above presents the status of the gross motor skills of the 136 children assessed. Of them, 117 children were normal (i.e. had no impairments). The remaining 19 children were impaired, 11 mildly and 5 moderately and 3 severely.

3. Vision

A newborn is near-sighted but soon is able to see further away. Vision tests are simple and most are universal.

Abilities assessed included responding to face, responding to light, watching moving adults, fixing eyes on small objects, responding to a spinning ball of wool, and listening to instruction spoken from the back.

Table 1 presents the status of vision among the 136 children assessed. Of them, 126 were normal (i.e. had no impairments). The remaining 10 were impaired, 7 mildly, 1 moderately, and 2 severely.

4. Hearing

Hearing is the sense by which sounds are perceived or the capacity to perceive sound; sound waves are converted into nerve impulses for interpretation by the brain. Children who are not able to hear do not have the ability to speak properly, leading to multiple impairments.

Abilities assessed included responding to clapper bells, rattles, voices, and pointing to objects, a doll's features, and pictures.

Table 1 presents the hearing ability of the 136 children assessed. Of them, 119 children were normal (i.e. had no impairments). The remaining 17 children were impaired, 9 were mildly, 2 moderate, and 6 severely.

5. Speech

The communication or expression of thoughts in spoken words is known as speech.

Abilities assessed included crying, saying 4–6 meaningful single words (common objects, known people), babbling in a string (e.g. 'babababa'), chuckling, laughing, joining two words together to express oneself, vocalizing consonant and vowel sounds, saying one meaningful single word, and saying three-word and four word phrases.

Table 1 presents the status of speech among the 136 children assessed. Of them, 71 children were normal (i.e. had no impairments). The remaining 65 children were impaired, 13 mildly, 27 moderately, and 25 severely.

6. Cognition

Cognition is the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.

Abilities assessed included brightening to a face, making eye contact, socially smiling, comprehending names of familiar objects, asking to go to the toilet verbally or through gestures, assimilation of noun labels, beginning to be aware of strangers to modify responsiveness, spontaneous self-related symbolic play, making towers of eight cubes, matching four colours, matching shapes on the board, pointing at objects when asked, pretend play, and building three steps.

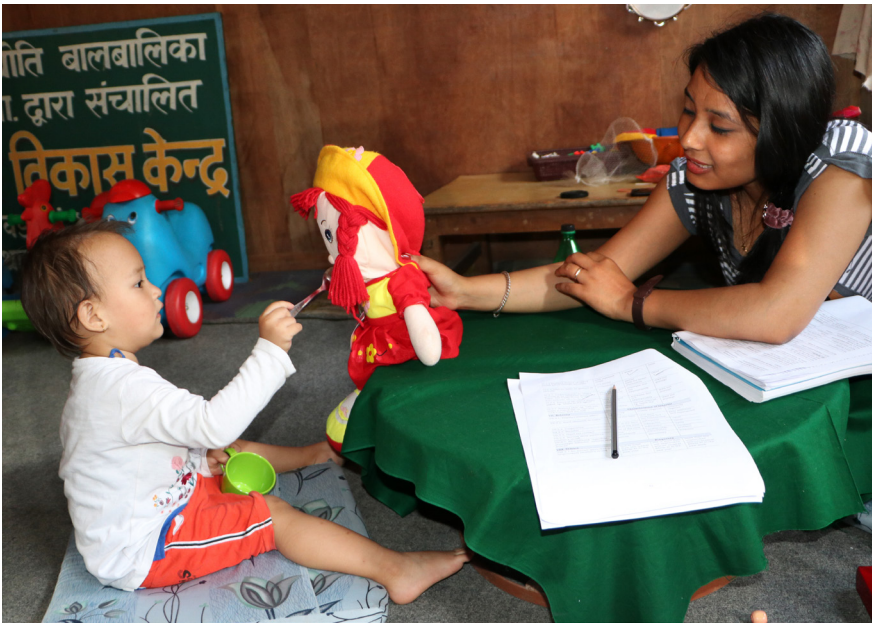


Table 1 presents the status of cognition among the 136 children assessed. Of them, 70 were normal (i.e. they were able to follow the instructions and do the activities related to cognition for their age). The remaining 66 children were impaired, 35 mildly, 16 moderately, and 15 severely.

