TWO-STAGE CHILD DISABILITY STUDY

among children 2-9 years

BHUTAN

2010 - 2011

National Statistics Bureau
Ministry of Education
Ministry of Health

unicef

United Nations Children's Fund

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FOREWORD

The National Statistics Bureau (NSB) is pleased to present the "Two-Stage Child Disability Study Report." It is based on the two stage study designed to estimate the prevalence of childhood disabilities among children 2-9 years in Bhutan.

The Bhutan Multiple Indicator Survey (BMIS) 2010 supported by UNICEF and UNFPA provided the first stage screening of the children by the mothers and/or caretakers. The Ten Questions screening instrument was included as an integral part of the BMIS 2010 to screen children with likelihood of having a disability. It reported on the children's ability to perform according to their age-group. The second stage assessment implemented by Special Education Section under the Ministry of Education, actually confirmed the disability status.

Little is known about the nature, type and possible causes of childhood disabilities in Bhutan. Young children exhibit development of physical, motor, cognitive, language, social, emotional and adaptive functioning skills in their early years. They also exhibit developmental disabilities or experience the onset of other conditions, which can affect functioning in various domains.

This report marks a significant advance to better understand the extent, nature and degree of disability in Bhutan among children aged 2-9 years. It presents the differences in prevalence by degree of disability -any, mild and moderate or severe; prevalence of disabilities by functional domains, prevalence of children living with single and multiple disabilities and examines the factors associated with childhood disability.

The report suggests recommendations for various stakeholders to prioritize programmes that will ensure that children with disabilities and special needs, who are so often marginalized, have equal access to basic services such as education, health care and social protection. We hope that the report will serve as an important tool for policy makers, researchers, practitioners, non-government and civil society organizations, and volunteers in our joint endeavour to promote participation, equity and happiness of children with disabilities.

The study itself was an invaluable tool for advocacy and awareness raising, a way of capacity building. The NSB would like to highly acknowledge the Special Education Section, Ministry of Education for having coordinated the second stage assessment; the Ministry of Health for all the support; and UNICEF for the technical and financial support. The NSB also wishes to thank all the trainers, field surveyors, data analysts, as well as parents and children who were involved in the assessment.

(Kuenga Tshering)
Director General
National Statistics Bureau

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ACRONYMS

BPF	Bangladesh Protibondhi Foundation
BMIS	Bhutan Multiple Indicator Survey
CSPro	Census and Survey Processing System
CRC	Convention on the Rights of the Child
DSO	Dzongkhag Statistical Officer
ECCD	Early Childhood Care and Development
ICF-CY	International Classification of Functioning Disability and Health, Children & Youth
ICF	International Classification of Functioning Disability and Health
MICS	Multiple Indicator Cluster Survey
NSB	National Statistics Bureau
OECD	Organisation for Economic Co-operation and Development
PHCB	Population and Housing Census of Bhutan
RFA	Rapid Functional Assessment
RNDA	Rapid Neurodevelopmental Assessment
RRR	Relative Risk Ratio
SPSS	Statistical Package for the Social Sciences
TQ	Ten Questions
UNICEF	United Nations Children's Fund
UNCRPD	United Nations Convention on the Rights of Persons with Disabilities
WHO	World Health Organisation

EXECUTIVE SUMMARY

This report highlights the salient findings of the two-stage child disability study among children aged 2-9 years conducted in 2011. The first stage was a screen to identify children with conditions making them more likely to be living with a disability. The second stage was a detailed assessment to accurately determine their disability status. This two-stage procedure is designed to reduce the costs of administering a detailed assessment to many children who are highly unlikely to have a disability.

The first stage of the survey was conducted as part of the Bhutan Multiple Indicator Survey (BMIS) 2010 which included a Ten Questions (TQ) module on disability in the household questionnaire to screen children aged 2-9 years old with the purpose of identifying children who were considered more likely to be living with a disability. Out of the sample of 11,370 children, 3,500 children were screened as having potentially a functional impairment or disability. In the second stage the 3,500 children screened positive in the first stage and an additional 787 children randomly selected and representing 10 percent of the children who were screened negative, were assessed. During the second stage, the assessors/surveyors conducted the Rapid Neurodevelopmental Assessment (RNDA)[1] and the Rapid Functional Assessment (RFA) in a controlled standardized environment to the extent possible. The RNDA and RFA tools were used to determine the functional status in the following eight functional domains; gross motor, fine motor, vision, hearing, speech, cognition, behaviour and seizures.[2]The assessment tools used were developed by the Bangladesh Protibondi Foundation (BPF).

In this study, the definition of disability is based on the model of disability as reflected in the WHO International Classification of Functioning Disability and Health (ICF). Children are identified as living with a disability if they have difficulty in function in at least one functional domain.

Functional difficulties exist on a continuum. For different purposes, a different threshold of difficulty might be used for identifying children with disabilities. Therefore the analysis in this report examines the differences in prevalence by degree of disability -- that is, "any", "mild" and "moderate or severe". The children with moderate and severe disabilities were combined in one category because of the small number of severe disabilities and the statistical tests showed the moderate and severe degrees of

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[1] Validation of Rapid Neurodevelopmental Assessment instrument for Under-Two-year old Children in Bangladesh; Pediatrics, volume 125, Number 4, April 2010

[2] "Seizures" are not technically a functional domain, but seizures can limit a child's activities and are correlated with other functional difficulties.

disability had similar associations with various socioeconomic factors related to disability. In contrast, the analysis showed that the association of the same socio-economic factors is distinctly different for children with mild disabilities compared to those with moderate or severe disabilities.

Prevalence

The prevalence of any disability is irrespective whether a child is living with a single disability or multiple disabilities. The prevalence of any disability among children in the age group 2-9 years old based on identifying difficulty in at least one functional domain is 21 percent. The prevalence of mild disability is about 19 percent. The prevalence of moderate disability is two percent and the prevalence for severe disability is about one (0.7) percent; the prevalence of moderate or severe disability clubbed together is about three (2.7) percent. However when considering the prevalence of the disabilities by different functional domains, it needs to be noted that the number of disabilities is larger than children with disabilities given the fact that some children are living with multiple disabilities. Across the different domains, cognition was by far the most prevalent at 15 percent, followed by behavioural domain at about six (5.6) percent and fine motoric domain at about six (5.5) percent. The prevalence of children living with a single disability is 14 percent while the prevalence of children living with multiple disabilities is eight percent. While single disabilities are far more prevalent among children living with mild disabilities, multiple disabilities become more prevalent among children living with moderate or severe disabilities.

Factors Associated with Disability

The analysis in this report also examines characteristics or factors associated with disability. The prevalence of any disability among younger children aged 2-5 years is 27 percent compared to 16 percent for children aged 5-9 years. The prevalence rates for boys at 21 percent and for girls at 22 percent are close and not statistically different.

The disability prevalence is significantly higher among poor children with 26 percent for the lowest wealth quintile compared to 14 percent for the highest quintile. Furthermore, the disability prevalence rates appear to vary for those children living in rural areas (23%) compared to those living in urban areas (14%). However, the rural/urban divide seems to become less significant once other associated factors such as wealth and mother's education are accounted for.

The mother's education is also associated with the child's disability, whereby the disability prevalence rate for children with mothers who have no education is 23 percent against a prevalence rate of 14 percent when the mothers have secondary education or more.

The association of factors with mild disability are statistically different from the association with moderate or severe disabilities. Therefore a multivariate analysis was applied to look at the impact of various factors independent of these correlations. It found that the most significant factors associated with disability were (i) age of the child, (ii) wealth, and (iii) education of the mother.

Younger children were twice as likely to be living with a disability as older children but no significant difference when comparing mild to moderate or severe disability. Similarly, poor children were twice as likely to have a disability compared with rich children. For mild disabilities, being in the lowest wealth quintile gave a child the highest risk, while for moderate or severe disabilities it was actually being in the second lowest quintile that gave a child the highest risk. Looking at the relation between mother's education and any disability, however the multivariate analysis did not find any significant association. But, a more detailed analysis found that children with mothers with no education at all were almost twice as likely to have a moderate or severe disability compared to children with mothers with primary or secondary education. In parallel, the probability of having a mild disability was not as affected. This implies that programs aimed at improving mother's education could have a significant impact on preventing children's conditions from worsening.

The multivariate analysis also found that children residing in the Eastern Region were less likely to be disabled than in other regions, who had similar characteristics. To be more specific, children residing in the Eastern Region were found to be significantly less likely to have a mild disability while it seemed to have little impact on moderate or severe disabilities. In contrast, no significant differences were found in regard to disabilities in rural compared to urban areas.

Limitations

The methodology employed in this study was the first of its kind in Bhutan; therefore some unforeseen methodological challenges had to be overcome. Disability questions are difficult to administer and the interviewers were new to the process. Also, the logistical issues were complicated and led to an unexpected delay between the two stages. The capacity in terms of personnel to carry out the medical assessment was a challenge.

The sensitivity and specificity measures of the study were below those of previous studies in other countries, like Bangladesh, Jamaica and Pakistan. The sensitivity and specificity measures refer to how well the first stage picks up children who are living with disabilities and how well it excludes children who don't have them. The better the study's sensitivity and specificity are, the more precise the final estimates. However, the accuracy of the final determination whether a child is living with a disability is based on the second stage-assessment, which is fairly a robust methodology. Therefore while the relatively low sensitivity and specificity affected the efficiency of the study, it didn't affect the final disability determinations in the second stage and thus there is a high degree of confidence in the study results.

This study provides a clear picture of the disabilities that are prevalent among the children in Bhutan, both in terms of the degree and type of disability – that is whether the disability is mild, moderate or severe and which functional domains are affected, e.g. motor skills,cognition, behaviour, etc. The study also provides insight into how some socio-economic factors are associated with that disability. The RNDA and RFA tools are fairly simple and can be implemented with sufficient training in developing country contexts to detect disability among children. At the same time, while the two tools are tested and fairly simple to administer, it should still be noted that by using two different tools for two different age-groups there might be a potential for systematic differences. Both tools are very useful for identifying disability among children. However the thresholds for identifying the differences in prevalence by degree of disability may possibly differ between the two age-groups, since the severity rating or grading are carried out differently for the two tools. This issue requires further research on the precision of the actual tools and is thus outside the scope of this study. While acknowledging the potential for a systematic difference in regard to the two age groups the results and findings are reliable as the two assessment tools have been carefully adapted to child development process.

Recommendations

The study findings provided recommendations for the government and relevant stakeholders (i) for enhancing the evidence-base concerning children living with a disability to feed into the policy level, (ii) for preventing childhood disabilities, (iii) for building systems and services for children living with disabilities, and (iv) for creating the awareness and demand for such services.

The recommendations regarding *enhancing the evidence-base for public policy* are the following:

- For the larger community of researchers and data collectors on disability, and for countries like Bhutan, it is important to clearly define the concept of disability, based on the WHO-ICF[3] adjusted to the country context.
- Further work should be undertaken to improve the use of the TQ screening instrument and to ensure better logistical oversight and resources in a future second stage procedure.
- Investigate potential causes of disability more in depth, including questions pertaining to the delivery of the child (e.g. prenatal, intra-partum and postnatal conditions), and pertaining to the genetic history such as consanguinity. Conduct further research to support formulating and implementing public policy regarding the integration of children living with disabilities. The research needs to focus on: understanding the various background, personal, and contextual factors that might contribute to disabilities in Bhutan; better ways to implement an on-going system of disability determination; improving the understanding of interventions designed to prevent disability or to improve the lives of children with disabilities; developing a better understanding of cognitive disability in particular; and further exploring the differences between mild and more severe forms of disability.

The recommendations regarding the *prevention of childhood disabilities* include a continued focus on a balanced and equitable socio-economic development, with a particular focus on vulnerable and disadvantaged groups, and on the prevention of growth of inequalities[4]. Furthermore, there need be a continued focus on mother's education in particular, as mother's education seems to prevent children's mild disabilities to progress into moderate or severe disabilities.

The recommendations regarding *building systems and services for children living with a disability* include (i) promoting of early detection programmes so that appropriate and timely interventions can take place, and (ii) developing programmes for parental education focusing on issues such as health and nutrition, early detection and other parental interventions, as well as outreach programmes for early child development.

The recommendations regarding *creating awareness and demand for services concerning children living with a disability* cover (i) conducting disability awareness raising campaigns in order to reduce stigma and change attitudes, and(ii)

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[3] WHO's International Clarification on Functioning, Disability and Health (2001)

[4] Royal Government of Bhutan, (1999), Bhutan 2020: A Vision for Peace, Prosperity and Happiness, Chapter 6

strengthening the demand and capacity for community based rehabilitation and inclusive health and education services for children with disabilities.

Conclusion

In conclusion, this study marks a great advance in understanding the nature and degree of disability among the childhood population of Bhutan. The assessment of children aged 2-9 years shows that the prevalence of any disability based on an identified difficulty in at least one functional domain is 21 percent. The prevalence of mild disability is 19 percent and the prevalence of moderate or severe disability is about three (2.7) percent. Across the different domains, cognition was by far the most prevalent at 15 percent. The prevalence of children living with a single disability is almost twice the prevalence of children living with multiple disabilities. Whereas a single disability is more prevalent among mild disabilities, multiple disabilities are more prevalent among children living with moderate or severe disabilities.

Regarding factors associated with disability, the prevalence of any disability among younger children aged 2-5 years is 27 percent compared to 16 percent for children aged 5-9 years. The rates for boys and for girls are around 20 percent and not statistically different. Disability rates also vary by mother's education, poverty, and residence (rural – urban). The disability prevalence is higher for children with mothers with no education, among poor children and those living in the rural areas. The multivariate analysis showed that the most significant factors associated with disability were the child's age, the mother's education and the household's wealth. The major finding was that the probability of having a moderate or severe disability was greatly reduced with the mother's education, while the probability of a mild disability was not as affected. The results of the study provide a platform to further promote the health, well-being, and happiness of all the children including children living with disabilities.

1 CHAPTER

INTRODUCTION

This chapter serves as an introduction to the Bhutan Child Disability study regarding children aged 2-9 years and is presented in the following subchapters:

1.1 Background and Rationale of the Study
1.2 Study Objectives
1.3 Operational Definition of Disability.

1.1 Background and Rationale of the Study

The Royal Government of Bhutan has the mandate to meet the needs of all children in Bhutan as a signatory to the UN Convention on the Rights of the Child (CRC). The Ministry of Education is entrusted with achieving the goal of Universal Primary Education, promoting a paradigm shift from a welfare-based to a rights-based approach towards children with disabilities through the formulation of the National Education Policy. This policy is inclusive of all children, including those with disabilities.

However, there is a dearth of information on the nature, prevalence and more importantly the profile of children living with disabilities in Bhutan. The lack of reliable data impacts negatively on the planning for the service provision to disabled persons in the country as well for creating an enabling environment to address the needs of children with disabilities.

Although the Population and Housing Census of Bhutan (PHCB) 2005 reported that about 3.4 per cent of the country's total population is living with disabilities[5], little is known about the nature and type of disabilities. Moreover, evidence suggests that the types of questions used in the census tend to under count people with disabilities[6]. Thus, identification of vulnerable children with special needs has become essential in order to provide them with appropriate services, such as health, education and social protection.

To address this data gap in Bhutan, a module on child disability was

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[5] Royal Government of Bhutan, (2005), Population & Housing Census of Bhutan 2005, p. 179

[6] Mont, D. (2007), Measuring Disability Prevalence. World Bank, March 2007, p. 6.

included in the Bhutan Multiple Indicator Survey (BMIS) 2010. Previous research has shown that identifying disabled children in a regular household survey is extremely difficult. Children's functional limitations are confounded with an individual child's developmental progress. In addition, the parents and children often have difficulties providing detailed, accurate information on their functioning. Therefore, a two-stage study was developed whereby in the first stage a screening test took place to identify the children aged 2-9 years reported having a functional difficulty indicating the likelihood of an existing disability. In the second stage, an in-depth assessment verified the reported functional difficulty; thus determining whether the children were actually living with a disability or not.

The BMIS 2010 provided the first stage of this investigation screening the children through administering a questionnaire to the parents or caretakers regarding the functioning of their children. Thus, these Ten Questions (TQ) identified those children aged 2-9 years reported being at risk of having a disability. In the second stage, teachers and health workers conducted an assessment determining whether the children screened positive in the first stage were actually living with a disability. The two stages together constituted the Bhutan Child Disability Study and the results regarding the disability prevalence rates among the children aged 2-9 years are presented in this report.

1.2 Study Objectives

The objectives of the child disability study were:

1. To estimate the prevalence of childhood disabilities among 2 - 9 years old children.
2. To determine personal, family, and community factors associated with childhood disability.

The goal of these objectives is to provide information relevant for developing and implementing public policy aimed at ensuring that disabled children have access to basic services such as education, health care and social protection.

1.3 Operational Definition of Disability

According to the UN Convention on the Rights of Persons with Disabilities (UNCRPD), "Persons with disabilities include those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others" (article 1).

This approach to defining disability draws upon the social model of disability, which conceptualizes disability as emerging from the interaction between a person's functional limitations and the environment. In other words, a person might have the functional status of not being able to move his/her legs, but what makes him/her disabled is a lack of assistive devices, an inaccessible physical environment, negative attitudes and stereotypes which prevent him/her from fully participating in the economic and social life of the community. Therefore, disability is not synonymous with a medical diagnosis, nor is it lodged completely within the person, but rather emerges from an interaction between personal functioning and the environment.

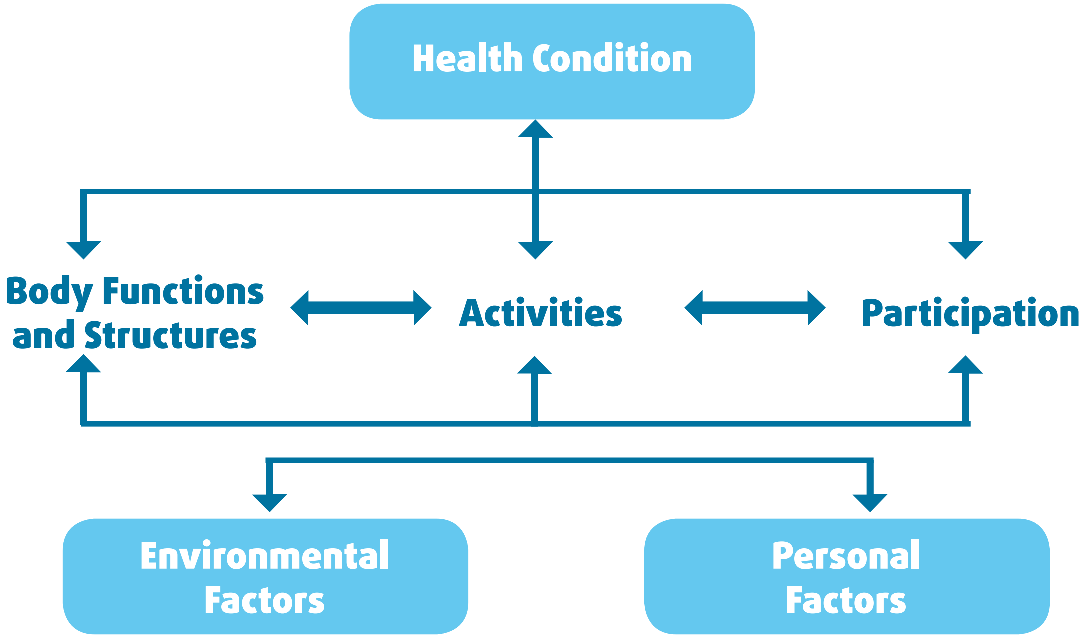
This relationship is captured within the model that underpins the WHO's International Classification of Functioning, Disability and

Health (ICF)[7]. In the figure, functional limitations are broken down into three categories: Body Structure and Functioning, Activities and Participation. An example of a constraint in Body Structure and Functioning is not being able to move one's legs. An example at the activity level would be walking, and participation refers to higher order activities like attending school, being employed and participating in civic activities.

Limitations in body functioning stem from an underlying health condition, but how they are translated into disability is affected by environmental factors. By environment is not only meant the physical environment, but the cultural and policy environment as well. In addition, one's functioning is affected as well by personal factors such as personal resources and experiences.

According to the WHO, the International Classification of Functioning, Disability and Health (ICF) refers to disability as "… an umbrella term for impairments, activity limitations and participation restrictions. It denotes the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors)".[8] Impairments are described as loss or abnormality in body structure or physiological functions, including mental functions.

Figure 1.1 The ICF Model of Functioning, Disability and Health[9]



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[7] WHO, (2001), *International Classification of Functioning, Disability and Health, World Health Organization, Geneva, 2001*

[8] WHO, (2002), *Towards a Common Language for Functioning, Disability and Health ICF, World Health Organization, Geneva 2002, p. 2*

[9] WHO, (2002), *Towards a Common Language for Functioning, Disability and Health ICF, World Health Organization, Geneva 2002, p. 9*

The ICF, though, does not set out a single definition of disability. What the ICF does is to present a detailed description regarding the full range of human functioning at the Body Function and Structure, Activity, and Participation levels for adults. The ICF-CY[10] takes the same approach for children and youth. They describe these functionalities in terms of various functional domains – for example, motor skills, vision, hearing, etc.

This study follows the ICF approach by identifying children who have difficulty in performing an age appropriate activity in any of the eight functional domains: gross motor, fine motor, vision, hearing, speech, cognition, behaviour and seizures. It is acknowledged that seizures are not really a functional domain, but they are often a symptom of a neurological dysfunction, and thus relevant when diagnosing disability. In addition, the children are assessed as having either 'No Difficulty, a 'Mild Difficulty', a 'Moderate Difficulty' or a 'Severe Difficulty'[11] with activities related to the particular domains. Based on the child's overall performance in the assessment, the condition of the child is subsequently determined as living with a disability or not.