7. Behaviour

Behaviour is the way in which children conduct themselves, particularly in the presence of others.

Behaviours assessed included ability to console crying, cooperativeness, display of responsiveness to surroundings, attention to tasks, eye contact, irritability, and sociability.

Table 1 shows the levels of behaviour impairment among 136 children. Of them, 67 children are normal (i.e. no impairments were seen). The remaining 69 children were impaired, 46 mildly, 16 moderately, and 7 severely.

8. Seizure

A seizure is a change in behaviour due to the abnormal discharge of electrical current in the brain.

Information about seizures was gathered by asking the parents or caregivers of the children assessed about the symptoms. In most cases, it was caregivers who responded, as few parents were available during the time of testing.

Table 1 shows that among the assessed, 135 children were normal with no abnormalities but that one child had a severe impairment due to seizures.

V.A.2. Assessment of Nutritional Status

Table 2

RNDA Area	Level of Impairment				
	Normal	Mild	Moderate	Severe	Total
Stunting	93	29	13	1	136
Wasting	97	35	3	1	136

1. Stunting

Stunting is impaired growth and development that children experience due to lack of proper nutrition, repeated infection, and/or inadequate psychosocial stimulation. Stunting happens over a period of time and is due to chronic lack of nutrition or improper health and care.

The height of each child was measured and charted on an age-specific height graph to assess the level of stunting.

Table 2 shows that of the 136 children assessed, 29 have mild stunting, 13 moderate and 1 severe. The remaining 43 children measured within the acceptable range of heights for their ages.

Our data found that 30% of the boys and 32.8% of the girls assessed were stunted, with the severity of stunting greater among the girls than the boys.

2. Wasting

Wasting happens when children do not weigh enough for their age, usually because they do not have enough nutritious food to eat or are recovering from an illness. Wasting can be an acute condition, whereas stunting is chronic.

The weight for each child was compared with an age-specific weight chart to determine if they were wasted and to what degree.

Table 2 shows that 97 out of 136 children were normal (i.e. had no impairments). The remaining 39 children were underweight, 35 mildly, 3 moderately, and 1 severely.

Our data shows that 23.8% of the boys and 32.8% of the girls assessed were wasted.

Overall, the nutritional status assessment revealed that while both boys and girls were found malnourished, more girls were malnourished than boys.

V.A.3. Specific Impairments by Children's Age Groups

All children present at the daycare centre on the day of assessment participated in this study. Thus, children from 8 months of age to under 7 years were assessed (although it should be noted that while only children aged 2 to 3 years are supposed to access daycare services, younger and older children were also present). Table 3 breaks the data into age and impairment. It categorises children into those that have no impairments and one, two, three, and more impairments according to their age.

The findings, laid out in Table 3, show that 120 children out of the 136 assessed (88%) had some form of impairment, and 90 children (66%) have more than one impairment. This is an overwhelming and concerning rate.

Table 3

Impairments in RNDA Area	Children's Age Group							Total Number of Children
	< 1 year	1-2 year	2-3 year	3-4 year	4-5 year	5-6 year	6-7 year	
One Area	1	9	15	1	2	2	0	30
Two Areas	2	9	13	1	4	0	0	29
Three Areas	0	12	8	1	1	0	0	22
Four Areas	0	8	15	0	0	0	0	23
Five Areas	0	4	3	0	0	0	0	7
Six Areas	0	3	2	0	0	0	1	6
Seven Areas	0	0	3	0	0	0	0	3
No Impairment	0	4	7	2	2	1	0	16
Total Children with Impairment	3	45	59	3	7	2	1	120
Total Children	3	49	66	5	9	3	1	136

Of the 136 children assessed, only 16 children did not have any impairment and behaved according to age-specific expectations in all 10 of the RNDA and nutrition domains. Altogether 120 children were impaired in at least one domain of the RNDA. Furthermore, 30 children were impaired in one area and 29 in two areas. If we assume that the 59 children with up to two impairments can reverse these impairments, there are still 61 children (45% of the test group) who have more than two impairments.

The data shows that of the 120 children having some form of impairment, 37 of them had severe impairments, some in multiple domains. The rate of severe disability in this population was 27.2%. We need to study this finding further to understand the implications of this study.