The questions used in the BMIS 2010 are focused on physical functioning and basic activities. Therefore, in the broadest sense the BMIS 2010 questions are not identifying disability as it is meant in the social model of disability. However, for the purpose of the data collection here, the survey's focus on physical functioning and basic activities is appropriate. The purpose of this study is to identify 2-9 years old children with functional difficulties as children living with disabilities who are at risk of being excluded from participation requiring special services and who would benefit by making services more inclusive.

Identifying the prevalence of the different disabilities among the children provides an idea of the demand for these services. Examining their personal, family and community characteristics offers an insight into how to target those services, or prevent those functional limitations in the first place. Looking at their participation rates in various areas like school enrolment provides information about where the barriers to participation lie.

Therefore, this study uses "disability" as shorthand for the presence of functional limitations in the eight functional domains mentioned above that put a child at risk of being disabled in the social model sense – that is, being unable to fully participate in society.

Functional limitations, of course, are not binary. They encompass a wide range from having relatively minor difficulties in functioning to being completely unable to function. This study will report on whether a child is living with a disability, any disability or not, disability per functional domain, and single or multiple disabilities. The study categorises disabilities in three levels as follows:

Mild Disability: a child has a mild disability if s/he has a mild difficulty in any of the eight functional domains, and no difficulties in the remaining functional domains.

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[10] WHO, (2007), International Classification of Functioning, Disability and Health, Children & Youth version, ICF-CY, World Health Organization

[11] The grading of severity of the difficulty or disability is discussed under section 2.3.3 of the Methodology section.

Moderate Disability: a child has a moderate disability if s/he has a moderate difficulty in any of the eight functional domains, and no difficulty or only a mild difficulty in the remaining domains.

Severe Disability: a child has a severe disability if s/he has a 'severe' difficulty in any of the eight functional domains, and no difficulty or only a mild or moderate difficulty in the other domains.

In addition to the above, two important issues must be addressed, the cut-off for disability and the issue of multiple disabilities. The prevalence of disability will be very different if mild disability is the cut-off for whether a child is disabled or not. The prevalence will be relatively low if the severe level is used as the cut-off. The appropriate cut-off level depends on the reason for identifying the disability. If one is trying to assess the educational needs of all children, then the mildest cut-off might be the most appropriate. If one were determining eligibility for permanent cash benefits for people who are unable to work in the current environment then a more severe cut-off would be most appropriate.

For policy analysis, all levels of disability should be examined. It is relevant for policy development to look at the outcomes for children at all three different degrees of disability. May be children with minor disabilities have equal outcomes to children with no disabilities, but children with moderate disabilities start experiencing worse outcomes. This would provide important information as to where the appropriate cut-off should be for particular programs. Alternatively, maybe children with mild disabilities are also experiencing much worse outcomes. This could be convincing evidence that these programs should be broadened.

As described in later chapters, the data analysis showed no significant differences in the patterns or associations between children with a moderate disability and children with a severe disability. Considering also the low absolute number of severe disability cases, limiting meaningful data analysis, it was decided to combine data regarding children with moderate and severe disabilities into one category of 'moderate or severe disability'. Therefore, for the most cases, the analysis explores three categories of disability: any; mild; and moderate or severe disabilities. 'Mild' and 'moderate or severe' are a disaggregation of the 'any' disability category.

This report also reflects the disability prevalence of different domains: gross motor, fine motor, hearing, vision, speech, cognition, behaviour and seizures. Children can experience difficulties in multiple functional domains, sometimes even caused by multiple underlying health conditions. According to a social model, what is more important than whether a child experiences 'single' or 'multiple' disabilities is the level of inclusion and participation which that child enjoys.

This report will examine disabilities from multiple perspectives: the presence of any, mild, and moderate or severe disabilities in children; the prevalence of disability in the different functional domains; the prevalence of single and multiple disabilities; and the extent to which socio-economic and demographic characteristics are correlated with disability.

2 CHAPTER

STUDY METHODOLOGY

This study investigates the prevalence of childhood disability in Bhutan, using a two-stage quantitative research design. For the first stage, data were collected using the Ten Questions (TQ) screening tool; in the second stage an assessment test was conducted using the Rapid Neurodevelopmental Assessment (RNDA) tool for 2-5 years and the Rapid Functional Assessment (RFA) tool for 5-9 years. This chapter reports on six components of the research methodology. They are each addressed in subchapters, followed by a chapter conclusion addressing the limitations of the study.

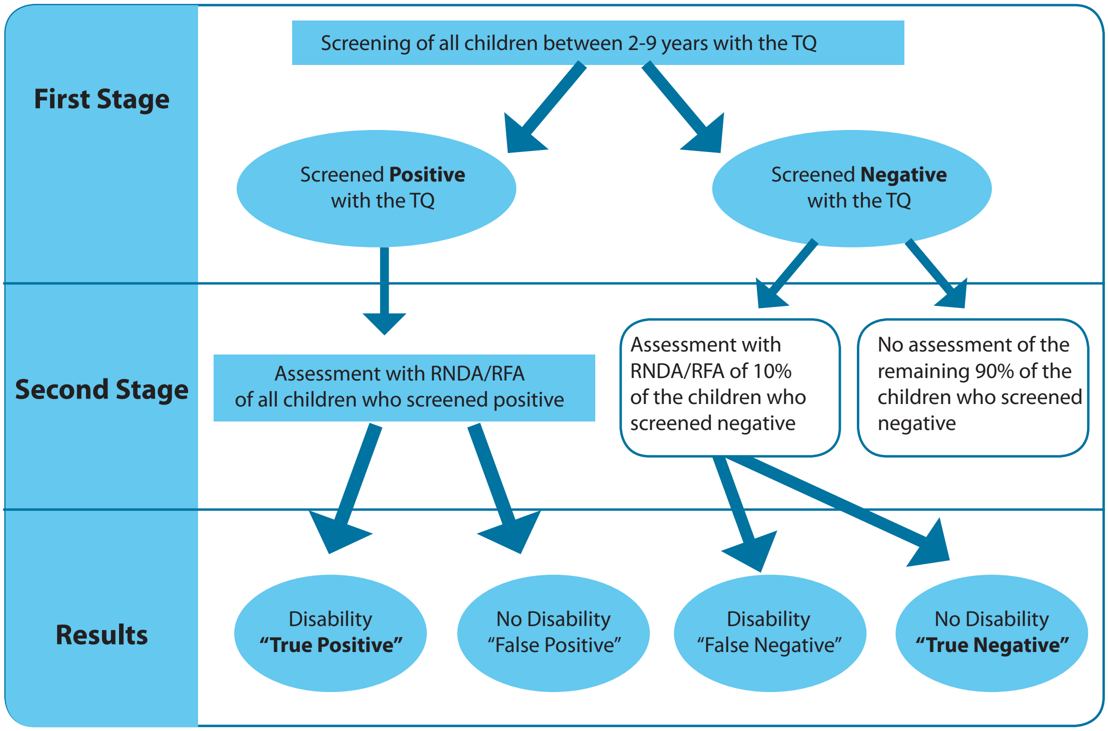
2.1 Study Design

A two-stage study designed to estimate the prevalence of childhood disability among children 2-9 years old was adopted. The study is based on an epidemiological methodology of studying certain rare disorders in countries where professional resources are limited and diagnosis is expensive.

The purpose of the TQ in the first stage is to have a relatively low-cost way of identifying children who are considered likely to have a disability. Children screened as positive by the first stage are considered to be at a higher risk of actually having disability. If only first stage results are used to determine the prevalence of disability, it will most likely be highly overestimated, because the screen is designed to capture even marginal cases.

A second stage assessment is therefore required using a rigorous and accurate assessment tool to

Fig.2.1 Diagrammatic Representation of the Two-Stage Study Design



confirm how many of the children who initially screened positive are in fact living with a disability. The second stage is more costly and labour intensive. It would generally not be feasible to apply the second stage assessment on the entire original sample; the first stage screening is a way of improving the targeting – or the efficiency – of the second stage assessment.

Acknowledging that the TQ screening in the first stage has a margin of error, it is important to ascertain its accuracy. Therefore, a selection of children who initially screened negative to any disability were included in the second stage to determine how many children, though initially screening negative, are actually living with a disability. Children not identified by the TQ screening but who are actually living with a disability are referred to as False Negatives because they were screened as negative by the first stage, but are identified as disabled in the second stage assessment.

The first stage was conducted in 2010 through the Bhutan Multiple Indicator Survey (BMIS)[12] , applying the disability module known as the Ten Questions (TQ) module. The TQ module screened all children aged 2-9 years in the BMIS household sample to identify those potentially living with a disability.

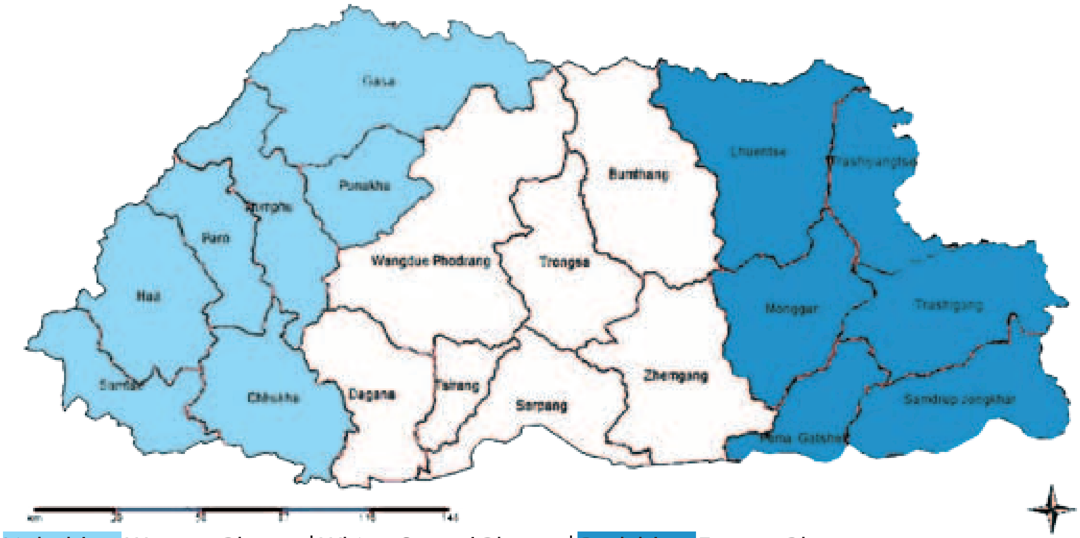
In the second stage all children screened positive using the TQ were assessed again using the RNDA or the RFA tools depending on the child's age to ascertain the child's disability status. In the second stage, 10 percent of children who screened negative in the TQ were randomly selected to also be assessed using the RNDA or RFA to account for the possibility of False Negatives in the initial TQ screening.

2.2 Sample Design

The first stage survey (BMIS 2010) used a multi-stage, stratified cluster sampling approach for the selection of the households. The sample was stratified by *Dzongkhags* (districts) across rural and urban areas. Within each stratum, a specified number of village clusters in rural areas and blocks in urban areas were selected systematically using a probability proportional to size sampling method.

After listing households within each selected

Fig.2.2 Map of Bhutan by Dzongkhag (District) and Regional Divisions.



Light blue: Western Bhutan | White: Central Bhutan | Dark blue: Eastern Bhutan

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[12] The Bhutan Multiple Indicator Survey is a Bhutan customization of the UNICEF Multiple Indicator Cluster Survey (MICS)

enumeration area, a systematic random sample of 20 households was drawn from among each of them. A total of 15,400 households were selected as the total sample size for the survey.

The second stage assessment drew its sample from the first stage BMIS 2010 survey. During the first stage a total of 11,370 children aged 2-9 years were identified in the selected households. All 11,370 children were screened using the TQ out of which 3,500 children screened positive and 7,870 screened negative. In the second stage all 3,500 children who screened positive with the TQ plus a randomly selected 10 per cent negatively screened children (787) were assessed. The total sample size for the second stage assessment thus added up to 4,287. Details regarding the sample size refer Table 2.1

1. Total number of children (2-9 years) surveyed during the BMIS 2010 = 11,370
2. Total number of children (2-9 years) screened positive in BMIS 2010 = 3,500
3. Total number of children (2-9 years) screened negative in BMIS 2010 = 7,870
4. 10 percent of children screened negative 787
5. Children to be assessed in the second stage (2) + (4) = 3500 + 787 = 4,287

Figure 2.2 shows a map of Bhutan with the location of the *Dzongkhags* (districts), where the survey took place.

Table 2.1 **Region/*Dzongkhag* Sampling Distribution for the Second Stage Divisions.**

Dzongkhag	Screened Positive in the first stage	10% of Screened Negative in the first stage	Total
Western	1,112	265	1,377
Chhukha	180	45	225
Gasa	73	7	80
Haa	108	50	158
Paro	263	25	288
Punakha	147	50	197
Samtse	217	43	260
Thimphu	124	45	169
Central	1,232	287	1,519
Bumthang	129	44	173
Dagana	186	43	229
Sarpang	101	52	153
Trongsa	220	42	262
Tsirang	138	36	174
Wangdue Phodrang	293	17	310
Zhemgang	165	53	218
Eastern	1,156	235	1,391
Lhuentse	333	21	354
Monggar	133	45	178
Pema Gatshel	87	42	129
Samdrup Jongkhar	273	38	311
Trashigang	177	47	224
Trashi Yangtse	153	42	195
Total Sample (3,500+787)	3,500	787	4,287

2.2.1 Study age group (2-9 years)

Rapid neurodevelopment occurs during the early years of a child's life in which physical, motor, cognitive, language, social, emotional and adaptive functioning skills develop at specific ages. Further, during this period, young children can also exhibit developmental disabilities or incur the onset of other conditions, which can affect functioning in various domains: gross motor, fine motor, vision, hearing, speech, cognition, behaviour and seizures. The rapid neurological and developmental growth of children in the first two years of life adds complexity and challenges to assessing their disability. For children below two years of age, it is difficult to distinguish normal variability in development from developmental disability using a tool as broad as the TQ screening[13]. For children of primary school age, the approach is generally to talk about age appropriate developmental milestones[14]. For children age 10 and older, standard questions designed to identify disability in adults are less confounded by developmental issues[15]. Furthermore, for children over nine years of age, particularly those living with intellectual disabilities, the TQ might no longer be able to detect children who have reached developmental milestones but with significant delay[16]. The TQ was developed and tested to screen children of 2-9 years only.

2.2.2 Survey Sites

The BMIS during the first stage covered all 20 *Dzongkhags* (districts) in Bhutan. The second stage study also covered all 20 *Dzongkhags*, comprising seven *Dzongkhags* from the western region, seven from the central region and six from the eastern region. The total sample of children assessed in each dzongkhag was spread across different village clusters in the rural areas and blocks in the urban areas. Children included in the second stage were brought together in local schools and health units where possible for assessment. Home visits were undertaken for the rest of the children. In the initial second stage data collection, harsh weather conditions prevented access to some areas. Furthermore, data collection was conducted during the winter vacation, meaning that some children were not available due to travel for the winter vacation. Compounding this, several assessors were school teachers who were only available during the winter vacation. Owing to these different limitations in the initial data collection in the second stage, a second 'mop-up' round of data collection was conducted in June 2011. This round focused on reaching areas where data collection had been restricted in the first round, especially in the western region. However, in the end, some far flung locations, namely Lunana under Gasa *Dzongkhag* in the north and Merak

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[13] Bone M and Meltzer H, (1988), OPCS Surveys of Disability in Great Britain, Report 3, The prevalence of disability among children, London HMSO

[14] Simpson GA, Colpe L, Greenspan S, (2003),Measuring functional developmental delay in infants and young children: prevalence rates from the NHIS-D, PaediatrPerinatEpidemiol, 2003 Jan;17(1):68-80

[15] Simeonsson, R.J., M. Leonard, D. Lollar, E. Bjorck-Akesson, J. Hollenweger, and A. Martinuzzi, (2003), Applying the International Classification of Functioning, Disability and Health (ICF) to measure childhood disability, Disability and Rehabilitation, Vol. 25, No. 11-12, 2003

[16] UNICEF and University of Wisconsin, (2008), Monitoring Child Disability in Developing Countries, Results from the Multiple Indicator Cluster Surveys

and Sakteng in Trashigang *Dzongkhag* in the east, were excluded from the second stage assessment due to their remoteness, each being three to five days walking distance, and the small sample size.

2.3 Survey Instruments

2.3.1 First Stage: The Ten Questions (TQ)

During the general BMIS household survey conducted between April – July 2010, the TQ screening was administered to mothers or primary caretakers of children aged 2-9 years. The TQ was originally developed in 1984 designed for use in resource-poor settings[17, 18]. The questions are designed in such a way that they can be applied in virtually any setting and include questions about general function abilities and development milestones rather than culture-specific skills, e.g. eating with a fork or tying shoelaces.

The purpose of administrating the TQ was to obtain responses on children in relation to their;

- *functional difficulties* e.g. seeing, hearing, muscle movement, language production and reception, etc.,
- *health conditions* e.g. epilepsy, and
- *activity limitations* e.g. difficulties doing activities required or desired for everyday living, e.g. walking and learning[19].

Table 2.2 below presents the questions comprising the TQ.

Table 2.2 **The Ten Questions (TQ) used for First Stage Screening**

Sl. No.	The Questions
1	Compared with other children, does or did (Name) have any serious delay in sitting, standing, or walking
2	Compared with other children, does (*Name*) have difficulty seeing, either in the daytime or at night?
3	Does (*Name*) appear to have difficulty hearing? (uses hearing aid, hears with difficulty, completely deaf?)
4	When you tell (*Name*) to do something, does he/she seem to understand what you are saying?
5	Does (*Name*) have difficulty in walking or moving his/her arms or does he/she have weakness and/or stiffness in the arms or legs?
6	Does (*Name*) sometimes have fits, become rigid, or lose consciousness?
7	Does (*Name*) learn to do things like other children his/her age?
8	Does (*Name*) speak at all (can he/she make him or herself understood in words; can say any recognizable words)?
9.a	(For 3-9 year olds): Is (*Name*)'s speech in any way different from normal (not clear enough to be understood by people other than the immediate family)?
9.b	(For 2-year-olds): Can *(Name)* name at least one object (for example, an animal, a toy, a cup, a spoon)?
10	Compared with other children of the same age, does (*Name*) appear in any way mentally backward, dull or slow?

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[17] Thorburn M, Desai P, Paul T, Malcolm L, Durkin MS, Davidson LL., (1992),Identification of childhood disability in Jamaica: the ten question screen, International Journal of Rehabilitation Research 1992;15:115-127

[18] Durkin MS., (1991),Population-based studies of childhood disability in developing countries: Rationale and Study Design, International Journal of Mental Health 1991, 20 (2):47-60

[19] Loaiza, E. andCappa, C., (2005),Measuring Children's Disability via Household Surveys: The MICSExperience, UNICEF, 3 UN Plaza, New York

If the mother or primary caretaker responding to the TQ reports a problem in either one or more of the questions, the result is considered positive, meaning that the child is considered likely to live with a disability. While the TQ can specify in which area a child is not functioning according to his age,e.g. functional or activity limitations, it however cannot tell us whether the disability is mild, moderate or severe.

The advantage of the TQ is that the screening is considered very sensitive to severe forms of disability. In other words, the TQ is likely to screen positive and it is especially likely to identify children with severe disabilities, as the caretakers more easily detect those disabilities. However, previous studies have also shown that the TQ has a low predictive value overall[20]. Children who have been screened positive with the TQ might reveal during further evaluation not to have a disability or to have a mild disability or temporary health conditions. For these reasons, the TQ is best used not as an assessment tool, but rather as a screening instrument.

Two summary measures are typically used to assess the validity or efficiency of a diagnostic tool, in this case the TQ screening. The first is "sensitivity" and the second is "specificity". Sensitivity refers to how well the TQ screening identifies children who are actually living with a disability. Sensitivity is therefore concerned with finding the True Positives, being the children who really *are* living with a disability, versus the False Positives, being children who are screened as having a disability but actually are *not* living with a disability.

Specificity refers to how well the TQ screening correctly recognizes those children who are not living with a disability. Specificity is therefore concerned with finding the True Negatives, being children who really are *not* living with a disability, versus the False Negatives, being children who were screened as *not* having a disability but actually *are* living with a disability. The method for assessing sensitivity and specificity is described in Table 2.3.

Table 2.3 Sensitivity and Specificity

First Stage: TQ	**Second Stage: RNDA and RFA**	
	Disabled	***Not Disabled***
Positive ➔ **Negative ➔**	True Positives False Negatives	False Positives True Negatives
	All Disabled = True Positives + False Negatives	*All Non-Disabled = False Positives + True Negatives*
	Sensitivity = $\frac{\text{True Positives}}{\text{All Disabled}}$	**Specificity =** $\frac{\text{True Negatives}}{\text{All Non-Disabled}}$

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[20] Zaman S, Khan NZ, Islam S, Banu S, Dixit S, Shrout P, et al., (1990),Validity of the 'Ten Questions' for Screening Serious Childhood Disability: Results from Urban Bangladesh,International Journal of Epidemiology 1990;19(3):613, 617

Sensitivity is the ratio of True Positives to the total number of disabled children:

$$\textbf{Sensitivity} = \frac{\textbf{True positives}}{\textbf{True positives + False negatives}}$$

If sensitivity equals 1, then the first stage has been successful in identifying all disabled children. If it equals 0.5, then it was only successful in identifying half of the disabled children.

Specificity is the ratio of True Negatives to the total number of non-disabled children:

$$\textbf{Specificity} = \frac{\textbf{True negatives}}{\textbf{True negatives + False positives}}$$

If specificity equals 1, then the first stage is successful in excluding all the non-disabled children from moving to the second stage. If it equals 0.5, then it was only successful in excluding half of the non-disabled children.

Both sensitivity and specificity measures are important. The goal is to have a procedure that can exclude as many non-disabled children from undergoing second stage assessments as possible, without excluding too many of the truly disabled children. There is necessarily a trade-off between sensitivity and specificity. The more stringent you are in attempting to cut down on False Positives, the more False Negatives you will typically generate. That is, by having a higher threshold in the screening process to exclude more children who are not disabled, children who are disabled – but may be near the borderline – will also be excluded.

Sensitivity and specificity measures for previous disability studies using the two-stage methodology with the TQ instrument are reported in Annex C. In surveys conducted regarding prevalence of serious child disabilities in Pakistan and Bangladesh[21], sensitivity was about 0.85 and specificity was about 0.90, which is very good. It means that 85 percent of the children living with a serious disability were identified by the first stage, and 90 percent of the non-disabled children were excluded. In Jamaica the results were less good. Although specificity was about the same at 0.85, sensitivity was only 0.56. That means that only 56 percent of the seriously disabled children were identified by the first stage screening in Jamaica. However, this is still much better than what would be achieved through random testing. In Jamaica, about two percent of the children had serious disabilities[22]. So if the TQ-screening was ineffective, it would have had a sensitivity of only 0.02. Therefore, in the case of Jamaica, less of the more expensive second stage assessments had to be administered to get good coverage of children living with a serious disability.

It should be noted that sensitivity and specificity refer to the first stage instrument – that is, how good the TQ is at identifying disabled children and excluding those without disabilities.

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[21] Durkin MS, Davidson LL, Desai Hasan ZM, Khan N, Thorburn MJ, Shrout PE, Wang W, *Validity of the Ten Questions Screen for Childhood Disability: Results from Population-Based Studies in Bangladesh, Jamaica, and Pakistan*, Epidemiology, 1994;5:287. Please note in article the prevalence are defined per 1,000 children.

[22] For details refer to table 2.11a.

Sensitivity and specificity don't determine the quality of the second stage, which is assumed to be a rigorous assessment yielding accurate results in identifying disabilities. Sensitivity and specificity refer to how efficiently you can employ the second stage by using the first stage as a screen.

Another way of measuring a screening test's efficacy is by looking at the positive and negative predictive values. The positive predictive value is a measure of the precision of the screening tool. It is simply the ratio of the number of true positives to all the children positively identified, that is, true positives divided by true positives plus false positives. In other words, the percentage of the children identified as disabled by the screening instrument that were truly disabled. The negative predictive value is the flip side of this. It is the percentage of children identified as not disabled by the screening instrument who were really not disabled.

2.3.2 Second Stage: the Rapid Neurodevelopmental Assessment (RNDA) and the Rapid Functional Assessment (RFA)

Two neurological assessment tools were used depending on the age of the child being assessed: the Rapid Neurodevelopmental Assessment (RNDA) tool, which is used to assess the younger age group 2 – 5 years[23]; and the Rapid Functional Assessment (RFA) tool, which is used to assess the older age group 5 – 9 years.

The RNDA is a structured tool that can be adapted for either infants and toddlers upto 24 months, or for young children aged 2 - 5 years. The reliability and the validity of this comprehensive assessment procedure for ascertaining neurodevelopmental status of children aged upto 24 months were tested in epidemiological surveys in Bangladesh[24]. The study has shown that young children can be assessed for functional limitations by using the structured, reliable and valid RNDA tool. In countries where medical professional expertise is lacking this may provide a cost effective assessment tool for identifying disabilities.

The RNDA tool was developed to determine the functional status in the following domains: primitive reflexes, gross motor, fine motor, vision, hearing, speech, cognition, behaviour, and seizures. In this particular study, the primitive reflexes were excluded from the tool and only the other eight functional domains were used. Acknowledging that 'seizures' is not a functional domain, it is still included as it is often is present with functional comorbidities.

Each functional domain is tested using age-appropriate indicators of functionality, called items. For example a 26 month old child would be tested for the following items under gross motor domain*: runs, kicks a ball, climbs stairs holding rail, etc*. See Annex G for RNDA and RFA Assessment forms.

Children are normally expected to perform these functions under each domain at the average or upper limit of their ages. The successful

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[23] The RNDA tool is applicable to children aged 24 months to 60 months. This study included only 4 children aged 24 months. Due to the small number the data regarding these children were excluded from the data analysis.

[24] (2010), *Validation of Rapid Neurodevelopmental Assessment instrument for Under-Two-year old Children in Bangladesh*; Pediatrics, volume 125, Number 4, April 2010

performance of these functions is considered to be age-appropriate and developmentally on track whereas non-performance of the functions is considered to be developmentally delayed. The study in Bhutan was for children 2 – 9 years old, therefore the RNDA tool for children upto 24 months was not used.

The Rapid Functional Assessment (RFA) for children aged 5-9 years uses a descriptive method to determine whether a child is 'able' or 'not able' to perform certain tests under the same functional domains as the RNDA. For the RFA, the cognition domain is expanded to also include measures of 'self-care', which are assessed in the RFA.

In total the second stage assessment therefore used two sets of assessment tools for two different age groups of children.

1. Rapid Neurodevelopmental Assessment (RNDA) for children 2 – 5 years
2. Rapid Functional Assessment (RFA) for children 5 - 9 years

Structured questionnaires were developed for the covered age range of 2-9 years. The Table 2.4 presents the assessment forms for different age groups for each assessment A, B & C.

Bangladesh Protibondhi Foundation (BPF) provided the survey instruments and associated instruction manuals. These instructions were combined with detailed guidelines on how to apply the second stage assessment. A manual was developed in Bhutan containing guidelines on filling out the structured questionnaire as well as on organizing and conducting the assessment in the Bhutanese context. The training manual covered developing field standards and protocols, conducting revisits and referrals, providing positive parenting advice and delineating responsibilities of different actors involved in the study such as field supervisors, coordinators, assessors and technical support.

Table 2.4 **Assessment Category, Age Group and Corresponding Forms for each Age Group**

Assessment	Age group	Number of Assessment forms
Assessment A[25]	24 months	One Form
Assessment B	25-60 months	Five forms one each for the following age groups: 25 to less than 30 months, 30 to less than 36 months, 36 to less than 42 months, 42 to less than 48 months, 48 to 60 months.
Assessment C	5-9 years	One Form

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[25] The RNDA tool is applicable to children aged 24 months to 60 months. This study included only 4 children aged 24 months. Due to the small number the data regarding these children were excluded from the data analysis.

2.3.3 Grading of disability in RNDA and RFA

This study applies two different methods of grading disability for two separate age groups:

- The RNDA grading of disability for children aged 2 – 5 years uses the RNDA adapted generic ICF qualifier (International Clarification of Functioning, Disability and Health)[26] as a reference to categorize the degree of difficulty, and requires a number of calculations
- The RFA for age group 5-9 years uses a descriptive method, which defines the categorization of the disability based on a description of the findings.

The RNDA Assessment

As mentioned in chapter 2.3.2, the RNDA assessment of 2 – 5 years old consists of eight domains each with different age appropriate items testing the child's functioning skills. The number of items varies across the different domains and according to the child's age, as shown in Table 2.5 below.

Grades are then given according to the child's successful performance or non-performance for each item or function. The successful performance of all items under each domain is recorded as 'normal' and graded '0', whereas a decreasing level of performance in the items is recorded either as 'mild' with a grading of '0.5', 'moderate' with grading of '1', or 'severe' with grading of '2'.

After the assessment is completed, scores are added up to show the total score for each domain. This figure is then divided by the maximum score in the same domain, resulting in a percentage expressing the degree of difficulty in functioning for the respective domain. The maximum score is the score a child would have if they had severe difficulties in every category

Table 2.5 Number of items under each Domain in RNDA for 2-5 years

Domain		Number of items under each domain according to the age specific assessment forms used in the study					
		2 years	2-5 years				
		24 months	25 - 30 Months	30 - 36 Months	36 - 42 Months	42 - 48 Months	48 - 60 Months
1	Gross Motor	3	3	2	2	3	4
2	Fine Motor	3	4	4	4	4	4
3	Vision	2	2	2	1	1	1
4	Hearing	2	1	1	1	1	1
5	Speech	1	1	1	1	1	1
6	Cognition	8	7	7	6	6	6
7	Behaviour	6	7	7	7	7	7
8	Seizures	1	1	1	1	1	1

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[26] First created in 1980, the ICF (International Clarification of Functioning, Disability and Health) is a unifying framework for classifying the health components of functioning and disability. In 2001 the ICF was approved by the World Health Assembly and now constitutes a core classification of the WHO International Clarifications

Table 2.6 Number of items and corresponding maximum score for a particular Domain in RNDA

Number of items and corresponding maximum score								
Number of items	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Maximum score	2	4	6	8	10	12	14	16

within the domain, or simply two times the number of categories, as shown in Table 2.6.

Using the RNDA adapted generic ICF qualifier reference table below, the percentage obtained in each domain is classified as having 'No Difficulty' if the percentage falls between 0-5 percent, 'Mild Difficulty' if the percentage falls between 5-25 percent, 'Moderate Difficulty' if the percentage falls between 25-50 percent and 'Severe Difficulty', if the percentage obtained falls greater than 50 percent .

For example, a 26 months old child is expected to successfully perform three items under the 'gross motor' domain. If the child's performance is 'severe' in the first item, 'mild' in the second item and 'moderate' in the third item, performance in each item is graded as 2, 0.5 and 1 respectively, which are subsequently added up to arrive to the total score.

The grades for the three items in the above mentioned example are added at the total score of 3.5 (i.e. 2+0.5+1). This figure is then divided by the maximum score of 6, which the three items can have for the 'gross motor' domain. The result is expressed in percentage as per Table 2.7, thus defining the degree of the disability. Following this reasoning, the formula is 3.5/6*100 which equals 58 percent, meaning that the child has severe difficulties in the 'gross motor' domain as per Table 2.7.

The RFA Assessment

The Rapid Functional Assessment (RFA) for 5-9 years also tests functioning skills across eight domains as in RNDA, however an additional domain namely 'self care' is included to obtain information about activities of daily living such as dressing, feeding, washing, etc. The eight domains and specific items under each domain are shown in Table 2.8.

Table 2.7 RNDA 2-5 years Severity Rating adapted from the ICF

Severity	Severity rating used in RNDA (%): Adapted from ICF
No difficulty	< 5
Mild difficulty	5 - 25
Moderate difficulty, (whereby moderate difficulty is defined as up to half the scale of complete difficulty)	25 - 50
Severe Difficulty	> 50

In the RFA the performance or the non-performance of the specific items under each domain was recorded as 'able or not able'. Afterwards the items (e.g. all eight items in the domain 'fine motor') were evaluated collectively and graded. It means that the grades of severity of the difficulties, whether 'mild, moderate, and severe' were assigned for the overall domain. For this purpose, the severity rating reference chart as shown in Table 2.9 was used, based on the ability of the children to perform specific tests under each domain. Unlike the RNDA assessment, the RFA assessment depends on the discretion of the assessors hence corresponding grading of disability might sometimes appear subjective.

Table 2.8 Number of Items under each Domain in RFA 5-9 years

	Domain	Number of items under each domain (5 - 9 years)
1	Gross Motor	2
2	Fine Motor	8
3	Vision	1
4	Hearing	1
5	Speech	6
6	Cognition + Self-care	17+10
7	Behaviour	8
8	Seizures	1

2.4 Data Collection Procedures

2.4.1 Training of surveyors and supervisors

Surveyors and supervisors for the second stage assessment were trained in a three level cascading model. In August 2010, the first group of seven Bhutanese received a two-week training in Bangladesh on how to conduct RNDA and RFA; they were recruited among health, educational and statistical professionals. They became the core team, which subsequently trained the supervisors and surveyors/assessors. The core team's training covered basic neurological development and hands-on experience in using the assessment tools, including determining grades of disability with the RNDA and RFA tools.

As the second level the core team of trainers subsequently trained 30 professionals to become the supervisors. The trainees included paediatricians, ophthalmologists, senior physiotherapists and special educators.

During the third level of training, the core team and the supervisors trained 90 surveyors/assessors, mostly primary school teachers, physiotherapists and eye technicians. Core team members assisted by the supervisors conducted the training in the three regions of Bhutan; Central, Western and Eastern. The training included hands-on work with children aided by manuals, guidelines, video aid assessments, practical demonstrations, case presentations,

Table 2.9 RFA Severity Reference Chart for 5-9 years

Domain		Mild	Moderate	Severe
1	**Gross motor**	• Can walk but needs help in climbing steps • Can walk and climb steps independently but unsteadily.	• Can walk with help	• Unable to walk even with substantial help.
2	**Fine motor**	• Weak grasp, can use hands most purposes	• Difficulty in holding implements, dressing	• No functional use of hands except to point
3	**Hearing**	• Difficulty with normal speech (Lowest dB heard 25-40 dB)	• Difficulty with loud normal speech (Lowest dB heard 40-60 dB)	• Difficulty with shouted speech, can understand amplified speech (Lowest dB heard 60-90 dB)
4	**Vision**	• Can see non reflected object of 1.5 cm. (e.g. smartie)	• Can see non reflected object o >1.5 cm. (e.g. one inch cube)	• Perceives bright light or reflecting object.
5	**Speech**	• Speaks • is understood, but can get across only basic ideas	• Understood with difficulty, gets only basic needs across	• Either no speech, or cannot be understood by others
6	**Cognition + (Self-care)**	• Slow in cognition • no accompanying motor, • nospeech deficit. • age appropriate adaptive behaviour (activities of daily living), • no delay in attaining developmental milestones	• Slow in cognition with difficulty in speech or • slight difficulty in adaptive behaviour (activities of daily living) or • delay in attaining developmental milestones	• Poor in cognition with difficulty in speech or • poor adaptive behaviour (activities of daily living) or • delay in attaining developmental milestones
7	**Behaviour**	• No more than minor limitation in present social (family, peer group) or occupational (usually school) functioning	• Symptoms or functional limitations between 'mild' and 'severe' are present	• Symptoms result in marked limitations in social (family) peer group or occupational (usually school) functioning
8	**Seizure**	• More than one unprovoked seizure in the past year but not in the past month	• More than one unprovoked seizure in the past month	• More than one unprovoked seizure in the past week

role-playing and evaluations. Training for the supervisors at the second level and for the assessors at the third level each lasted eight days.

2.4.2 Field Assessment and Procedures for the Second Stage

In the second stage of the assessment, two rounds were conducted to complete the study in the field. The first round lasted from 12 January to 14 February 2011 and was carried out in all the three regions and twenty *Dzongkhags*. To also assess the children who were not covered in this first round, an additional round lasting 10 days was conducted from 30 May to 8 June 2011 in the *Dzongkhags* of Chhukha, Gasa, Haa, Paro, Punakha, Thimphu and Wangdue Phodrang.

Altogether 40 teams, each team comprising of a supervisor and two assessors, one health worker and a teacher were deployed. Depending on the number of children to be assessed in each dzongkhag between two and four teams were dispatched. Supervision took place at three levels; national, district and field level. On the national and district levels Ministry of Education officials and UNICEF staff conducted the supervision. In the field, trained supervisors conducted the supervision.

The National Statistics Bureau (NSB) provided a list of all the children to be assessed in each area containing all the necessary information of the child, their sex, name, and name of household head. The *Dzongkhag* Statistical Officers (DSOs) and local leaders identified the child in question and the child would come to the nearest health centre or school for the assessment, accompanied by an adult. The DSOs provided the child's identifying information and filled out the relevant part of the disability assessment questionnaire accordingly before handing it to the supervisors and the team. The separation of duties between providing the baseline information and the assessment rating was established to prevent a bias by the surveyors before the assessment.

Before the assessors would start the actual assessment, the child's chronological age, measured in months on that particular day, would be carefully determined, since the assessment concerns the child developmental stage and thus is age-dependent. The chronological age was determined based on the child's health card whereby important factors, such as if the child was born premature, were taken into account. After determining the chronological age in months, the assessment began, either by selecting an age specific RNDA assessment form, if the child was between 2-5 years old, or by using the RFA assessment if the child was 5-9 years old. Anthropometric measurement of the child was undertaken if the child was 2-5 years.

After completing the assessment a summary sheet containing two columns to record the nature and severity of the child's disability was completed. Again, if the child was between 2-5 years old, an item wise grading sheet was completed to record the corresponding delay in specific items under each functional domain.

In addition to the assessment, parents/caregivers accompanying the children were given positive parenting tips and referral advice depending on the severity of their children's difficulties. Although most assessments took place at health centres and schools, others were carried out at the child's own home.

To protect the confidentiality of the obtained information and the interest of the sample group under study, certain ethical considerations were taken into account. Since this study involved children aged 2-9 years, seeking consent from their parents/caregivers was considered the most important. Thus, before the child was assessed, parents/caregivers were introduced to the study and informed about the overall purpose.

2.4.3 Response Rate

During the assessment, the assessors would make a maximum of three attempts to assess the child. If they were not able to successfully complete the assessment during these attempts the child would be considered a non-respondent. Despite the assessors' best efforts only 3,491 children out of 4,287 could be assessed resulting in 81 percent coverage.

The main reason for non-response was the families' movement for vacation, pilgrimage and to warmer places since the field assessment took place in the winter. The period between the first stage and the second stage of the survey was over six months. Owing to this long time gap seven percent of children were found to be over-aged. In addition, the information regarding the household was at times found to be no longer valid due to the long time gap between the first and second stage of the survey.

Other reasons for non-response included refusal by the mother or care taker, and sometimes even the child refused an assessment despite an environment conducive for the tests. Partial completion included cases where children stopped cooperating after conducting few tests. Some assessments could not be completed due to the fact that some children lived in remote parts of the country and were not accessible due to harsh weather conditions during the time of the assessment. The details are reflected in Table 2.10.

2.4.4 Sensitivity and Specificity

As noted earlier, previous uses of this two-stage procedure have yielded good measures of sensitivity and specificity in Bangladesh, Pakistan and Jamaica. In Pakistan and Bangladesh, about 85-87 percent of seriously disabled children were identified by this procedure, although the

Table 2.10 Status of the Field Assessment

Category	Number	Percent %
Completed Assessment	3,491	81.0
Child moved/not found	372	8.7
Child over aged	280	6.5
Child not at home	59	1.4
Child uncooperative	32	0.7
Not enumerated	20	0.5
Mother/caretaker refused	19	0.4
Partly completed	10	0.1
Partially completed due to identified impairment	2	<0.1
Child has died	2	<0.1
Total	**4,287**	**100**

sensitivity for Jamaica was somewhat lower at 56 percent. The percentage of actual negatives that were identified was around 90 percent for all three countries, as shown in Table 2.11.a below. In comparison, the validity measures for Bhutan were not good as shown in Table 2.11.b

The sensitivity, indicating percentage of actual positives for moderate or severe disabilities identified by the TQ in Bhutan, was 56 percent thus equal to Jamaica but significantly lower than in Bangladesh and Pakistan. The specificity in Bhutan, the percentage of actual negatives for moderate or severe disabilities identified by the TQ-screening, was 69 percent, thus significantly lower than in Jamaica, Bangladesh and Pakistan. The calculation of these measures took into account the fact that only 10 percent of the first stage negatives were assessed, so a weighting scheme was required (see Annex A).

The lower degree of validity is concerning. As will be reported in Chapter 3, the two-stage procedure in Bhutan revealed that the

Table 2.11a Sensitivity and Specificity of the Two-Stage Procedure in Bangladesh, Jamaica and Pakistan for Serious Non-sensory Disability among Children 2-9 years old

	Bangladesh			Jamaica			Pakistan		
	Value	95% Confidence Interval		Value	95% Confidence Interval		Value	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Serious nonsensory disability[27]									
Sensitivity	**0.87**	0.52	1.0	**0.56**	0.23	0.88	**0.85**	0.63	1.0
Specificity	**0.93**	0.92	0.94	**0.85**	0.84	0.87	**0.88**	0.87	0.88
Positive predictive value	**0.09**	0.07	0.11	**0.07**	0.05	0.09	**0.18**	0.15	0.21
Negative predictive value	**1.0**			**0.99**	0.98	1.0	**0.99**	0.98	1.0
Prevalence (per 1,000)	**8.1**	5.43	10.77	**19.79**	9.51	30.07	**30.97**	24.24	37.70

Table 2.11b Sensitivity and Specificity of the Two-Stage Procedure in Bhutan

	Any Disability	Mild Disability	Moderate or Severe Disability
Sensitivity	0.32	0.31	0.56
Specificity	0.69	0.70	0.69
Positive Predictive Value	0.23	0.19	0.02
Negative Predictive Value	0.78	0.81	0.99

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[27] Includes all cases with serious cognitive, motor, vision, hearing or seizure disabilities

prevalence rate for any disability in Bhutan is about 21 percent, while the prevalence rate for moderate or severe disabilities is around three percent in Bhutan. Therefore, the TQ screening with a sensitivity of 0.32 for any disability is doing about 50 percent better than random testing would. However, the two-stage procedure reveals that the TQ-sensitivity is 0.56 for moderate or severe disabilities, which is much higher than the prevalence rate of around three percent, and as mentioned above similar to Jamaica. The TQ is actually picking up more than half of the moderate or severe disabilities, which are fairly rare events.

Table 2.11.b combines children with moderate and severe disabilities into one category instead of separate categories. The reasons as explained further in Chapter 3 are twofold. Firstly the number of children with severe disabilities is very small so it makes the precision of any estimates fairly low. Secondly, the statistical tests show that the relationship between various socio-economic factors and moderate disabilities is statistically the same as the relationship between those factors and severe disabilities. However, the relationship of those factors with mild disabilities is statistically different, and warrants investigation.

As stated earlier, the purpose of the two-stage procedure is minimizing the cost of determining a low probability event. The purpose of the first stage is to screen all children to identify the children with potentially a disability. Thereafter, one performs a more extensive, rigorous second stage assessment on the children who were screened positive, and thus not only ensuring a valid and thorough assessment but also at a low cost. To achieve this, it is important that the first stage is administered properly with well-trained interviewers. The BMIS-interviewers received extensive training, therefore it is unclear what introduced the greater source of error than expected, causing a relatively low sensitivity of the screening as presented in Table 2.11.b.