Further, if we are to meet the SDGs for Nepal by 2030, these results must be taken seriously and appropriate measures put in place to deal with the results. Improving and expanding early childhood education and providing parenting education and support is the critical first step.

During the course of this study, children identified with moderate to severe impairment were referred to the Child and Adolescent Psychiatry Unit OPD in Kanti Children's Hospital, Kathmandu, for further assessment, intervention and treatment.

V.B. Impressions of the Assessors

1. Children who were reported to be "addicted to the screen" were unable to perform well on the RNDA. These children had difficulty participating in the assessment activities and cried continuously.

2. Children who were reported to be "addicted to junk food" were unable to perform well and showed moderate to severe impairments. They were severely impaired in motor skills and exhibited severe wasting and stunting.

3. A group of children had multiple impairments in vision, hearing and fine motor skills.

4. Children who had moderate impairments were often ill and were unable to meet the age-level requirements in walking, speaking and motor coordination. These children lacked confidence as well.

5. According to teachers and caregivers, parents of sickly children were often overprotective and did not allow their children to engage in age-appropriate tasks. Their excessive solicitousness hindered the children's gross motor skill.

6. Children with parents who caregivers reported used corporal punishment or verbal abuse to discipline their children were not amenable and refused to follow directions or participate.

7. Mild impairment was not considered a problem by either parents or caregivers. Particularly with regard to the hearing and vision domains, parents and caregivers were not aware that a given child had any impairment. If they understood that these impairments could worsen if not attended to, their attitudes might have changed.

8. Children with mild impairments in the behaviour domain made mistakes during the test. About one-third of the children were found to be mildly impaired in behaviour. Parenting styles (permissive, authoritative or indifferent) could be one reason for this impairment. For example, it was reported that some parents fulfilled all their children's desires, pampering them excessively; some did not respond well to their children and failed to address their needs; and some, including those as young as 19 years old, were not aware of positive parenting methods.

9. CCs focused on reading, writing and arithmetic, and not provide children opportunities to learn through play. Parents, too, tend to express happiness if their children engage in academic work. Perhaps this environment played a role in mildly impairing their cognitive domain.

VI. Conclusions

This study of 136 young children showed a concerning outcome with significant implications for childrearing in Nepal. Using standards set in Bangladesh, not in a developed country, about 88% were found to have some sort of impairment, and only 12% were considered normal in all aspects.

In the categories of gross motor skills, fine motor skills, vision, hearing, and seizure, more than 100 children out of the total 136 assessed were normal (i.e. did not have an impairment). More children were impaired in fine motor skills than in gross motor, which meant that the children were not able to perform age-appropriate tasks. This shortcoming is due in part to the lack of opportunities to participate in activities that build eye-hand coordination, such as threading beads.

In the categories of wasting and stunting, only 90 (66%) of the 136 children were in the normal range. This data is in line with the nutritional data for Nepal as a whole, where over 30% of children suffer from chronic or acute malnutrition. Also in line with other research is the finding that while 30% of boys were stunted, only 23.8% showed signs of wasting. The girls did worse on both measures: the rates of both wasting and stunting were 32.8%.

In the categories of speech, behaviour and cognition, only about half of the children were in the normal range. These numbers are cause for alarm and action because if children are not able to function according to their age in these important domains, they will not be able to comfortably satisfy all the demands that life makes of them, and thus will have a hard life.

While the levels of impairment in speech, cognition and behavioural development among the children assessed is a cause for great concern, these

are areas in which stimulation and care can make a considerable difference. Children do not develop elaborate language systems unless they are exposed to the spoken word from or before birth. In our study, more than 18% of children were reported to have severe speech impairment, 20% moderate, and 9% mild. A full 47% of children have mild or serious difficulty speaking in an age-appropriate manner, meaning they have not received the stimulation necessary to develop language. These children, particularly the 20% with moderate speech delays and 18% with severe speech delays, will face lasting difficulties if their impairments are not addressed immediately.

In the behavioural impairment category, 49% of children were reported as impaired. The fact that the majority of these impairments are mild suggests that early interventions will work. However, a full 17% have moderate-to-severe and 5% severe impairments, facts suggesting that intervention will be difficult. We are well aware that children's behaviours are learned and that fostering good behaviour is the job of the adult caretaker. To fill this gap, caretakers must be made aware of a child's development levels and educated on appropriate care, both at home and in CCs.