The reasons for the lower validity levels compared to previous usage of this methodology could be;the time lag between the two stages, cultural differences in the willingness and ability of caretakers to identify functional difficulties, or other factors.

One way to examine potential sources of error is by comparing the attributes of the True Positives from the first stage with the False Negatives of the second stage. In other words, are there consistent major differences between those children identified as disabled in the first stage and confirmed as such in the second stage, compared to those children from the 10 percent randomly chosen who were not identified as disabled in the first stage but were actually found to have a disability during the second stage? The comparison between these two groups is shown in Table 2.12. As these are raw un-weighted percentages it is difficult to make precise comparisons, but there do not appear to be any major differences.

All the children in Table 2.12 have a disability; the table presents those children that are 'True Positive' and as such identified by the TQ in the first stage, and those children living with a disability who were not identified in the first stage and thus are called 'False Negative'.

By comparing the True Positives with the False Negatives it can help us determine whether

Table 2.12 Comparisons of True Positives and False Negatives Demographic Profile from First Stage

	True Positive		False Negative	
	Number	Percent %	Number	Percent %
Sex				
Boy	324	51	59	44
Girl	306	49	75	56
Residence				
Rural	538	85	119	89
Urban	92	15	15	11
Mother's Education				
None	510	81	115	86
Primary	64	10	12	9
Secondary	56	9	7	5
Wealth Quintile				
Poorest	204	32	32	24
Second	143	23	45	34
Middle	127	20	32	24
Fourth	106	17	14	10
Richest	50	8	11	8

there appears some kind of error in the two-stage procedure. As an example, in relation to disabled children from the 'second poorest' demographic category the Table 2.12 shows the percentage of True Positives as 23 percent, while the percentage of False Negatives is 34 percent in this category. In comparison, the number of True Positives from 'richest' category represented eight percent of all True Positives, and the percentage of False Negatives in the same category also represented eight percent of all False Negatives. The last example doesn't reveal any systematic error in the two-stage procedure when it concerned this specific demographic category.

The only possibly interesting difference between the two groups is that the disabled boys were more likely to be picked up by the first stage than were disabled girls. This result is not unusual. In fact most studies find that boys are more likely to be disabled, the same is also found in OECD member countries[28]. It shows that boys are more likely than girls to be identified as disabled by their parents and schools. The reasons are not clear, but hypotheses include that more attention is paid to boys' development and also that when boys have behavioural or cognitive difficulties they are more likely to act out and thus get noticed.

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[28] Organisation for Economic Co-operation and Development (OECD)

There is not much difference between type of residential area or mother's education. In terms of wealth, the most common quintile for the True Positives is the lowest, while for the False Negatives it is the second lowest. Still about the same percentage are below the median, thus no major pattern stands out.

Another way to compare these children is by the nature of their disabilities, but in this case comparisons of the functional domains in which the difficulties arise, as reflected in Table 2.13, don't show any glaring differences either. Cognitive difficulties predominate for both groups followed by equal rates of behavioural and fine motor skills. However, some difference emerges in the area of severity, as reflected in the subsequent Table 2.14.

As shown in Table 2.14, children with only mild difficulties are more prevalent among the False Negatives (90%) than the True Positives (82%), which can be expected. Given the relatively low rate of severe and moderate difficulties compared to mild difficulties, the gap between 82 percent and 90 percent does suggest that the first stage is doing a better job of identifying the moderate or severely disabled children. The rate of moderate and severe disability among the True Positives is nearly double that of the False Negatives, with 18 percent for the True Positives compared to 10 percent for False Negatives.

However, it will be important to test this procedure more extensively to figure out how to implement it more efficiently in the future to take full advantage of the potential benefits of the two-stage design.

2.5 Data Processing and Analysis

The data entry application was designed using CSPro version 3.2 software. Double data entry was done under close supervision by NSB programmers, and any data validation and cleaning took place in several stages. Out of the total 3,491 children successfully assessed, the data of only 3,487 children were analyzed. All the assessments of the 24 months old, only four

Table 2.13 **Comparisons of Disability by Domain of True Positives and False Negatives from First Stage**

Domain	True positive		False negative	
	Number	Percent %	Number	Percent %
Gross Motor	75	12	11	8
Fine Motor	165	26	34	25
Vision	16	3	0	0
Hearing	34	5	1	1
Speech	90	14	12	9
Cognition	432	69	96	72
Behaviour	163	26	35	26
Seizures	48	8	4	3

Table 2.14 Comparisons of Disability by Levelof True Positives and False Negatives from First Stage

Level of disability	True positive		False negative	
	Number	Percent %	Number	Percent %
Mild	517	82	120	90
Moderate or Severe	113	18	14	10

children, were dropped from the analysis due to the extremely limited numbers.

Initial data analysis was done using SPSS under the guidance of the technical experts from the Bangladesh Protibondhi Foundation (BPF). For this initial analysis, 95 percent confidence intervals were included to estimate prevalence rates and odds ratios. By including such confidence intervals it provides the users a sense of the precision regarding the study estimates and also enables a comparison between different sub-populations. The initial analysis was replicated and extended by an international consultant using STATA. Minor corrections were made to the weighting procedures of some tables. This report presents prevalence rates and related statistics that are weighted to reflect the two-stage design of the study (Annex A).

2.6 Limitations of the study

Measuring developmental disabilities in children is often challenging because obtaining precise data is difficult since developmental milestones change with age. In addition, disability is experienced differently according to the prevailing norms and beliefs of a particular society. Lastly the level of disability, especially regarding the participation restrictions, is influenced by a number of factors. These include environmental accessibility, availability of transportation, accessibility of public facilities, e.g. schools and health care, and the attitudes within the population.

Typically, household surveys are the only source of information on prevalence of childhood disability where information is obtained from mothers/care takers on children's level of functioning and developmental milestones. However, their responses might not be reliable to estimate the actual prevalence disability rates as they are based upon individual perceptions and beliefs. Hence, this study assigns disability grades for children 2-9 years old based on standardized assessment tools administered by trained assessors under supervision.

While the two standardized assessment tools (RNDA and RFA) are tested and fairly simple to administer, it should still be noted that by using two different tools for two different age-groups there might be a potential for systematic differences. Both tools are very useful for identifying disability among children. However the thresholds for identifying the differences in prevalence by degree of disability may possibly differ between the two age-groups, as the severity rating or grading are carried out differently for the two tools. Investigating this issue in detail requires further research on the precision of the tools and is outside the scope of this study. While acknowledging the potential for systematic differences in regard to the two age groups the results and findings are still reliable as the two tools have been carefully adapted to child development process.

The limitations of this study were recognized in the following areas;(i) the fact that the two stage disability study was conducted for the first time in Bhutan, (ii) practical constraints, and (iii) issues regarding statistical accuracy.

Lack of precedence

1. Since the study was conducted for the first time in Bhutan,the definition of disability was insufficiently determined whether it followed the social model for disability to the full extent meaning covering the functional impairments, activity limitations and participation restrictions. The technical clarifications regarding defining childhood disability, the grading of severity of disability, and the scope of the disability were a challenge.

2. Since it was the first time that such a study was conducted on the national scale, not much reference materials or technical guidelines were available for the planners or for the assessors. Therefore the survey planners and assessors came across many unforeseen problems such as identification of the households, assembling of RNDA & RFA tools, unexpected responses from families, and seasonal factors.

Practical constraints

3. Bhutan did not have sufficient medical professionals to perform the assessment. Therefore the assessors were mainly teachers who had no prior experience in assessing disability.

4. Although the assessors were well trained to conduct the RNDA and RFA in a standardized, consistent, controlled environment, assessors encountered some practical problems in the field situation. Although most assessments were conducted in a centralized location in the community like health centres, schools or community centres, many assessments had to be carried out in the children's home because some children did not turn up due to long distances from their homes to the assessment centres.

5. The time gap between the first stage and the second stage was more than six months and because of this gap, changes in the status of disability in children could have happened over time. This would also affect the sensitivity and specificity results. Moreover, many children aged out of the study age-range of 2-9 years, and thus did not qualify for the second stage assessment.

6. The field study was implemented during the winter vacation due to unavailability of teachers as assessors during the academic session. Since winter is also the time when people move on holidays, many children

(around 9%) could not be located for assessment.

7. Locating families/children and households especially in the urban centres was a challenge due to inadequate household information which was further constrained by the poor social interaction among neighbours unlike in traditional rural areas.

Statistical accuracy and validity

8. The estimated prevalence rates of disability by separate domains at *Dzongkhag* level are not reliable due to small sample size.

9. Sensitivity and specificity measures under performed compared to previous implementations of this methodology conducted in other countries.

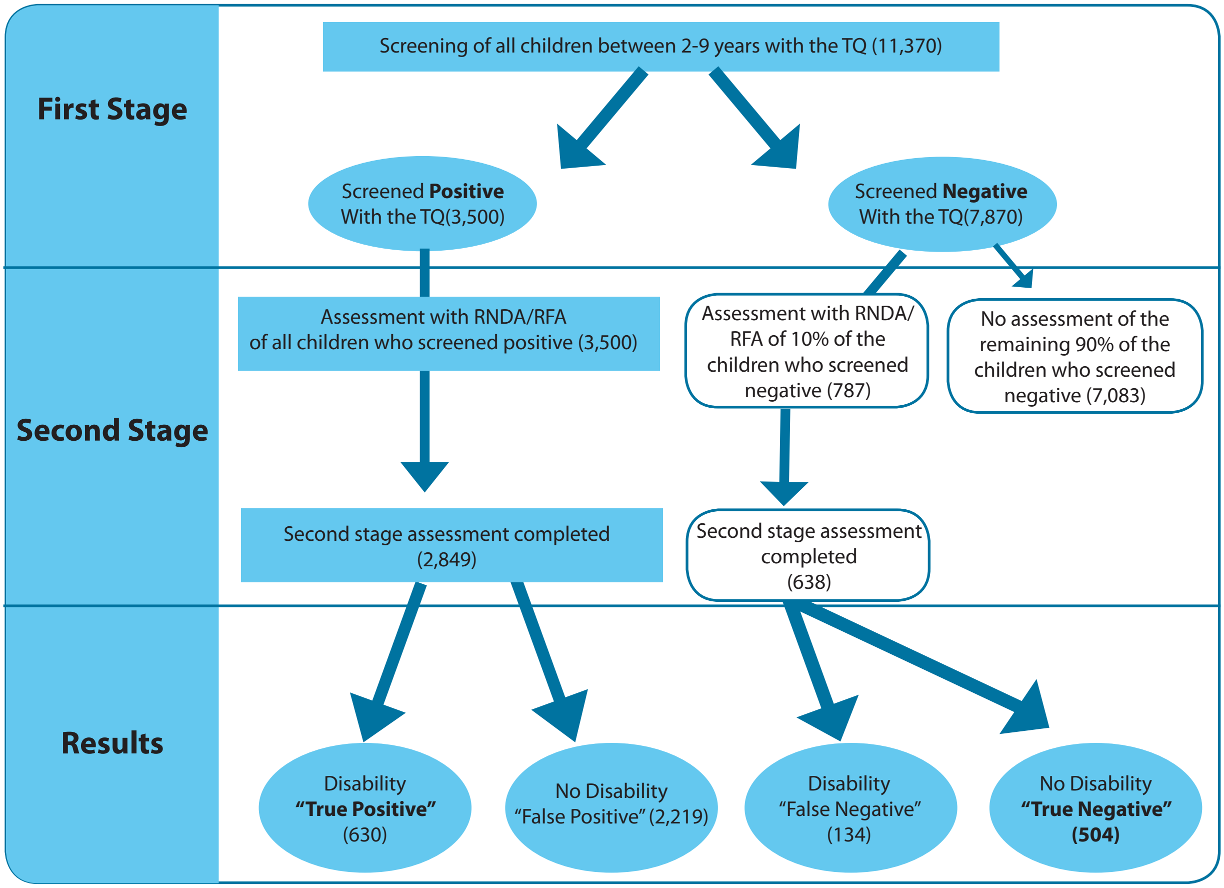
3 CHAPTER

STUDY RESULTS

This chapter presents the statistical analysis of data generated in the first and the second stage of the study. The sample size in the second stage consisted of two parts. The first part consisted of the children aged 2-9 years that were screened positive in the first stage during the BMIS 2010 using the TQ screening tool to identify those at risk of having a disability (3,500 children).The second part consisted of a 10 percent randomly selected sample of children who were screened negative (787 children) in the first stage. They make up the group of children who proceeded to the second stage assessment. Figure 3.1 shows the study representation in a diagram.

In the first stage 15,400 household were surveyed and 7,247 were found to have children of 2-9 years. With that, the total target sample in the first stage was 11,370 children between 2-9 years of age. The total target sample in the

Fig.3.1 Diagrammatic Representation of the Study Coverage



second stage assessment was 4,287 children. Of this sample, only 3,491 (81%) children were completely assessed, mostly because children moved or were too old to be included in the assessment due to the long time-gap between the first stage and second stage assessment. Table 2.10 in the previous chapter presented the detailed breakdown of the reasons for non-inclusion. From the 3,491 children who were completely assessed, the data of only 3,487 children were analyzed, because four cases of children aged 24 months were excluded based on the small number. If the child screened positive during the first stage was confirmed in the second stage, the child is a True Positive. If the second stage did not confirm the first stage result the child is instead a False Positive. The same applies for the 10 percent randomly selected children who were all screened negative in the first stage. If confirmed in the second stage they are indeed True Negatives but if they turned out to be living with disability despite initially screened negative they are False Negatives. The study results are presented in the following sections.

3.1 Study results of the first stage: Likelihood for Disability
3.2 Study results of the second stage: Prevalence of Disability
3.3 Prevalence of Disability by Functional Domain
3.4 Prevalence of Disability across Multiple Domains
3.5 Factors Associated with Disability
3.6 Summary

3.1 Study Results of the First Stage: Likelihood for Disability

During the first stage children between 2-9 years of age were screened by asking their mother or caretaker a series of questions to assess if the children were at risk of living with a disability such as sight impairment, deafness

Table 3.1 Percentages of Children 2-9 Years Old with Risk of Living with a Disability as Reported by their Mother or Caretaker According to type of Disability

Sl. No.	Ten Questions (TQ)	Total (%)
1	Delay in sitting, standing or walking	2.8
2	Difficulty seeing, either in the daytime or at night	2.0
3	Appears to have difficulty hearing	2.3
4	No understanding of instructions	3.6
5	Difficulty in walking moving, moving arms, weakness or stiffness	2.6
6	Have fits, become rigid, lose consciousness	4.2
7	Not learning to do things like other children his/her age	4.4
8	No speaking, cannot be understood in words	6.7
9a	Speech is not normal	12.7
9b	Cannot name at least one object	22.6
10	Appears mentally backward, dull, or slow	2.7
Percentage of children 2-9 years of age with at least one *reported* disability		30.4[29]

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[29] Royal Government of Bhutan – National Statistics Bureau, (2010), Bhutan Multiple Indicator Survey April 2010 – July 2010, Final Report, Chapter XI: Child Disability, Page 177

and difficulties with speech. This approach rests in the concept of functional disability developed by the WHO and aims to identify the implications of any impairment or disability for the development of the child (such as health, nutrition and education). The TQ in the survey are shown in Table 2.2 in the previous chapter. Using the TQ, Table 3.1 represents the percentage of children aged 2-9 participating in the survey who were screened positive to being at risk of living with a disability as reported by their mother or caretaker. For a complete table including demographic categorization see Annex D.

Of the 11,370 children aged 2-9 years who were screened with TQ in the first stage, 30 percent were reported to be at risk of living with a disability. Mothers or caretakers reported in three percent of the cases that the child had delay in sitting, standing or walking. Around two percent of the children had difficulty in vision and hearing while about four percent had problems in understanding instructions. As many as 23 percent of the children could not name at least one object such as a cup or a spoon followed by 13 percent of children whose speech was not normal. Around four percent of children seemed to have fits and could not do things like other children of his/her age.

3.2 Study Results of the Second Stage: Prevalence of Disability

The second stage confirms any disability among children and also grades disabilities from mild to moderate to severe, and identifies the domains in which the child is experiencing difficulty in functioning. As mentioned, RNDA data analysis was only carried out for children above 24 months of age up to and including 60 months of age. Thus from this section and onwards the age category 2-5 years is used for this group. RFA data analysis was carried out as planned on the age group 5-9 years, covering children of more than 60 months of age up to and including 9 years of age.

This section reflects the prevalence of any, mild, moderate, and severe disability as well as moderate or severe disability combined among children irrespective whether these children are living with a single disability or multiple disabilities. Section 3.3 reflects the distribution of all the disabilities across the different functional domains.

Disability is a heterogeneous characteristic so publishing a single prevalence estimate necessarily obscures the variance of functioning within the population. Moreover, most people have a preconceived notion of disability related to severe disabilities and are therefore surprised at how large the prevalence estimates of any disability, including mild disabilities are. Conversely, many may be surprised by the low prevalence estimates if confronted by a measure that only includes severe disabilities, especially if they at the same time are considering the full range of functional difficulties a child might be living with. Thus, Table 3.2 below provides prevalence rates using different thresholds for disability.

The prevalence of any disability in at least one functional domain is 21 percent. The prevalence for mild disabilities is 19 percent; for moderate disabilities two percent; while for severe disabilities only about one (0.7) percent. Unless otherwise noted, the default definition of disability used in this report considers children with any functional difficulties – even only mild ones – as living with a disability.

Table 3.2 also provides breakdowns of disability by sex and age. The prevalence rates of any disability for boys and girls are similar at 21 percent and 22 percent and thus the study shows no statistical significant gender difference. The prevalence rate of any disability for younger children aged 2-5 years is 27 percent compared to 16 percent for children aged 5-9 years, and these figures are statistically significant.

Besides showing the categories of any, mild, moderate, and severe disabilities, table 3.2 also shows a fifth category that combines moderate or severe disabilities. The two reasons for combining moderate and severe disabilities are the following. Firstly, the number of observations of children with severe disabilities is extremely small, increasing the standard error of any estimate – especially when they are disaggregated according to various characteristics. For example, if comparing the rate of severe disability against mother's education, the conclusions about differences are based on very small numbers, meaning that the variances associated with those estimates become so large as to make the results difficult to interpret. Secondly, statistical tests described later in this chapter showed no statistically significant difference in the correlations of various socio-economic characteristics between moderate and severe disabilities. However, as discussed later, the differences in the correlations of socio-economic characteristics between the category of mild disabilities compared to the category of moderate or severe disabilities are statistically significant. Therefore, in future tables only three categories will be discussed – children with any disability, only a mild disability, or having either a moderate or severe disability.

Table 3.2 Childhood Disability Prevalence by Age and Sex (%)

	Any Disability		Mild		Moderate		Severe		Moderate or Severe	
	Prevalence Rate (%)	Standard Error	Prevalence Rate (%)	Standard Error	Prevalence Rate (%)	Standard Error	Prevalence Rate (%)	Standard Error	Prevalence Rate (%)	Standard Error
All Children	21.3	1.1	18.6	1.0	2.1	0.4	0.7	0.2	2.7	0.4
By sex										
Male	20.7	1.6	18.0	1.4	1.9	0.5	0.8	0.3	2.7	0.6
Female	22.0	1.6	19.0	1.4	2.2	0.6	0.6	0.2	2.8	0.6
By age										
2-5 Years	26.8	1.7	22.7	1.4	3.2	0.7	0.9	0.3	4.1	0.7
5-9 Years	15.5	1.5	13.9	1.4	0.8	0.3	0.5	0.1	1.3	0.3

Note: The prevalence figures are rounded off to the nearest first decimal point and thus do not necessarily add up to the totals.

3.3 Prevalence of Disability by Functional Domains

Differences do exist between the prevalence rates of any disabilities by the functional domains, as can be seen in Table 3.3 below. It needs to be noted that the total number of disabilities by functional domain is more than the total number of children living with disabilities, since a child can be living either with a single or with multiple disabilities. Consequently, the following table reflects the total number of disabilities rather than the total number of children with disabilities. However, the prevalence rates of any, mild and moderate or severe disabilities reflected in the tables elsewhere in the report are based on the total number of children in the sample.

As shown in Table 3.3 above, the top three functional domain disabilities are cognition, behaviour and fine motor for all the three categories; any, mild and moderate or severe disability. The only exception is for moderate or severe disability, where the second functional domain disability is speech followed by behaviour, while fine motor is only found in the fourth place.

Table 3.3 Prevalence Rates of Disabilities by Functional Domains

	Domain	Any Disability			
		Number of disabilities	Prevalence Rate (%)	95% Confidence Interval	
				Lower	Upper
1	Gross Motor	86	2.0	1.3	2.7
2	Fine Motor	199	5.5	4.2	6.7
3	Vision	16	0.2	0.1	0.3
4	Hearing	35	0.5	0.2	0.7
5	Speech	102	2.3	1.5	3.0
6	Cognition	528	15.1	13.1	17.1
7	Behaviour	198	5.6	4.3	6.8
8	Seizures	52	1.0	0.5	1.4
	Domains	**Mild Only**			
		Number of disabilities	**Prevalence Rate (%)**	**95% Confidence Interval**	
				Lower	**Upper**
1	Gross Motor	63	1.8	1.0	2.5
2	Fine Motor	171	5.0	3.8	6.2
3	Vision	9	0.1	0.0	0.3
4	Hearing	20	0.2	0.1	0.3
5	Speech	55	1.4	0.8	2.0
6	Cognition	461	13.8	11.9	15.7
7	Behaviour	155	4.9	3.7	6.1
8	Seizures	37	0.8	0.4	1.2

Domains		Moderate or Severe			
		Number of disabilities	Prevalence Rate (%)	95% Confidence Interval	
				Lower	Upper
1	Gross Motor	23	0.2	0.1	0.4
2	Fine Motor	28	0.5	0.2	0.8
3	Vision	7	0.1	0.0	0.1
4	Hearing	15	0.3	0.0	0.5
5	Speech	47	0.9	0.5	1.3
6	Cognition	67	1.3	0.8	1.9
7	Behaviour	43	0.7	0.3	1.0
8	Seizures	15	0.2	0.1	0.2

Looking at Table 3.3 in more detail it is also possible to analyse the distribution of disabilities by functional domain for children with mild as compared to moderate or severe disabilities. Cognition is the most common functional domain that children with both mild disabilities and those with moderate or severe disabilities have. However, proportionally children with mild disabilities have more commonly a disability in cognition than those living with moderate or severe disabilities. In fact, difficulties are more evenly distributed for children with moderate or severe disabilities. One big difference is that speech problems are more represented among the moderate and severely disabled children compared to children living with mild disabilities.

The rate of cognitive difficulties is strikingly higher than the rate for other functional domains. Therefore, a logit was estimated to determine the odds ratios of various factors with respect to the presence of cognitive disability (please refer to Chapter 3.5 for further details regarding the logit model). The results in Table 3.4 show that children are more likely to have cognitive disabilities if they are less than 5 years old as the odds ratio is significantly above 1. The educational status of the mother appears to reduce the probability of cognitive disabilities in children although the reduction is surprisingly weaker among mothers with secondary education compared to mothers with only primary education. Being richer or living in either the Central or Eastern Regions also appear to reduce the probability of cognitive disabilities in children. The only statistically significant difference between these results and the logit for any disability reported in Table 3.12 is the stronger results for primary education. This, of course, says nothing about the mechanism by which mother's education reduces cognitive disabilities. In the logit, the impact of the mother's education is controlled for wealth and place of residence. It could be that education leads to better pre-natal care or better health care or more attention to developmental delays. Table 3.5 below presents the Top-3 functional domains where the prevalence rates for any disability are showing significant differences by the characteristics of age, sex and residency. Overall the domain cognition is showing statistically significant differences in relation to age and residency, while for gender there is a difference but not statistically significant. Thus, disability in cognition has the highest prevalence rate at 15.1 percent, with younger children having a higher rate at 18 percent compared to older children with a 12 percent prevalence rate. Furthermore, children in rural areas have a higher prevalence rate of 17 percent compared to eight percent among children in urban areas. The functional domains of behaviour and fine motor show statistically significant differences in relation only to age. Thus, the prevalence rate of behaviour disability is six percent with a higher rate in the younger age group at seven percent compared to four percent in the older age group. Similarly, the prevalence rate of fine motor disability is six percent with a high about 10 percent in the younger age group compared to a quite low at about one (0.7) percent in the older age group. The prevalence rates in the remaining domains for the three characteristics age, sex and residency are all less than five percent and the numbers too small for further analysis. However, these remaining domains and characteristics with corresponding prevalence rates are presented in Annex E.

Table 3.4 **Logit: Dependent Variable-Presence of Cognitive Disability for all Levels of Severity**

Cognition-All	Odds Ratio	Standard Error	z	P>|z|	95% Confidence Interval	
Boy	0.91	0.09	-0.96	0.34	0.75	1.10
Age 2-5 years	1.59	0.16	4.71	0.00	1.31	1.94
Mother's Education-Primary	0.68	0.12	-2.15	0.03	0.48	0.97
Mother's Education-Secondary	0.88	0.18	-0.60	0.55	0.59	1.32
Central Region	0.77	0.09	-2.16	0.03	0.61	0.98
Eastern Region	0.51	0.07	-5.15	0.00	0.40	0.66
Rural	1.29	0.23	1.42	0.16	0.91	1.83
Wealth Quintile 2	0.85	0.11	-1.25	0.21	0.66	1.09
Wealth-Middle	0.56	0.08	-4.13	0.00	0.42	0.74
Wealth-Quintile 4	0.49	0.09	-4.09	0.00	0.35	0.69
Wealth-Richest	0.29	0.08	-4.65	0.00	0.17	0.49
Constant	0.24	0.06	-6.03	0.00	0.15	0.39

Log likelihood = -1423.30

Number of obs = 3480

LR chi^2(11) = 116.19

Prob> chi^2 = 0.00

Pseudo R^2 = 0.04

3.4 Prevalence of Disability across Multiple Domains

The study offered the possibility to determine the prevalence of disability across multiple domains in addition to the disability in one domain. The results are presented in Table 3.6

Table 3.5 The Top-3 Statistically Significant Prevalence Rates of Any Disability by Functional Domains and Key Characteristics (%) (Age, Sex and Residency)

	Age			Sex		Residency	
	All	2-5 years	5-9 years	Boy	Girl	Rural	Urban
Cognition	15.1	18.0	11.9	13.9	16.2	16.8	8.0
Behaviour	5.6	7.2	3.8	6.4	4.9	5.7	4.9
Fine Motor	5.5	9.8	0.7	6.1	5.0	5.9	3.7

below. When looking at any disability, the table shows that the prevalence of a child living with a single disability is 14 percent compared to eight percent of a child living with multiple disabilities.

However, Table 3.7 shows that the relation inverts for children living with moderate or severe disability. Thus, children with a moderate or severe disability are actually more likely to experience multiple disabilities, while a single disability is more likely to occur among children with mild disabilities.

Table 3.6 Prevalence Rates of Children living with Single and Multiple Disabilities (%)

	Any Disability			
	Number of children	Prevalence Rate (%)	95% Confidence Interval	
			Lower	Upper
Total no.	764	21.3	19.1	23.6
Single	487	13.8	11.9	15.6
Multiple	277	7.6	6.1	9.0

Table 3.7 Prevalence Rates of Children Living with Mild and Moderate or Severe Disabilities

	Mild Only				Moderate or Severe			
	No.	Prevalence Rate (%)	95% Confidence Interval		No.	Prevalence Rate (%)	95% Confidence Interval	
			Lower	Upper			Lower	Upper
Total no.	637	18.6	16.5	20.7	127	2.7	1.9	3.6
Single	454	12.8	11.0	14.6	33	0.9	0.4	1.5
Multiple	183	5.8	4.5	7.1	94	1.8	1.2	2.4

3.5 Factors Associated with Disability

Studies show that many socio-economic and demographic characteristics are correlated with disability. Regarding any disability, Table 3.8 displays the prevalence rates across a number of the characteristics.

As stated above, there is no gender difference in disability rates, but prevalence is higher among those living in rural areas with 23 percent in the rural areas compared to 14 percent in the urban setting. Among the less educated mothers with no education the prevalence rate of any disability is 23 percent, while it is only 14 percent for secondary education. As stated earlier, the prevalence rate is also higher among younger children, 27 percent for children aged 2-5 years compared to 16 percent for children aged 5-9 years. This could have many causes such as lower survival rates of children with disabilities or interventions that lessen the extent of their

Table 3.8 Weighted Prevalence of Any Disability by Characteristics (%)

	Prevalence Rate (%)	Standard Error	95% Confidence Interval		Number of children (unweighted)
			Lower	Upper	
Bhutan	21.3	1.1	19.1	23.6	764
Sex					
Male	20.7	1.6	17.6	23.9	387
Female	22.0	1.5	19.1	24.8	377
Region					
Western	20.8	1.9	17.0	24.6	247
Central	23.3	1.8	19.7	26.9	281
Eastern	20.0	1.8	16.6	23.5	236
Residence					
Rural	23.1	1.3	20.6	25.7	657
Urban	14.1	2.0	10.1	18.1	107
Mothers Education					
None	22.8	1.3	20.2	25.3	625
Primary	18.6	3.1	12.5	24.6	76
Secondary +	13.5	2.8	8.0	19.0	63
Age					
2-5 years	26.8	1.7	23.5	30.1	502
5-9 years	15.5	1.4	12.8	18.2	262
Wealth Quintile					
Poorest	26.0	2.6	21.0	31.1	236
Second	25.6	2.2	21.3	29.9	188
Middle	21.2	2.2	17.0	25.5	159
Fourth	14.4	2.0	10.5	18.3	120
Richest	14.0	2.7	8.8	19.3	61

functional difficulties. The prevalence rate is also higher among poor children with 26 percent for the lowest quintile and 14 percent for the highest. All these differences are statistically significant.

When comparing the association of these factors between mild disabilities to the moderate or severe disabilities many similarities appear, but differences emerge as well. The similarities are firstly that there are no significant differences between gender in any of the categories and secondly that younger children in all categories are more likely to be disabled. Thirdly, the majority of disabled children are found in the poorest two quintiles. Tables 3.9 and 3.10 show these similarities in detail.

Table 3.9 Weighted Prevalence of Mild Disability by Characteristics (%)

	Prevalence Rate (%)	Standard Error	95% Confidence Interval		Number of children (unweighted)
			Lower	Upper	
Bhutan	18.6	1.1	16.5	20.7	637
Sex					
Male	18.1	1.6	15.0	21.1	319
Female	19.0	1.4	16.2	21.8	318
Region					
Western	19.3	1.9	15.6	23.1	219
Central	19.6	1.8	16.2	23.1	233
Eastern	16.5	1.7	13.2	19.8	185
Residence					
Rural	20.4	1.3	17.9	22.8	549
Urban	11.4	1.9	7.7	15.0	88
Mothers Education					
None	19.5	1.2	17.1	21.9	512
Primary	17.6	3.1	11.5	23.6	68
Secondary +	12.8	2.8	7.3	18.3	57
Age					
2-5 years	22.7	1.6	19.6	25.8	423
5-9 years	13.9	1.4	11.3	16.6	214
Wealth Quintile					
Poorest	22.9	2.5	18.0	27.8	199
Second	20.7	2.1	16.6	24.9	143
Middle	18.8	2.1	14.6	22.9	137
Fourth	12.4	1.9	8.8	16.1	105
Richest	13.2	2.7	7.9	18.4	53

Tables 3.9 and 3.10 also show some differences. One difference is that while the prevalence rate of moderate or severe disability is not statistically different by rural and urban residence, the prevalence rate for mild disabilities is significantly lower in urban areas compared to rural areas. Another difference is that the lack of mother's education seems to have a stronger connection to the prevalence of moderate or severe disabilities. There may also be a difference in regard to regions, where the prevalence rate for moderate or severe disabilities seems to be lower in the western region, while for mild disabilities there is no significant difference when comparing the different regions.

Table 3.10 Weighted Prevalence of Moderate or Severe Disability by Characteristics (%)

	Prevalence Rate (%)	Standard Error	95% Confidence Interval		Number of children (unweighted)
			Lower	Upper	
Bhutan	2.7	0.4	1.9	3.6	127
Sex					
Male	2.7	0.6	1.6	3.8	68
Female	2.8	0.6	1.6	4.0	59
Region					
Western	1.5	0.5	0.6	2.4	28
Central	3.5	0.9	1.9	5.2	48
Eastern	3.3	0.8	1.8	4.8	51
Residence					
Rural	2.8	0.5	1.9	3.7	108
Urban	2.6	1.0	0.7	4.6	19
Mothers Education					
None	3.3	0.5	2.3	4.3	113
Primary	0.7	0.3	0.2	1.2	8
Secondary +	0.5	0.2	0.1	0.9	6
Age					
2-5 years	4.1	0.7	2.6	5.5	79
5-9 years	1.3	0.3	0.7	1.8	48
Wealth Quintile					
Poorest	3.1	0.9	1.3	4.9	37
Second	4.6	1.1	2.5	6.6	45
Middle	2.4	0.8	0.8	4.0	22
Fourth	1.9	0.8	0.2	3.5	15
Richest	0.6	0.2	0.2	1.1	8

However, since region, rural/urban, mother's education and wealth are correlated with each other, the tables shown above must be viewed with caution and strong conclusions cannot be drawn based only on this evidence. It is important to identify whether the differences in prevalence between the rural versus urban areas are driven by the area of residence or by the underlying poverty rates in the different areas, or even by the trend of rural women having lower literacy rates than urban women.

To account for this, a multivariate approach was used to estimate the impact of each factor on the likelihood of disability while controlling for the other factors. That method allows us to account for the correlations between disability and all the factors simultaneously. The multivariate approach yields the estimated impact of a particular factor independent of the others. The results of this approach will be further discussed in section 3.5.1.

Table 3.11 **Weighted Prevalence for Any Disability by *Dzongkhag*** [31]

Dzongkhag	Prevalence Rate (%)	Standard Error	95% Confidence Interval		Number of children living with disability (unweighted)
			Lower	Upper	
Bumthang	21.9	5.8	10.5	33.2	40
Chhukha	24.4	4.3	16.0	32.8	45
Dagana	30.5	5.0	20.7	40.3	57
Gasa	20.6	10.9	-0.7	41.9	8
Haa	10.2	3.5	3.3	17.1	15
Lhuentse	8.9	2.6	3.9	14.0	26
Monggar	21.1	4.9	11.4	30.8	32
Paro	29.1	4.9	19.6	38.6	74
Pema Gatshel	10.6	3.5	3.7	17.5	19
Punakha	19.6	4.5	10.7	28.5	25
Samdrup Jongkhar	10.1	2.1	6.0	14.2	48
Samtse	27.5	4.3	19.0	35.9	68
Sarpang	11.7	3.9	4.1	19.3	17
Thimphu	11.0	4.1	2.9	19.1	12
Trashigang	30.9	4.5	22.1	39.8	57
Trashi Yangtse	32	4.5	23.1	40.9	54
Trongsa	16.5	4.0	8.6	24.4	36
Tsirang	33.0	5.8	21.6	44.4	39
Wangdue Phodrang	23.1	5.1	13.1	33.2	44
Zhemgang	26.1	4.3	17.6	34.6	48

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[31] The *Dzongkhag* (district) wise presentation of weighted prevalence should be interpreted with caution due to the small size of observations.

The disability prevalence estimates for the *Dzongkhags* (districts) show a wide range from 8.9 percent in Lhuntse to 33.0 percent in Tsirang. The Table 3.11 presents the different prevalence rates of any disability for all the 20 *Dzongkhags*.

When comparing differences across *Dzongkhags*, it is important to keep in mind the large standard errors associated with each estimate which require further analysis to determine statistically meaningful differences. However generally speaking, if the estimates of prevalence in two *Dzongkhags* are both within each other's confidence intervals they are not statistically different. For the same reason, the comparison between mild with moderate or severe disabilities at the district level is not analyzed.

3.5.1 Multivariate Analysis of Factors Associated with Disability

A multivariate approach was used to estimate the impact of each factor on the likelihood of disability while controlling for the other factors. A logit model was used to examine the impact of various factors on the presence of a disability. This logit model predicts the probability that a child is disabled based on the values of the characteristics considered. Without going into the model's technical details, the results are a set of variables that provides the best prediction whether a child is living with a disability. Basically, this allows us to predict for any child how his or her probability of being disabled changes if any factor is increased, while all the others are held constant.

These estimates, while easily showing which factors are statistically significant and whether they increase or decrease the probability of being disabled, do not immediately express the size of that impact. The estimates themselves are not reported in this document. However, the odds ratios based on these estimates are reflected in the report and can be interpreted in a straightforward manner. In short, if the odds ratio is greater than one, it increases the probability that the child is living with a disability; if it is less than one, it lessens the probability.

For example, in the case of urban versus rural, only one of these variables is used in estimating a logit, because a child lives either in a rural area or an urban area. If the variable 'rural' is used, then the odds ratio generated would be the ratio of the probability of being disabled if the child lives in a rural area over the expected probability of being disabled if he/she does not live in a rural area, i.e. an urban area. If the odds ratio equals one then living in a rural area has no impact on disability. Thus the probability of living with a disability – if the values of all the other factors are the same– is not different whether or not the child lives in a rural area. If the odds ratio equals 0.5, then a child living in a rural area is half as likely to be living with a disability, if he/she has the same characteristics as another child living in an urban area. If the odds ratio is 2, then the child in the rural areas would be twice as likely to be living with a disability.

Table 3.12 shows the results of a logit model with the dependent variable representing the presence of any disability. The odds ratio column shows the impact of each factor on the relative odds of having a disability.

The P>|z| column allows us to examine the probability that the true value of the odds ratio is different from one – that is, that the associated factor has a significant impact on the probability of being disabled. If the value of this column is 0.05, then there is a 95 percent chance that the true odds ratio, being an estimate, is different from one and thus the factor has an influence on disability.

The most significant factor is age. Based on the odds ratio, younger children are nearly twice as likely to have a disability, even after controlling for the other factors. This estimate is highly statistically significant. Assuming that the assessments in stage two worked equally well for younger children and older children, this difference can be explained in several ways. Firstly, it could be that a recent increase in disability rates has occurred. Secondly, may be young disabled children don't survive to older ages. Thirdly, children may be receiving various interventions that are improving their functioning levels so that they are experiencing less difficulties as they get older.

Children living in the eastern region are also less likely to be disabled, controlling for other factors. This is in fact different from the results in Table 3.8 where the impact of each factor on the likelihood of disability while controlling

Table 3.12

Logit Model: Dependent Variable-Presence of any Disability

Any Disability	Odds Ratio	Standard Error	z	P>|z|	95% Confidence Interval	
Boy	0.95	0.08	-0.59	0.56	0.81	1.12
Age 2-5 years	1.94	0.17	7.69	0.00	1.64	2.30
Mother's Education-Primary	0.89	0.13	-0.79	0.43	0.68	1.18
Mother's Education-Secondary	0.88	0.15	-0.78	0.43	0.63	1.22
Central Region	0.91	0.10	-0.92	0.36	0.74	1.12
Eastern Region	0.72	0.08	-3.02	0.00	0.58	0.89
Rural	1.08	0.16	0.54	0.59	0.81	1.44
Wealth Quintile 2	0.82	0.10	-1.67	0.09	0.66	1.03
Wealth-Middle	0.63	0.08	-3.72	0.00	0.50	0.81
Wealth-Quintile 4	0.51	0.08	-4.42	0.00	0.38	0.69
Wealth-Richest	0.43	0.09	-4.00	0.00	0.28	0.65
Constant	0.31	0.06	-5.94	0.00	0.21	0.45
Log likelihood = -1775.01			Number of obs = 3487			
			LR chi^2(11) = 116.68			
	Prob> chi^2 = 0.00					
	Pseudo R^2 = 0.032					

for the other factors are shown, revealing the importance of looking at conditional probabilities.

The other highly significant factor is wealth quintile. Compared to the lowest quintile, children in the next lowest quintile are 82 percent as likely to have a disability. The odds ratio falls steadily across all quintiles with the richest children only 43 percent as likely as the poorest to have a disability.

The differences in disability prevalence between boys and girls, mother's education, or between rural and urban areas proved to be no longer statistically significant.

The statistics at the bottom of Table 3.12 refer to the model's goodness of fit. The most interesting would be the Prob> chi^2 and R^2. The Prob> chi^2 shows that the model predicts better than random at above the 99 percent confidence level. The low value of R^2 suggests that other factors, which are not accounted for in the model, also contribute significantly to the probability of being disabled. However, the low R^2 value is quite standard for this kind of study.

3.5.2 Multinomial Analysis of Factors Associated with Disability by Degree of Disability

As stated earlier, disability is heterogeneous. Therefore, it could be that the factors correlated with mild – the more common – disabilities, might be different than those for moderate or severe disabilities. This could be the result of several causes. Firstly, mild and moderate or severe disabilities might stem from different root causes. Secondly, certain factors might have a strong impact on mitigating the impact of a health condition that causes disability, even if it does not completely remove the limitation. Thirdly, children living in different environments – even with the same functional limitation in terms of body function and structure – might experience different degrees of difficulty in performing various activities relative to their peers. To that end, a multinomial logit was estimated to compare the association of various factors with mild and moderate or severe disabilities.

Whereas the logit model discussed above looked at the probability that a child had a disability, a multinomial logit estimates multiple outcomes together, in this case two because a child has the probability of being in more than two categories: she or he could be living with any disability, mild disability, or with moderate or severe disability. The model allows for factors to have a different influence on the two degrees of disability. In the first logit, the implicit assumption was that, for example living in a rural area has the same impact on having a mild disability as it does having a moderate or severe one. The multinomial logit model relaxes that assumption.

In the multinomial model, odds ratios are not computed. Instead relative risk ratios (RRR) are calculated, which basically reflect the same information as an odds ratio. They show the relative risk of being in one particular category compared to the base condition of not living with a disability, such as the relative risk of being mildly disabled compared to not being disabled. Given that every child has a probability of being in more than two states, it is not a simple ratio of two probabilities, as is the odds ratio.

Table 3.13a Multinomial Logit: Dependent Variable by Disability Level - None and Mild

Disability Severity Level	RRR	Standard Error	z	P>|z|	95% Confidence Interval	
None (base outcome)						
Mild						
Boy	0.91	0.08	-1.04	0.30	0.76	1.09
Age 2-5 years	1.99	0.19	7.37	0.00	1.66	2.39
Mother's Education-Primary	0.96	0.14	-0.30	0.76	0.71	1.28
Mother's Education-Secondary	0.95	0.17	-0.32	0.75	0.67	1.34
Central Region	0.86	0.10	-1.34	0.18	0.69	1.07
Eastern Region	0.65	0.08	-3.65	0.00	0.51	0.82
Rural	1.18	0.18	1.05	0.30	0.87	1.59
Wealth Quintile 2	0.74	0.09	-2.40	0.02	0.58	0.95
Wealth-Middle	0.64	0.08	-3.46	0.00	0.49	0.82
Wealth-Quintile 4	0.52	0.08	-4.06	0.00	0.38	0.71
Wealth-Richest	0.43	0.10	-3.74	0.00	0.28	0.67
Constant	0.26	0.05	-6.46	0.00	0.17	0.39

The regression in Tables 3.13.a and 3.13.b allows for different coefficients to be estimated for mild disabilities and for moderate or severe disabilities, and in fact, a number of differences emerge. The most striking is the difference in the estimated relative risk ratio (RRR) for mother's education. Mother's primary or secondary education appears to have no impact on the presence of mild disabilities, meaning it is not statistically different from 1. However, for moderate and severe disabilities it can reduce the risk by nearly half. The RRR for primary education is 0.58 and 0.52 for secondary education. They are not statistically significantly different from each other, so the fact that a mother has at least some education implies that – all other factors equal – their children are moderately or severely disabled at only a 50-60 percent rate of the children of mothers without education.