With children's speech and behaviour domains compromised, cognition is bound to be negatively impacted. A full 57% of the children assessed in this study suffered from cognitive impairments, with 25% of those impairments mild, 12% moderate, and 11% severe.

Although the sample was small — just 136 children — the results are powerful enough to show that serious intervention needs to be made in early childhood development and care. If what the low level of child development we found in Lalitpur CCs holds true across the nation, Nepal will not be able meet any of its SDG goals as early nurturing is the foundation for the development of any country. So far, Nepal has made progress in areas such as access to health and vaccinations, as well as in implementing development projects that require technical fixes and funding. However, this success is piecemeal, and might dissipate once funds are withheld or a project is complete. If Nepali children are to be prepared for the 21st century, they need life, literacy and technical skills, but most of all they need to be creative, open- minded, resilient and empathetic. All these skills are fostered in the earliest years of life, when it is proper parenting and good childcare centres that matter the most. Only when children are nurtured to reach their full potential will Nepal's future be bright. Nepal's newfound federalism and the promise of free and compulsory education to children demand that more resources be provided to ensure better parenting and holistic care in the early years.

VII. Recommendations

Based on the insights of the small study it conducted, RBF makes the following recommendations:

1. Conduct large assessments in order to establish population-based data on neurodevelopment and, once statistics are available, make effective plans.

2. Carry out a population-wide RNDA and, quickly afterward, develop referral centres in different parts of the country. Speed is essential because once impairments are identified, parents will seek help. If this help is not organized in advance, parental faith in the system will dissipate.

3. As Bhutan has done, establish facilities in every school to train staff in conducting RNDAs, providing early intervention services, and referring children and their parents to appropriate healthcare providers.

4. Use RNDAs and the intervention that follow to achieve 10 SDGs (goals 1, 2, 3, 4, 5, 6, 8, 9, 10 and 16) and reach the status of a middle-income country by 2030, aims achievable only if we have a capable population that is neurologically strong.

5. Make providing parenting education that highlights child development milestones a priority. When parents are aware of development targets, they will no longer deny their children's impairments, an issue seen during this present study, and will instead provide their children with the necessary stimulation and additional help required. Parents have the best interests of their children at heart, but they need exposure and education to understand what is best for their children.

6. Consider that money spent on proper nutrition for mothers as well as for children is money very well spent. Hungry mothers give birth to weak children, who in turn become unhealthy mothers and give birth to more weak children. The cycle will continue until the government addresses the nutritional needs of both mothers and children in a responsible manner.

7. Abandon the technical fixes we have sought so far, whether in nutrition, parenting or schooling, and instead develop a holistic programme encompassing all three. For such a programme to be effective and efficient and to capitalise on the benefits of our new federal structure, the participation of all stakeholders is essential.

8. As provided for those clauses in the Act Relating to the Rights of Persons with Disabilities of 2017 that make education accessible to children with disabilities according to their needs, identify the neurological impairments and assess the nutritional status of children, analyse their needs, and provide each vulnerable child with those interventions that will most benefit him or her.

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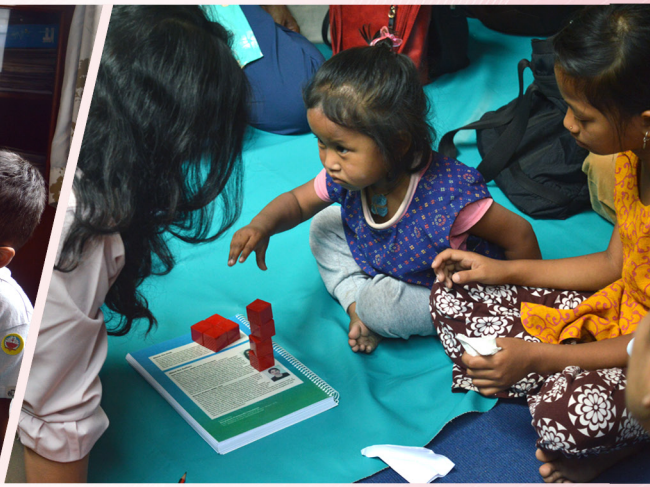

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