Table 3.13b Multinomial Logit: Dependent Variable by Moderate or Severe Disability

Disability Severity Level	RRR	Standard Error	z	P>|z|	95% Confidence Interval	
Moderate or Severe						
Boy	1.18	0.22	0.92	0.36	0.83	1.70
Age 2-5 years	1.73	0.33	2.91	0.00	1.20	2.51
Mother's Education-Primary	0.58	0.22	-1.45	0.15	0.28	1.21
Mother's Education-Secondary	0.52	0.25	-1.39	0.17	0.20	1.31
Central Region	1.28	0.32	0.98	0.33	0.78	2.11
Eastern Region	1.22	0.31	0.79	0.43	0.74	2.00
Rural	0.64	0.22	-1.30	0.19	0.32	1.26
Wealth Quintile 2	1.28	0.30	1.09	0.28	0.82	2.02
Wealth-Middle	0.60	0.17	-1.80	0.07	0.34	1.05
Wealth-Quintile 4	0.41	0.16	-2.31	0.02	0.19	0.87
Wealth-Richest	0.39	0.20	-1.81	0.07	0.14	1.08
Constant	0.06	0.03	-6.24	0.00	0.02	0.14

Log likelihood = -2106.41
RRR=Relative Risk Ratio

Number of obs = 3487
LR chi^2(11) = 141.26
Prob> chi^2 = 0.00
Pseudo R^2 = 0.032

On the one hand, caution is advised because none of the education coefficient estimates are statistically significant at the 95 percent confidence level, but they would be significant at about the 85 percent level for the moderate and severe disabilities compared with only being significant at about the 25 percent confidence level for mild disabilities. The difference warrants further study into the relationship between mother's education and the level of disability. It could be that educated mothers take actions that prevent mild disabilities from becoming more severe, or it could just be that the underlying causes for moderate and severe disabilities are different from the causes of mild disability.

Another difference that is statistically significant relates to the Eastern Region. Living in that region significantly reduces the risk of mild disability by over one-third. However, it has no statistically significant impact on moderate or severe disabilities – and the point estimate actually implies a greater prevalence of moderate or severe disability in the Eastern Region.

The relationship between wealth and the two levels of disability also differs by the degree of difficulty. First of all, the relationship is much more statistically significant for the mild level of disability, although that is partially a factor of there being more observations with mild disabilities. But the relative risk ratios are also different. For mild disabilities, being in the lowest quintile gives a child the highest risk, while for moderate or severe disabilities it is actually being in the second lowest quintile that gives a child the highest risk. This might have to do with survival rates of children with moderate or severe disabilities.

The multinomial logit model also allows us to test to see if any explanatory power is gained by allowing for the possibility that factors have a differently sized impact on mild versus moderate or severe disabilities. If all the factors had the same impact on both degrees of disability, then a Wald test would suggest that the multinomial logit was unnecessary and does not really tell us anything different from the original logit.

A Wald test run on the multinomial logit presented in Tables 3.13.a and 3.13.b revealed that the mild and moderate or severe disabilities are better explained with the multinomial model rather than the original, combined model. The last column of the Wald test as shown in Table 3.14 tells us that the hypothesis that the state of having no disabilities and the state of having a mild disability are really the same thing can be rejected at above a 99 percent confidence level. The same can be said for the hypothesis that no disabilities and moderate or severe disabilities are equivalent states. This confirms that not having a disability, having a disability, having a mild, moderate or severe disability are indeed different conditions.

The final value in the last column says that the hypothesis that mild and moderate or severe disabilities represent the same state, meaning that various factors have the same influence on them, can be rejected at the 98 percent confidence level. This infers that moderate or severe disabilities are not merely a continuum of mild disabilities. The process leading to mild disabilities in children appears to be different in certain respects than the process leading to moderate or severe disabilities. The various characteristics assessed impact on mild disabilities differently to moderate or severe disabilities.

Table 3.14 Wald Test based on Multinomial Logit

Null Hypothesis: All coefficients except intercepts associated with a given pair of outcomes are 0 (i.e., categories can be collapsed)

Categories tested	chi²	df	P>chi²
None – mild	101.5	11	0.00
None - moderate/severe	35.5	11	0.00
Mild - moderate/severe	23.1	11	0.02

3.6 Summary

The basic findings of the report are that 21 percent of children in Bhutan are living with any disability, 19 percent of children are living with a mild disability, and about three percent are living with a moderate or severe disability.

Overall, cognition is by far the most prevalent type of disability. It is particularly common among children with mild disabilities rather than children with moderate or severe disabilities. Difficulties in speech however are relatively more common among children with moderate or severe disabilities.

The prevalence of children living with a single disability is 14 percent while the prevalence of children living with multiple disabilities is eight percent. While single disabilities are far more prevalent among children with mild disabilities, multiple disabilities become more prevalent among children living with moderate or severe disabilities.

The likelihood of disability is greater among younger children, among children living in the poorest households, and among children with mothers with no education. While disability is more prevalent in rural regions, the rural/urban divide becomes statistically insignificant once wealth and mother's education are accounted for.

Statistical tests showed that the factors associated with disability have different impacts on the presence of mild disability versus moderate or severe disability. This finding suggests that different mechanisms are at play in creating mild disabilities or moderate and severe. It appears that mother's education might be a key factor in preventing mild disabilities from becoming more serious conditions.

Chapter 4 elaborates on these findings and offers recommendations for future steps.

4 CHAPTER

DISCUSSION AND RECOMMENDATIONS

This study explores two aspects of disability among children aged 2 – 9 years old in Bhutan, the prevalence of disability and the potentially associated factors for childhood disability.

Prevalence

When disability is defined as the presence of any difficulty in eight functional domains – gross motor skills, fine motor skills, vision, hearing, speech, cognition, behaviour, and/or seizures, which is correlated with functional difficulties in several domains – the prevalence of disability in this age group 21 percent. If the mild disabilities are excluded, then the prevalence rate drops to about three percent, and if only the severe disabilities are included it drops further to about one percent.

Cognitive disabilities are by far the most common type of disability with a prevalence rate of 15 percent. While cognition is the functional domain with the highest prevalence rate for children with both mild and moderate or severe disabilities, it is relatively more common among children with mild disabilities. Speech difficulties are relatively more common among children with moderate or severe disabilities.

The prevalence of children living with a single disability is 14 percent while the prevalence of children living with multiple disabilities is eight percent. While single disabilities are far more prevalent among children living with mild disabilities, multiple disabilities become more prevalent among children with moderate or severe disabilities.

Associated Factors

Using multivariate analysis the prevalence of disability was found to be strongly associated with young age, poverty and living outside the Eastern Region. Moreover, using a multinomial analysis, the factors correlated with the mild disabilities differ significantly from those related to the moderate or severe disabilities. Notably, mother's education does not significantly affect mild disability but reduces the risk of moderate or severe disabilities by nearly half. This finding suggests either a different etiology of mild disabilities or the impact of mother's education on preventing mild disabilities from progressing to more serious conditions. Mother's primary education also had a strong association with the absence of cognitive disabilities, which were by far the most common childhood disability.

These findings suggest that implementing risk mitigation projects such as increasing community awareness on family and community based early child stimulation, establishing early childhood care and development programs, improving accessibility to inclusive education and health care services for children living with disabilities, and improving the socio-economic conditions could help reduce disability or mitigate its effects.

Methodology

Including the optional module on disability, the Ten Questions (TQ) in the BMIS 2010 has provided baseline information on children

2-9 years with an increased risk of disability. Furthermore, the optional module has provided the basis for a follow-up assessment using neurological-developmental assessment tools like RNDA and RFA, which in turn has determined the estimates for any disability and by categories like mild and moderate or severe. The advantage of the RNDA and RFA tools is that disability in each functional domain can be specifically identified under different categories, which will facilitate developing a systematic referral system for addressing or correcting the disability. For example, a child's mild cognitive disability can be addressed by teaching the parents about children's stimulation exercises instead of referring to a specialist.

One area of concern, however, was the lower degree of sensitivity and specificity in this study compared to the use of the two-stage TQ methodology in other studies. While the final determination of disability in the second stage is deemed to be accurate with a high degree of confidence, the screening procedure in the first stage didn't seem as efficient as in previous studies.

Recommendations

This chapter presents the recommendations for further research and analysis, as well as interventions at home, health centres and in schools. The conclusions are drawn from the study findings and the recommendations concern interventions by the Royal Government of Bhutan and relevant stakeholders to improve services which can benefit children living with disabilities as well as prevent children from experiencing different forms of disability in the future. This includes the institutionalizing use of the RNDA & RFA instruments in schools, Basic Health Units and hospitals for early detection and moderation of childhood disabilities.

The study findings provide recommendations for the Bhutanese government and/or relevant stakeholders for (i) enhancing the evidence-base concerning children living with a disability to feed into the policy level, (ii) preventing childhood disabilities, (iii) building systems and services for children living with disabilities, and (iv) creating the awareness and demand for such services.

The recommendations regarding enhancing the evidence-base for public policy are the following:

1. **The importance of establishing a clear definition of disability**
   For the larger community of researchers and data collectors on disability and for countries like Bhutan, the definition should be based on the difficulties children experience in functional domains as defined and recognized by the International Classification of Functioning, Disability and Health. In the context of Bhutan, cut-offs should be established for delineating mild disabilities as opposed to the moderate or severe disabilities.

2. **Further work should be undertaken to improve the implementation of the TQ screening tool**
   Qualitative and quantitative investigations, including possibly demonstration projects, need to be undertaken to more fully understand why the sensitivity and specificity of this two-stage procedure was significantly below that of studies in other countries in

order to make the process more efficient in the future.

3. **Future implementation of the second stage procedure requires greater logistical oversight and resources**
   The time gap between the first and the second stage should be minimized as much as possible and should not be more than six months as has been the case with this study. Place of assessing the children should be decided well in advance taking into consideration all logistical aspects so that all children are assessed under standardized environmental conditions to minimize any effect due to environmental differences. To the greatest extent possible, community health workers and other local resources should be used to build local capacity, reduce implementation costs and promote sustainability for the procedure.

4. **Investigate further potential causes of disability**
   The scope of the study could be increased to explore possible causes of disability by including a set of questions pertaining to the child and its mother in the second stage assessment such as the place of delivery; details regarding the delivery itself like prolonged labour; the child's condition immediately after delivery; neonatal history; details regarding the prenatal phase like maternal stress, habitual abortion, and trauma; and information regarding the genetic history such as consanguinity.

5. **Conduct further research to aid in the formulation and implementation of public policy**

Future research should focus on several things:

1) *Developing deeper understanding of the various background, personal, and contextual factors that may be contributing to disabilities in Bhutan*. If possible, panel data would allow for a better understanding of the causes and the impact of the onset of a disability.

2) *Strengthening ways to implement an on-going system of disability determination*. For example, with the intention of cutting costs on such a study, screening of a child's disability using TQ could be put into practice during the annual census, whereby follow-up assessments like the second stage assessment could be carried out at health centres and schools involving health workers and teachers.

3) *Developing a better understanding of interventions designed to prevent disability or to improve the lives of children with disabilities*. Program demonstrations should be designed with proper comparison or control groups to more accurately assess the benefits and costs of various interventions.

4) *Developing deeper understanding of cognitive disability, in particular.* Given that cognitive disabilities are by far the most common disability in Bhutan, special emphasis should be placed on determining interventions that prevent cognitive disabilities as well as provide parents and children with the advice, services and opportunities to improve their lives and promote the children's participation in society.

5) *Exploring the differences between mild, moderate or severe forms of disability.* This study shows that the factors associated

with mild disabilities differ in both nature and degree from moderate and severe disabilities. All studies should therefore take note of this in their design.

The recommendations regarding the *prevention of childhood disabilities* include the following:

1. **Promote Socio-economic development**
   It is recommended to continue to focus on a balanced and equitable socio-economic development, with a particular focus on vulnerable and disadvantaged groups, and on the prevention of growth of inequalities[31]. In all aspects covered by this assessment, poverty has remained a very significant factor associated with disability, i.e. as poverty increases, so does both mild and moderate or severe disabilities among children.

2. **Promote mother's education**
   To focus on education in general and mother's education in particular, including through literacy programmes and non-formal education should be continued. The analysis suggests that mother's education prevents mild disabilities among children to progress into moderate or severe disabilities. In parallel, the analysis suggests that mother's primary education significantly reduces the probability among children for cognitive disabilities, which is the most common disability. While the statistics do not provide any information about the reason for this, it could be that education leads to better pre-natal care or better health care or more attention to developmental delays and corresponding early stimulation.

The recommendations regarding building systems and services for children living with a disability are the following:

1. **Promote early detection programs.**
   The study recommends not only strengthening the capacity in rehabilitation but also in detection and diagnosis of disabilities. Awareness raising and early detection programs need to be institutionalized so that cases are detected early and appropriate and timely interventions can take place to prevent the worsening of conditions. For example, a community school teacher or a local health centre staff can be trained on how to use the RNDA and RFA tools to detect children living with disability in the community. They can provide early interventions such as home based stimulation, positive parenting exercises or simple advice. Such a system will also facilitate early referral for serious disability cases to specialized centres

   The study has also identified many children who could benefit from the use of orthotics and assistive devices such as walking supports and hearing aids, wheelchairs, spectacles, etc. Arrangements should be made to provide such devices depending on need so that these children will be empowered to better participate by experiencing less difficulties in functioning

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[31] Royal Government of Bhutan, (1999), *Bhutan 2020: A Vision for Peace, Prosperity and Happiness*, Chapter 6

and becoming more independent.

2. **Promote parental education and early child development through relevant outreach programmes**.
   The study has shown that children whose mothers are literate or children who are exposed to early childhood care and development programmes performed better in the RNDA and RFA assessments. Access to services related to early childhood care and development programmes, and a child friendly environment at home could enhance children's developmental capacity. Programs educating parents on health and nutrition, early detection, parental interventions, and the availability of Government support could reduce both the prevalence and the severity of disability.

The recommendations regarding creating awareness and demand for services concerning children living with a disability are the following:

1. **Establish disability awareness campaigns**
   Previous recommendations addressed the issue of helping parents and community workers identify children with disabilities and guide them toward appropriate interventions. However, children and people living with disabilities often face stigma and discrimination. Either people are ashamed of their disabled children or greatly underestimate their children's capacity to participate in society. Public awareness campaigns should be expanded to reduce the stigma of disability and to change attitudes among disabled people and non-disabled people alike that children and people living with disabilities cannot be full members of society.

2. **Strengthen the demand and capacity for community based rehabilitation, inclusive health and education services for children living with disabilities.**
   More than one out of five children in Bhutan has at least a mild disability. Studies from other countries have shown that disability acquired in childhood can have lifelong impacts on employment, poverty and other socioeconomic indicators. Since not all disabilities can be prevented, it is important to strive to make the society inclusive, so that all its children have the opportunity to fully participate in society. This includes evaluating and re-thinking all social programs, such as schools, training, etc. At the same time, there is a need to create a demand among parents and local service providers for these inclusive and community based services. Such demand creation requires targeted and well-designed awareness raising campaigns and capacity building efforts.

In conclusion, this study marks a significant advance in Bhutan's ability to understand the nature and degree of disability among its childhood population. The prevalence rate of any disability in children aged 2-9 years is 21 percent in Bhutan. The prevalence rate of mild disability is 19 percent and two percent for moderate disability, while the prevalence rate drops to about one percent, if only the severe disabilities are considered. The cognitive disabilities are by far the most common type of disability with a 15 percent prevalence rate. The prevalence of a child living with any single disability is 14 percent compared to eight percent prevalence of a child living with multiple disabilities. However, children living with a moderate or severe disability are actually more likely to experience multiple disabilities, while a single disability is more likely to occur in the category of mild disabilities.

This work provides a platform to strengthen the society's inclusiveness promoting the health, well-being, and happiness of all its children also of the children living with disabilities.

Annex A.

Methodology for Calculating Prevalence Rates and Odds Ratios

Prevalence Rate Calculation

The result of the first stage screening of the population can be presented as those who screened positive (S^+) and those who screened negative (S^-). In the second stage study all who screened positive (S^+) and 10 percent of those who screened negative (S-) are assessed and results obtained are assigned as disability present (D^+), or absent (D^-). The resulting 2x3 table is shown below and the total true positives and false negatives are estimated to determine the disability prevalence.

Table A.1

Results of a Two-stage StudyReported in a 2x3 table

		Disability (Second Stage result)			
		D^+	D^-	Not Assessed	Total
Screen (First Stage)	S^+	a	b	c	a+b+c
	S^-	d	e	f	d+e+f
	Total	a+d	b+e	c+f	**N=a+b+c+d+e+f**

Weighted prevalence is then calculated to account for differential probabilities by extrapolating the true-positive rate among the population evaluated in the second stage to the entire population surveyed in the first stage. Similarly the false negative rate among the population evaluated in second stage is extrapolated to the entire population evaluated in the first stage.

Two methods for weighting are used by assigning disability status, either D+ or D- to all the population surveyed, and even those for whom an assessment in the second stage did not occur. Accordingly the 2x3 un-weighted data table is reduced to 2x2 table to calculate the prevalence rate. Other statistics like sensitivity, specificity, prevalence, positive predictive validity (PPV), negative predictive validity (NPV) can be also calculated using the 2x2 weighted table.

Table A.2

Weighted Data of Two Stage Study (2x2 table)

		Disability (Second stage result)		
		D^+	D^-	Total
Ten Questions (First Stage)	S^+	a+[c*a/(a+b)]	b+[c*b/(a+b)]	a+b+c
	S^-	d+[f*d/(d+e)]	e+[f*e/(d+e)]	d+e+f
	Total			**N=a+b+c+d+e+f**

Table A.3

Re-writing Table A.2

		Disability (Second stage result)		
		D^+	D^-	Total
Ten Questions (First Stage)	S^+	g	h	g+h
	S^-	i	j	i+j
	Total			**N=g+h+i+j**

g=true positive, h=false positive, i=false negative, j=true negative

The following formula is used for the calculation.

1. Prevalence = $\lambda 1(\pi) + \lambda 2\ (1-\pi)$,
2. Standard error =$\mathrm{sqrt}[1/N.\{X/f1)+(Y/f2)+(Z)\}]$
3. Sensitivity= $g/(g+i)$
4. Specificity= $j/(h+j)$
5. PPV=$g/(g+h)$
6. NPPV=$j/(i+j)$

$\lambda 1 = g/(g+h)$, $\lambda 2 = i/(i+j)$

$\pi = (g+h+i)/N$

$X=\{\pi\lambda 1(1-\lambda 1)\}$

$Y=\{(1-\pi)\lambda\ 2(1-\lambda 2)\}$

$Z=\{\pi(1-\pi)\ (\lambda 1-\lambda 2)^2\}$

$F1=(a+b)/(a+b+c)$

95% CI=Prevalence ±1.96*S.E

$F2=(d+e)/(d+e+f)$

The prevalence rate can be presented as per 1,000 children. The calculations of prevalence and standard errors are based on the two-stage design[33]. The 95 percent Confidence Interval is calculated by multiplying the standard error by 1.96 and then subtracting this amount from the prevalence estimate to get the lower bound, and adding it to the prevalence to get the upper bound. The prevalence rate in this report is expressed as percentages.

Associated factors calculation using odds ratio

The variables that may have effect on the prevalence can be presented as those with high risk factor (R) and low risk factor (Ř). Screening positive in the first stage is represented as S+, screening negative as S-. The prevalence from

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[33] Shrout, P. E. and Newman, S. C., (1989), *Design of Two-Phase Disability Surveys of Rare Disorders*, Biometrics, Vol. 45, No 2, June 1989; 549-555

Table A.4

Breakdown by First and Second Stage Assessments by Risk Factor

			Disabled (Second stage result)		Not Assessed in Second Stage	Total
			D	Ď		
Risk Factor	**R**	**S^+**	A	B	C	D
		S^-	E	F	G	H
	Ř	**S^+**	I	J	K	L
		S^-	M	N	O	P

the second stage is assigned as disability present (D), or absent (Ď).

Table A.4 provides the breakdowns needed to create the weighted values necessary for computing the odds ratios, in order to take into account the fact that not all children in stage one were assessed in stage two.

In Table A.5, then:

$a = A+C*(A/(A+B)) \;+\; E+G*(E/(E+F))$

$b = B+C*(B/(A+B)) \;+\; F+G*(F/(E+F))$

$c = I+K*(I/(I+J)) \;+\; M+O*(M/(M+N))$

$d = J+K*(J/(I+J)) \;+\; N+O*(N/(M+N))$

Table A.5

Odds Ratio Calculation

		Disease (Second Stage result)		
		D	Ď	Total
Risk Factor	R	a	b	a+b
	Ř	c	d	c+d
	Total	**a+c**	**b+d**	**N=a+b+c+d**

The following formula is used to calculate the odds ratio, standard error and confidence interval:

$OR = (a*d)/(b*c)$

$\text{Log } OR = \log \text{ of } (a*d)/(b*c)$

$\text{S.E} \log OR = \text{sqrt}\,(1/a+1/b+1/c+1/d)$

$95\%\ CI = \exp(\text{Log } OR \pm 1.96*\text{S.E} \log OR)$

Where,

OR = Odds ratio

log =natural logarithm

exp= exponential

Table B.1 Weighted Prevalence of Mild Disability by *Dzongkhag*

Dzongkhag	Prevalence rate (%)	Standard Error	95% Confidence Interval		Number of children (un weighted)
			Lower	Upper	
Bumthang	12.2	4.4	3.7	20.8	27
Chhukha	21.2	4.2	13	29.4	38
Dagana	25	4.9	15.4	34.5	45
Gasa	20.6	10.9	-0.7	41.9	8
Haa	9.3	3.5	2.5	16.2	12
Lhuntse	7.3	2.5	2.4	12.2	20
Monggar	17.2	4.7	8.0	26.5	25
Paro	27.3	4.8	17.8	36.8	67
Pema Gatshel	10	3.5	3.1	16.9	17
Punakha	18.2	4.5	9.4	26.9	23
Samdrup Jongkhar	6.4	1.0	4.5	8.4	38
Samtse	25.4	4.3	16.9	33.8	60
Sarpang	11	3.9	3.5	18.6	15
Thimphu	10.6	4.1	2.5	18.7	11
Trashigang	23.9	4.4	15.2	32.5	41
Trashi Yangtse	27.6	4.5	18.7	36.4	44
Trongsa	15.5	4.0	7.6	23.3	32
Tsirang	31.4	5.8	20.0	42.8	36
Wangdue Phodrang	21.5	5.1	11.5	31.6	39
Zhemgang	20.4	4.1		28.4	39

Table B.2 Weighted Prevalence of Moderate or Severe Disability by *Dzongkhag*

Dzongkhag	Prevalence rate (%)	Standard Error	95% Confidence Interval		Number of children (un weighted)
			Lower	Upper	
Bumthang	9.6	4.3	1.2	18.1	13
Chhukha	3.0	1.7	-0.4	6.5	7
Dagana	4.9	2.4	0.3	9.5	12
Gasa	0	0	0	0	0
Haa	0.7	0.4	-0.1	1.4	3
Lhuntse	1.5	0.6	0.3	2.8	6
Monggar	3.5	2.3	-1	7.9	7
Paro	1.4	0.5	0.4	2.4	7
Pema Gatshel	0.4	0.3	-0.2	1.0	2
Punakha	2.0	1.8	-1.5	5.5	2
Samdrup Jongkhar	3.4	1.9	-0.3	7.0	10
Samtse	1.5	0.5	0.5	2. 5	8
Sarpang	0.4	0.3	-0.2	1.0	2
Thimphu	0.3	0.3	-0.2	0.8	1
Trashigang	6.5	2.5	1.6	11.3	16
Trashi Yangtse	3.7	1.8	0.1	7.2	10
Trongsa	0.8	0.4	0	1.5	4
Tsirang	0.7	0.4	-0.1	1.6	3
Wangdue Phodrang	1.2	0.5	0.2	2.2	5
Zhemgang	5.8	2.7	0.6	11.0	9

Annex C

Validity of Ten Questions in Bangladesh, Jamaica and Pakistan

Validity of Ten Questions as a Screen for Serious Nonsensory (Cognitive, Motor, and/or Seizure) Disability in Three Populations: Sensitivity, Specificity, Predictive Values, and Prevalence (95% Confidence Interval)

	Bangladesh			Jamaica			Pakistan		
	Value	95% Confidence Interval		Value	95% Confidence I nterval		Value	95% Confidence Interval	
		Lower	Upper		Lower	Upper		Lower	Upper
Serious nonsensory disability									
Sensitivity	**0.87**	0.52	1.0	**0.56**	0.23	0.88	**0.85**	0.63	1.0
Specificity	**0.93**	0.92	0.94	**0.85**	0.84	0.87	**0.88**	0.87	0.88
Positive predictive value	**0.09**	0.07	0.11	**0.07**	0.05	0.09	**0.18**	0.15	0.21
Negative predictive value	**1.0**			**0.99**	0.98	1.0	**0.99**	0.98	1.0
Prevalence (per 1,000)	**8.1**	5.43	10.77	**19.79**	9.51	30.07	**30.97**	24.24	37.70
Serious nonsensory disability- restricted									
Sensitivity	**0.83**	0.42	1.0	**1.0**	0.43	1.0	**0.88**	0.64	1.0
Specificity	**0.92**	0.92	0.93	**0.85**	0.85	0.85	**0.87**	0.87	0.88
Positive predictive value	**0.06**	0.04	0.08	**0.03**	0.02	0.04	**0.15**	0.13	0.18
Negative predictive value	**1.0**			**1.0**			**1.0**		
Prevalence (per 1,000)	**6.15**	3.63	8.68	**5.08**	3.02	7.15	**25.81**	20.00	37.70

Annex D

Likelihood of Child Disability from the First Stage Screening1 as reflected in the BMIS 2010

Percentage of children 2-9 years of age with disability reported by their mother or caretaker according to the type of disability, Bhutan, 2010

	Percentage of children aged 2-9 years with reported disability by type of disability														Num-ber of children aged 2-9 years
	Delay in sitting standing or walk-ing	Difficulty seeing. either in the daytime or at night	Appears to have difficulty hearing	No under-standing of instructions	Difficulty in walking moving. moving arms. weakness or stiffness	Have fits. become rigid. lose conscious-ness	Not learning to do things like other children his/ her age	No speaking cannot be understood in words	Appears mentally backward. dull. or slow	Speech is not normal	Number of children aged 3-9 years	**Cannot name at least one object**	Num-ber of children aged 2 years	Percent-age of children 2-9 years of age with at least one reported disability*	
Dzongkhag															
Bumthang	1.4	1.0	1.3	2.3	2.1	1.8	2.4	5.4	1.4	7.1	242	22.4	34	19.3	275
Chhukha	5.6	2.6	1.3	1.2	3.7	2.4	1.4	4.3	6.8	15.9	993	24.4	125	32.6	1118
Dagana	1.2	.9	1.6	3.2	2.3	2.1	1.9	2.4	1.7	21.2	367	23.3	46	31.7	413
Gasa	1.7	2.8	1.4	6.4	2.9	16.4	7.5	13.2	1.1	24.4	68	35.8	8	53.9	76
Haa	1.0	1.0	1.1	2.5	1.8	1.4	2.1	7.2	2.5	5.0	196	23.6	27	19.2	223
Lhuentse	1.2	1.2	.7	6.5	2.4	2.7	10.4	11.3	6.6	50.6	219	19.7	33	63.6	252
Monggar	2.3	1.2	2.1	2.6	1.6	.7	6.2	7.0	1.7	4.2	714	17.5	100	20.3	814
Paro	1.4	1.5	1.7	5.2	2.5	1.9	5.2	8.1	3.6	37.8	503	36.1	72	45.6	575
Pema Gatshel	1.6	2.1	.6	7.3	.8	1.1	5.8	11.2	1.1	.5	336	16.4	54	20.1	390
Punakha	2.5	.9	2.9	3.1	2.3	2.2	3.9	4.6	4.2	10.4	361	18.1	41	23.0	401
Samdrup Jongkhar	1.3	1.5	2.7	9.8	2.6	4.0	7.2	22.4	1.8	8.6	658	25.9	92	42.3	750
Samtse	5.8	3.7	2.6	3.6	3.0	2.9	5.2	3.1	2.1	16.2	1219	27.4	174	31.1	1394
Sarpang	1.6	1.9	2.0	1.5	2.7	1.1	2.6	3.5	2.2	3.5	567	35.4	69	16.6	636
Thimphu	1.1	1.1	.4	1.1	1.0	16.9	1.3	1.4	.8	2.0	1170	12.6	189	24.7	1359
Trashigang	2.9	1.0	4.7	4.1	3.6	3.5	3.8	11.3	2.7	8.6	879	13.5	108	29.8	987
Trashi Yangtse	1.8	1.9	3.4	6.4	2.5	1.3	9.2	7.4	1.7	5.3	281	31.6	34	28.7	316
Trongsa	3.8	.5	2.5	6.0	4.1	4.8	10.0	12.0	2.3	10.5	230	19.4	28	33.8	259
Tsirang	2.0	1.4	1.5	1.9	2.5	2.5	5.5	4.1	3.8	6.9	304	34.4	48	23.7	352
Wangdue Phodrang	5.4	2.0	2.8	4.7	4.6	3.3	5.7	5.3	2.9	40.7	404	23.4	57	50.3	461
Zhemgang	1.9	11.3	10.3	2.7	2.0	2.4	3.4	4.2	1.4	6.2	253	18.9	45	25.1	298

[37] This table is taken from the BMIS report page 178, i.e. this table is equivalent to Table CP.8 in the BMIS report

	Percentage of children aged 2-9 years with reported disability by type of disability														
	Delay in sitting standing or walking	Difficulty seeing. either in the daytime or at night	Appears to have difficulty hearing	No understanding of instructions	Difficulty in walking moving. moving arms. weakness or stiffness	Have fits. become rigid. lose consciousness	Not learning to do things like other children his/her age	No speaking cannot be understood in words	Appears mentally backward. dull. or slow	Speech is not normal	Number of children aged 3-9 years	**Cannot name at least one object**	Number of children aged 2 years	Percentage of children 2-9 years of age with at least one reported disability*	Number of children aged 2-9 years
Region															
Western	3.5	2.2	1.6	2.6	2.5	6.5	3.2	3.9	3.1	14.0	4510	22.7	636	30.5	5146
Central	2.5	2.5	2.9	3.0	2.9	2.4	4.2	4.8	2.3	14.4	2366	26.5	327	28.5	2693
Eastern	2.0	1.4	2.8	5.7	2.4	2.4	6.3	12.3	2.3	9.4	3087	19.5	420	31.5	3508
Residence															
Urban	2.0	2.2	.8	2.3	1.9	8.5	3.0	4.6	2.5	10.1	2796	20.9	387	29.5	3184
Rural	3.1	1.9	2.8	4.2	2.8	2.6	4.9	7.6	2.7	13.7	7166	23.3	996	30.7	8162
Age of child															
2-4	2.4	1.2	1.5	5.9	2.6	4.6	6.0	11.4	2.8	12.8	2577	22.6	1383	34.8	3960
5-6	3.1	1.8	2.0	2.7	2.3	4.9	3.4	4.9	2.2	13.3	3130	.	0	28.9	3130
7-9	2.9	2.8	3.2	2.2	2.8	3.4	3.6	3.7	2.8	12.2	4255	.	0	27.3	4255
Mother's education															
None	2.9	2.1	2.7	4.0	2.8	4.5	4.9	7.2	2.8	12.7	7374	24.3	975	31.4	8349
Primary	2.9	2.7	1.4	2.9	1.9	3.8	3.3	5.7	2.7	13.6	1171	20.2	152	29.6	1322
Secondary +	1.9	1.2	1.0	2.5	1.7	3.3	2.7	5.1	2.0	11.5	1418	17.6	257	25.8	1675
Mother not in household	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	0	.	0	.0	0
Wealth index quintiles															
Poorest	2.7	2.3	3.6	5.7	2.2	3.5	6.6	9.4	3.3	13.2	2162	28.6	290	33.8	2452
Second	4.0	1.7	2.8	3.5	3.6	2.7	4.3	7.2	2.5	10.5	1880	25.8	240	28.8	2120
Middle	2.9	1.8	2.6	3.4	3.3	3.4	4.5	6.7	2.9	13.7	1912	20.8	272	30.1	2184
Fourth	2.2	2.2	1.6	3.3	1.7	8.1	3.3	6.1	2.3	12.8	2182	19.3	327	32.0	2509
Richest	2.3	1.9	.7	2.0	2.2	2.9	3.0	3.9	2.2	13.1	1826	19.0	254	26.1	2080
Total[38]	2.8	2.0	2.3	3.6	2.6	4.2	4.4	6.7	2.7	12.7	9963	22.6	1383	30.4	11346

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[38] The total number of children; 11,346 differs from the data used in the BMIS study (11,370). The difference is insignificance and has no impact on the second stage assessment where the number of children who are in fact living with a disability, are identified

Annex E

Prevalence Rates by all Functional Domains

In chapter 3, the top three statistically significant prevalence rates by functional domains were analysed in relation to age, sex and residency. The prevalence rates in the remaining domains were all found to be less than five percent and the numbers too small for further analysis. However, they are presented in the tables below.

Table F.1 Weighted Prevalence of Any Disability by Domain and Age

Domain		Age					
		All	Standard error	2-5 years	Standard error	5-9 years	Standard error
1	Gross motor	2.0	0.4	3.5	0.7	0.3	0.1
2	Fine motor	5.5	0.6	9.8	1.1	0.7	0.3
3	Vision	0.2	0.0	0.2	0.1	0.1	0.0
4	Hearing	0.5	0.1	0.5	0.2	0.4	0.1
5	Speech	2.3	0.4	3.5	0.7	1.0	0.3
6	Cognition	15.1	1.0	18.0	1.5	11.9	1.3
7	Behaviour	5.6	0.6	7.2	1.0	3.8	0.8
8	Seizure	1.0	0.2	0.9	0.3	1.0	0.3

Table F.2 Weighted Prevalence of Any Disability by Domain and Sex

Domain		Boy		Girl	
		Prevalence rate (%)	Standard error	Prevalence rate (%)	Standard error
1	Gross motor	2.3	0.6	1.7	0.4
2	Fine motor	6.1	1.0	5.0	0.8
3	Vision	0.2	0.1	0.1	0.0
4	Hearing	0.5	0.1	0.5	0.2
5	Speech	1.9	0.5	2.6	0.6
6	Cognition	13.9	1.4	16.2	1.3
7	Behaviour	6.4	1.0	4.9	0.8
8	Seizure	0.8	0.3	1.1	0.4

The prevalence rate of gross motor disability is two percent with no significant difference in the prevalence rate by sex or residency. However, younger children 2-5 years old have a comparatively higher prevalence rate of gross motor disability as compared to the older age group of 5-9 years old. The prevalence of fine motor disability is about six (5.5) percent with boys having a slightly higher prevalence rate of six (6.1) percent as compared to girls at five percent, but the difference is not statistically significant. The prevalence rates of vision and hearing disabilities were found to be quite low (at 0.2 percent and 0.5 percent respectively) making it difficult to further analyse these rates in relation to age, sex and residency. The prevalence rate of speech disability is about two percent with a comparatively higher prevalence rate among younger children as compared with older children. The prevalence rate of behaviour disability is about six (5.6) percent while the prevalence rate of seizures is one percent with a slightly higher prevalence rate among rural children as compared to urban children.

Table F.3 Weighted Prevalence of Any disability by Domain and Residency

Domain		Rural		Urban	
		Dzongkhag Rate (%)	Standard error	Dzongkhag Rate (%)	Standard error
1	**Gross motor**	2.1	0.4	1.4	0.6
2	**Fine motor**	5.9	0.7	3.7	1.2
3	**Vision**	0.2	0.1	0.1	0.1
4	**Hearing**	0.6	0.2	0.2	0.1
5	**Speech**	2.2	0.4	2.5	1.0
6	**Cognition**	16.8	1.2	8.0	1.7
7	**Behaviour**	5.7	0.7	4.9	1.3
8	**Seizure**	1.1	0.3	0.5	0.2

Annex F

Field Monitoring & Technical Support: List of National Coordinators, Regional Coordinators, Field Supervisors, and Field Assessors and Dzongkhag Statistical Officers

National Coordinators

1. Mr. Kinley Gyeltshen, Chief Program Officer, ECCD & SEN, DSE, MoE
2. Mr. Kinlay Penjor, Planning Officer UNICEF Bhutan

Region: Punakha

Regional Coordinators

1. Dr. Chencho Dorji, Psychiatrist, JDWNRH, Thimphu
2. Mr. Karma Norbu, Ast. Program Officer, Special Education Section, MoE.
3. Mr. Nar Bahadur Chhetri, Monitoring & Evaluation Officer, UNICEF Bhutan

Field Supervisors

1. Ms. Sushila Gurung, Teacher, Deaf Education Unit, Drugyel Lower Secondary School, Paro
2. Ms. Chokey Yangzom, Teacher, Changangkha Middle Secondary School, Thimphu
3. Mr. Yeshey Lhendup, Teacher, Lhuentse Higher Secondary School
4. Ms. Tsheten Yangzom, Teacher, Ragaytung Primary School, Phuentsholing
5. Mr. Sonam Tshering, Teacher, Gaselo Lower Secondary School, Wangdue Phodrang
6. Ms. Passang Lhamo, Lecturer , Royal Institute of Health Sciences, Thimphu
7. Ms. Dechen Wangmo, Chief Nurse , JDWNRH, Thimphu
8. Mr. Sangay Choedup, Physiotherapist, JDWNRH, Thimphu
9. Mr. Chandra Kumar Chhetri, Sr. Ophthalmic Technician, JDWNRH, Thimphu

Field Assessors

1. Mr. Tenzin Gochey, Teacher, Gedu Higher Secondary School, Chhukha
2. Ms. Sonam Yangden, Teacher, Katsho Lower Secondary School, Haa
3. Mr. Sonam Tobgay, Teacher, Katsho Lower Secondary School, Haa
4. Mr. Karma Tenzin, Teacher, Deaf Education Unit, Paro
5. Ms. Thuji Wangmo, Teacher, Drugyel Lower Secondary School, Paro
6. Mr. Kencho Wangdi, Vice Principal, Khuruthang Middle Secondary School, Punakha
7. Mr. Jigme Tenzin, Teacher, Khuruthang Middle Secondary School, Punakha
8. Ms. Nedup Dolkar, Teacher, Tencholing Primary School, Wangdue Phodrang
9. Mr. Abirman Thapa, Teacher, Gaselo Lower Secondary School, Wangdue Phodrang
10. Mr. Tandin Norbu, Teacher, Dashiding, Middle Secondary School, Punakha
11. Mr. Pema Choidhar, Teacher, Dashiding Middle Secondary School, Punakha
12. Mr. Phuntsho Norbu, Physiotherapist, Punakha Hospital
13. Ms. Choden, Physiotherapist, Bajo Hospital, Wangdue Phodrang
14. Mr. Sonam Tobgay, Physiotherapist, Bajo Hospital, Wangdue Phodrang
15. Mr. Rinzin, Physiotherapist, Paro Hospital
16. Ms. Tshering Zangmo, Physiotherapist, Gidakom Hospital, Thimphu
17. Mr. Sherab Gyeltshen, Physiotherapist, Phuentsholing Hospital
18. Ms. Kinzang Dema, Physiotherapist, JDWNRH, Thimphu

19. Ms. Sonam Zangmo, Opthalmic Technician, JDWNRH, Thimphu
20. Mr. Abi Narayan, Opthalmic Technician, JDWNRH, Thimphu
21. Mr. Tandin Gyeltshen, Lab Technician ,Punakha Hospital
22. Mr. Pelden Wangchuk, X-ray Technician , Punakha Hospital
23. Mr. Tashi, Opthalmic Technician ,Punakha Hospital
24. Mr. Dorji Tshering, ENT Technician ,Punakha Hospital
25. Mr. Kinga Wangchuk, Nurse Asst. Punakha Hospital
26. Mr. Chogay, Health Assistant, Kabisa, Punakha
27. Ms. Ugyen Lhaden, Ophthalmic Technician , Punakha Hospital

Region: Gelephu

Regional Coordinators

1. Mr. Tshering Penjor, Counselor Department of Youth and Sports, MoE
2. Mr. Tshering Norbu, Sr. Physiotherapist, JDWNRH, MoH
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2. Mr. Tshering Womling, Zhemgang Lower Secondary School
3. Mr. Tshering Wangdi, Teacher Tendu Higher Secondary Schoool
4. Dr. H.P. Chhetri, Pediatrician, Lungtenphu Hospital, Thimphu
5. Ms. Beda Giri, Physiotherapist, JDWNRH, Thimphu
6. Ms. Deki Pem, Lecturer, RIHS, Thimphu
7. Mr. Damber Gurung, Sr. Ophthalmic Technician, Gelephu

Field Assessors

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2. Mr. Lobzang Namgyal, Teacher, Tashiding Community Primary School, Dagana
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4. Mr. Arun Rai, Teacher, Sarpang Lower Secondary School
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9. Mr. Sonam Rinchen,Teacher, Tendu HSS, Samtse
10. Mr. Karma Tenzin,Teacher, Salami Community Primary School, Tsirang
11. Ms. Nima Khandu,Teacher, Damphu LSS, Tsirang
12. Ms. Maita Lachi Rai,Teacher, Trongsa Primary School, Trongsa
13. Mr. Sonam Gyeltshen,Teacher, Trongsa Primary School, Trongsa
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16. Mr. Pasang Drukpa, Betini Primary School, Tsirang
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19. Mr. Phuntsho, Physiotherapist Technician, Dagana Hospital
20. Mr. Tshering Wangchuk, Physiotherapist Technician, Yebilaptsa Hospital, Zhemgang
21. Mr. Tashi Gyeltshen, Physiotherapist Technician, Trongsa Hospital
22. Mr. Gantey Yoedzer, Physiotherapist Technician, Samtse Hospital

23. Mr. Phub Tshering, Physiotherapist Technician, CRRH Gelephu, Sarpang
24. Mr. Indralal Regmie, ENT Technician, Yebilaptsa Hospital, Zhemgang'
25. Mr. Sangay Ophthalmic Technician, CRRH Gelephu
26. Mr. Tshering Dorji, Ophthalmic Technician, Gelephu Hospital
27. Mr. Tshering Dorji, ENT Technician, CRRH Gelephu
28. Ms. Pema Chenzom, ENT Technician, Trongsa Hospital
29. Ms. Yeshy Lhadon, Ophthalmic Technician, Damphu Hospital
30. Mr. Kinley Phub, ENT Technician, Samtse Hospital
31. Mr. Tshering Dorji, ENT Technician, Samdrup Jongkhar Hospital

Region: Monggar

Regional Coordinators

1. Dr. Kinzang P. Tshering, Pediatrician, Medical Director, JDWNRH, Thimphu
2. Mr. Jigme Dorji, Principal, Changangkha Middle Secondary School, Thimphu
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2. Mr. Jambay,Teacher, Wangdue Chhoeling Lower Secondary School, Bumthang
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4. Mr. Pema Lhundup,Teacher, Tshompoling Primary School, Lhuentse
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8. Mr. Pema Rinzin, Teacher, Pema Gatshel Middle Secondary School
9. Ms. Rinchen Wangmo,Teacher, Samdrup Jongkhar Primary School
10. Mr. Sangay Tempa,Teacher, Samdrup Jongkhar Primary School
11. Ms. Kunzang Wangmo,Teacher, Khaling Lower Secondary School, Trashigang
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13. Ms. Yeshi Zangmo,Teacher, Trashi Yangtse Lower Secondary School
14. Mr. Nima Gyeltshen,Teacher, Trashi Yangtse Lower Secondary School
15. Mr. Phuntsho wangdi,Teacher, Wangduecholing Lower Secondary School, Bumthang
16. Mr. Jigme Chogyel,Teacher, Samdrup JongkharPrimary School
17. Mr. Tashi Phuentsho,Teacher, Samdrup JongkharPrimary School

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20. Mr. Kezang Tashi, Physiotherapist Technician, Samdrup JongkharHospital
21. Ms. Lungten Zangmo, Physiotherapist Technician, Pemagatshel Hospital
22. Mr. Rinzin Dorji, Physiotherapist Technician, Trashigang Hospital
23. Mr. Sherab Dorji, Physiotherapist Technician, Trashi YangtseHospital
24. Mr. Phub Dorji,Physiotherapist Technician, Wangduecholing Hospital, Bumthang
25. Mr. Kharananda Adhikari, Physiotherapist Technician, Riserboo Hospital, Wamrong, Trashigang
26. Mr. Tashi Phuntsho, Ophthalmic Technician, Pema Gatshel Hospital
27. Mr. Sherab Gyeltshen, Ophthalmic Technician, Riserbo Hospital, Wamrong, Trashigang
28. Mr. Karma Tenzin, Ophthalmic Technician, Bumthang Hospital
29. Mr. Samdrup Tshering, Ophthalmic Technician, ERRH Mongar
30. Mr. Sonam Tshering, Ophthalmic Technician, Trashi Yangste Hospital
31. Mr. Pelden, Ophthalmic Technician, Rangjung BHU, Trashigang
32. Ms. Namgay Zam, ENT Technician, Bumthang Hospital

Dzongkhag Statistical Officer (DSO)

1. Tenzin, Bumthang
2. Dorji Wangdi, Chhukha
3. Dorji Peljor, Dagana
4. Tashi Dorji, Gasa
5. Sonam Wangchuk, Haa
6. Karma Thinley, Lhuentse
7. Tandin, Monggar
8. Dorji Lethro, Paro
9. Bikash Chettri, Pemagatshel
10. Pema Jampel, Punakha
11. Chimmi Tshewang, Samdrup jongkhar
12. Phuntsho Chhoegyal, Samtse
13. Kishore Chettri, Sarpang
14. Sonam Choden, Thimphu
15. Dorji Chedup, Trashigang
16. Sonam Tshering, Trashi Yangtse
17. Wangchuk, Trongsa
18. Gem Tshering, Tsirang
19. Nimala, Wangdue Phodrang
20. Tshewang Rinzin, Zhemgang

Bhutan Multiple Indicator Survey(BMIS)

Second Stage Disability Assessment

BOOKLET FOR CHILDREN 2-9 YEARS

CHILD INFORMATION PANEL	CF
To be completed by the Dzongkhag Statistical Officer before the assessment using information provided by NSB.	
CF1. Block/Chiwog name and code: __________________________ ___ ___ ___	CF1A. Gewog/Town name and code: __________________________________ ___ ___
CF1B. Dzongkhag Name & Code: __________________________ ___ ___	CF2. Household Serial number: ___ ___ ___
CF3. Child's serial number:	CF4. Childs date of birth: ___ ___
___ ___	___ ___ / ___ ___ / ___ ___ ___ ___
CF5. Age of child ___	CF6. Sex of child Male......1 Female......2

WE ARE FROM MINISTRY OF EDUCATION AND HEALTH. WE ARE CONDUCTING A SURVEY ON THE SITUATION OF CHILDREN IN BHUTAN. WE WOULD LIKE TO UNDERTAKE AN ASSESSMENT OF YOUR CHILD TO SEE WHETHER YOUR CHILD HAS NORMAL GROWTH AND DEVELOPMENT. WE WILL CONDUCT SOME SIMPLE TESTS FOR THE SAME. THE ASSESSMENT SHOULD TAKE BETWEEN 30 MINUTES TO 1 HOUR. ALL THE INFORMATION WE OBTAIN WILL REMAIN STRICTLY CONFIDENTIAL.

IF YOU HAVE NO OBJECTION, MAY I START NOW?

☐ YES, PERMISSION IS GIVEN ☐ GO TO CF13

☐ NO, PERMISSION IS NOT GIVEN ☐ GO TO CF7. DISCUSS THIS RESULT WITH YOUR SUPERVISOR AND DSO

CF7: Was child brought to health centre?	Yes......1 No......2	1⇨ CF10
CF8: Was child brought to outreach clinic?	Yes......1 No......2	1⇨ CF10
CF9: Was child seen in their home?	Yes......1 No......2	
CF10. Status of assessment	Completed ......1 Mother/caretaker Refused ......2 Child uncooperative ......3 Not at home ......4 Child moved/ not found......5 Child has died......6 Partly completed 7	

CF11. Assessor (Name and number): Name______________________ _____ ___	CF12. Supervisor (Name and number): Name______________________ ___ ___	

THANK THE RESPONDENT AND THE CHILD FOR HIS/HER COOPERATION AND REFER THE MANUAL FOR POSITIVE PARENTING ADVICE (PPA)

CF13. Record the starting time.(24 hours)	Hours and minutes __ __ : __ __	

BACKGROUND INFORMATION		BF
BF1.WHAT IS THE NAME OF THE CHILD	________________________________	
BF2. IS (NAME) MALE OR FEMALE?	Male.. 1 Female... 2	
BF3. ARE YOU THE PRIMARY CARETAKER OF (NAME)?	Yes.. 1 No 2	
BF4. WHAT IS YOUR RELATIONSHIP TO (NAME)?	Mother .... 1 Father .... 2 Grandparent .... 3 Sibling .... 4 Other relative .... 5 Friend/neighbour .... 6 Babysitter .... 7 Other (please specify) ________________ 8	
BF5. DOES (NAME) HAVE A HEALTH CARD? *IF YES, ASK:* MAY I SEE IT?	Yes, seen.. 1 Yes, not seen.. 2 No .... 3 Don't Know 8	
BF6. CHILD'S WEIGHT	Kilograms (kg)..................__ __ . __ __ __ Weight not measured...............99.999	
BF7. CHILD'S LENGTH OR HEIGHT	Length (cm) ....__ __ . __ . __ Length / Height not measured 999.9	
BF8. Enter Day / Month / Year of assessment:	___ ___ / ___ ___ / ___ ___ ___ ___	

BF9. In what month and year was (name) born? Refer to the health card if available Month and year must be recorded.	___ ___ / ___ ___ / ___ ___ ___ ___	
BF10. Calculate chronological age in months	___ ___ ___ . ___ ___	
BF11. Was (name) born after completing full 9 months of pregnancy? *If possible refer to health card*	Yes .... 1 No .... 2 Don't Know 8	1 ⇨BF15
BF12. By how many weeks was (name) born early? *If possible refer to health card*	___ ___	
BF13. Record gestational age in weeks *Refer to health card*	___ ___ . ___ ___	
BF14. Calculate corrected age in months	___ ___ . ___ ___	⇨ BF16
BF15: Check chronological age in BF10 ☐ 24 months ⇨ Continue with Assessment A ☐ 25 to 60 months. ⇨ Continue with Assessment B ☐>5 to 9 years. ⇨ Continue with Assessment C		
BF16: Check corrected age in BF14 ☐24 months ⇨ Continue with Assessment A ☐ 25 to 60 months. ⇨ Continue with Assessment B ☐>5 to 9 years. ⇨ Continue with Assessment C		

Assessment A: (24 Months) **AA**

Enter age of child in months____________

☐ 24 months ⇨ Refer to Form 8

Name: **Sex:**

24 Months: **Form-8**

	Grades of Risk of Impairment		
Normal=0	**Mild=0.5**	**Moderate=1**	**Severe=2**
I. Gross motor	**Motor Activity**		
I. 8.1 Runs (24m)	attempts	walks only	walks with support
I.8.2 Kicks a ball (24m)	walks into ball	only positions self	does not try
I.8.3 Climbs stairs holding rail, both feet per stair (24m)	unsteady	needs help	does not try
II. Fine motor	Hand Activity		
II.6.3. Precise release of a pellet (size of a *'muri'/* puffed rice) into a small container (15-24m)	clumsy release	attempts, unsuccessful release	poor attempt
II.8.1 Drinks water from cup (24m)	clumsily	attempts	no attempt
II.8.2 Throws a ball very near (24m)	unsteady release	attempts	does not attempt
III. Vision	**Quality of Visual Behavior**		
III.5.1 Fixate 100/1000 from 30cm distance (9-24m))	fixates smartie at 30 cm	fixates 1" cube at 30 cm	fixates suspended 2 ½ inch red ball at 25 cm or less
III.3.3. Follows moving adult at 3 meters (12-24m))	from 2 m	from 1m	from <1m
IV. Hearing	**Listening Response**		
IV.6.2 Locates soft voice at 1 m distance above ear level (12-24m)	questionable R L	loud voice only R L	no response R L
IV.8.1 Points at doll's features when asked at 45 cm behind the ear with minimal voice (24m)	questionable R L	loud voice only R L	no response R L
V. Speech	**Quality of Vocal Expression**		
V.8.1 Joins two words together to express (24m)	4-6 meaningful words	2-3 meaningful words	single word
VI. Cognition	**Cognitive Function**		
VI.8.1 Assimilation of noun labels: associating between two nouns (eg. 'put spoon in cup'; 'give dolly to mummy') (24m)	with repeated prompting (>3 times)	at the one-noun level	cannot follow instruction
VI.8.2 Tower of 5 cubes (24m)	3-4 cubes	2 cubes	none
VI.8.3 Matches shapes on board puzzle (circle, triangle, square) (24m)	with repeated demonstration (>3 times)	one shape	none
VI.8.4 Asks for toilet by gesture or verbally (24m)	occasionally	partial (only for bowel movement)	never
Normal=0	Mild=0.5	**Moderate=1**	**Severe=2**

	Grades of Risk of Impairment		
Normal=0	**Mild=0.5**	**Moderate=1**	**Severe=2**
VI.7.2 #Spontaneous self-related symbolic play, eg. pretends to drink from cup or feed self (18-24m))	after demonstration	partial attempt (take the object)	does not attempt
VI.7.3 #Looking towards an object pointed at by examiner across the room: 'Oh! Look! There is a doll/car/ball" (18-24m)	after repeated cues (>3 times)	attempts, but not appropriately	does not attempt
VI.7.4 #Points at an object when asked, eg. "where is the light?" (18-24m)	after repeated request (>3 times)	attempts, but not appropriately	does not attempt
VI.7.6. #Detached-from-self symbolic play eg. feeds doll (20-24m)	after demonstration	partial attempt (take the object)	does not attempt
VII. Behavior	**Characteristics of Behavior**		
VII.2.3 Displays positive affect (1-24m)	sometimes negative	mostly negative	constantly negative
VII.4.1. Good attention to tasks (6-24m)	most of the time	very poor attention but not hyperactive	poor attention and hyperactive
VII.8.1 Cooperative (24m)	most of the time	infrequent	never
VII.8.2 Sociable (24m)	most of the time	infrequent	never
VII.3.3 #Good eye contact (3-24m)	most of the time	infrequent	never
VII.2.2 Normal sleep patterns (1-24m)	some disturbance	considerable disturbance	constant problem
VIII. Seizure	Frequency		
VII.4.1 No seizures (provoked or unprovoked) (6-24m) *(mother's recall)*	more than one typical febrile fit in the past year	more than one unprovoked seizure/ atypical febrile fit in past year	more than one unprovoked seizure/atypical febrile fit in the past week

ASSESSMENT A SUMMARY SHEET AA

Refer to the guide on the following page for scoring functional impairment

Functional Domain	Impairment (ICF)	Disability by Grade	Description in words of impairment (if any)
AA1.Gross Motor	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't Know............ 8	
AA2. Fine Motor	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA3.Vision	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA4. Hearing	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA5.Speech	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA6. Cognition	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA7. Behaviour	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA8. Seizure	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA9. Stunting	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA10. Wasting	Yes............1 No.............2	None............ 1 Mild .... 2 Moderate............ 3 Severe............ 4 Uncertain / Don't know............ 8	
AA11. Record the end time.(24 hours) Hour and minutes__ __ : __ __			*CF7*

Item wise grading sheet 24 Months

For each item, use one of the following codes: Normal = 1, Mild = 2, Moderate =3, Severe = 4

I. Gross Motor:

Item #	Grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
I.1.1/b		I.2.4/1		I.3.4/4-5		I.4.7/8		I.6.1/12	
I.1.2/b		I.2.5/2		I.3.5/5		I.5.1/9		1.6.2/13-14	
I.1.3/b		I.2.6/2		I.4.1/6		I.5.2/9		I.6.3/15-17	
I.1.4/b		I.2.7/2		I.4.2/6		I.5.3/9		I.7.1/18-23	
I.1.5/b		I.2.8/2		I.4.3/6-7		I.5.4/10		I.8.1/24	
I.2.1/1-2		I.3.1/3		I.4.4/7		I.5.5/10-11		I.8.2/24	
I.2.2/1		I.3.2/3		I.4.5/7		I.5.6/10-11		I.8.3/24	
I.2.3/1		I.3.3/3-4		I.4.6/8		I.5.7/11			

II. Fine Motor:

Item #	Grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
II.1.1/b-1		II.3.3/4		II.5.1/9-10		II.6.3/15-24			
II.2.1/2		II.3.4/5		II.5.2/11		II.7.1/18-23			
II.3.1/3-5		II.4.1/6-8		II.6.1/12-14		II.8.1/24			
II.3.2/3-4		II.4.2/7-8		II.6.2/12-14		II.8.2/24			

III. Vision:

Item #	Grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
III.1.1/b		III.2.1/1		III.2.4/2		III.3.3/3-24			
III.1.2/b		III.2.2/1		III.3.1/3-4		III.4.1/6-8			
III.1.3/b		III.2.3/2		III.3.2/5		III.5.1/9-24			

IV. Hearing:

Item #	Grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
IV.1.1/b		IV.2.1/1-3		IV.3.1/4-6		IV.4.2/7-11		IV.8.1/24	
IV.1.2/b		IV.2.2/1-3		IV.3.2/4-6		IV.6.1/12-23			
IV.1.3/b		IV.2.3/1-3		IV.4.1/7-11		IV.6.2/12-24			

V. Speech:

Item #	grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
V.1.1/b		V.3.1/4		V.4.1/6-8		V.6.1/12-14		V.7.1/18-23	
V.2.1/1		V.3.2/4		V.5.1/9		V.6.2/15		V.8.1/24	
V.2.2/2-3		V.3.3/5		V.5.2/10-11		V.6.3/6-17			

VI. Cognition:

Item #	Grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
VI.1.1/b		VI.3.1/3		VI.5.2/9-10		VI.6.4/14-15		VI.7.4/18-24	
VI.1.2/b		VI.3.2./3		VI.5.3/10		VI.6.5/15		VI.7.5/18-23	
VI.1.3/b		VI.3.3/4-5		VI.5.4/11		VI.6.6/16-17		VI.7.6/20-24	
VI.2.1/1		VI..4.1/6-7		VI.5.5/11		VI.6.7/16-17		VI.8.1/24	
VI.2.2/1		VI..4.2/7-8		VI.6.1/12-13		VI.7.1/18-23		VI.8.2/24	
VI.2.3/1		VI.4.3/8		VI.6.2/12-13		VI.7.2/18-24		VI.8.3/24	
VI.2.4/2		VI.5.1/9		VI.6.3/14		VI.7.3/18-24		VI.8.4/24	

VII. Behavior

Item #	Grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
VII.1.1/b		VII.1.4/b		VII.2.3/1-24		VII.3.3/3-24		VII.8.2/24	
VII.1.2/b		VII.2.1/1-2		VII.3.1/3-23		VII.4.1/6-24			
VII.1.3/b		VII.2.2/1-24		VII.3.2/3-23		VII.8.1/24			

VIII. Seizures:

Item #	Grade	Item #	grade	Item #	grade	Item #	Grade	Item #	grade
VIII.1.1/b		VIII.2.1/1-2		VIII.3.1/3-5		VIII.4.1/6-24			

ASSESSMENT B (25- 60 months) AB

Enter Age of child in months ___ ___ . ___ ___

☐ If 25-<30 months ⇨ Refer to Form 9
☐ If 30 - <36 months ⇨ Refer to Form 10
☐ If 36 - <42 months ⇨ Refer to Form 11
☐ If 42-< 48 months ⇨ Refer to Form 12
☐ If 48 - 60 months ⇨ Refer to Form 13

Name: **Sex:**

(25-<30) Months **Form 9**

Function	**Grade of Risk of Impairment**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
I. Gross motor	**Motor Activity**		
I.9.1 Runs	attempts	walks only	walks with support
I.9.2. Kicks a ball	walks into ball	only positions self	does not try
I.9.3. Climbs stairs holding rail, 2 feet /stair	unsteady	needs help	does not try
II. Fine motor	**Hand Activity**		
II.9.1. Precise release of a pellet (size of a 'muri'/puffed rice) into a small container	clumsy release	attempts, unsuccessful release	poor attempt
II.9.2. Drinks water from cup	clumsily	attempts	no attempt
II.9.3. Throws a ball with two hands very near	unsteady release	Attempts (hold)	does not attempt
II.9.4. Scribbles (with crayon on slate)	with difficulty	tries (hold)	cannot hold crayon
III. Vision	**Quality of Visual Behavior**		
III.9.1. Fixate 100/1000 from 30 cm distance	fixate smartie at 30cm	fixate 1 inch cube at 30cm	fixate suspended 2 ½ inch red ball at 25cm or less
III.9.2. Follows moving adult at 3 meters	from 2 meters	from 1 meter	from <1 meter
IV. Hearing	**Listening Response**		
IV.9.1. Points at doll's features when asked at 45 cm behind the ear with minimum voice	questionable Rt Lt	loud voice only Rt Lt	no response Rt Lt
V. Speech	**Vocal Expression**		
V.9.1. Joins two words together to express	4-6 meaningful words	2-3 meaningful words	one single word
VI. Cognition	**Cognitive Function**		

Function	**Grade of Risk of Impairment**		
VI.9.1Assimilation of noun labels: association between two nouns (e.g. 'put spoon in cup'; 'give dolly to mummy')	with repeated prompting (>3 times)	at the one noun label	cannot follow instruction
VI.9.2.Tower of 5 cubes	3-4 cubes	2 cubes	None
VI.9.3.Matches shapes on board puzzle (circle,triangle,square)	with repeated demonstrations (>3 times)	1 shape	None
VI.9.4.Asks for toilet by gesture or verbally	occasionally	partial (only for bowel movement)	never
VI.9.5. # Looks towards an object pointed at by examiner across the room: 'Oh! Look! There is the doll/ ball/car' etc. ,	after repeated cues (>3 times)	attempts, but not appropriately	does not attempt
VI.9.6. # Points at an object when asked, eg. 'where is the light?'	after repeated request (>3 times)	attempts, but not appropriately	does not attempt
VI.9.7. # Pretend play, eg. 'can you make a cup of tea?' then either feeds doll or self with cup	after demonstration	partial attempt, eg. takes the object	does not attempt
VII. Behavior	**Characteristics of Behavior**		
VII.9.1.Displays positive affect	Sometimes negative	mostly negative	constantly negative
VII.9.2.Good attention to tasks	most of the time	very poor attention but not hyperactive	poor attention and hyperactive
VII.9.3.Cooperative	most of the time	infrequent	never
VII.9.4.Sociable	most of the time	infrequent	never
VII.9.5.#Good eye contact	most of the time	infrequent	never
VII.9.6.Normal sleep patterns	some disturbance	considerable disturbance	constant problem
VII.9.7.No restricted, repetitive, stereotypic behavior, interest and activity	Seldom	sometimes	frequent
VIII. Seizure	**Frequency**		
VIII.9.1.No seizure (provoked or unprovoked) (mother's recall)	more than one typical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past year	more than one unprovoked seizure/ atypical febrile fit in the past week

Name: **Sex:**

(30-<36) Months **Form 10**

Function	**Grade of risk of Impairment**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
I. Gross motor	**Motor Activity**		
I.10.1.Jumping from height of 8 inches, with one foot leading	<8 inches with one foot leading	<6 inches	no jumping
I.10.2.Climbing stairs, alternate feet, hold one hand or holding rail/climbs stairs both feet per stair, not holding rail	climbs stairs holding rail, both feet per stair	needs assistance, both feet per stair	can't climb up
II. **Fine motor**	**Hand Activity**		
II.10.1.Laces 1 bead, no clumsiness	clumsily	tries but unsuccessful	does not try
II.10.2.Unscrews lid, no clumsiness	clumsily	tries but unsuccessful	does not try
II.10.3.Throws a ball with one hand, 3 feet	throws a ball with one hand, near	throws a ball with both hands	does not attempt
II.10.4.Draws a line (with crayon on slate)	with difficulty	tries	cannot hold crayon
III. **Vision**	**Quality of Visual Behavior**		
III.9.1.Fixate 100/1000 from 30 cm distance	fixate smartie at 30cm	fixate 1 inch cube at 30cm	fixate suspended 2 ½ inch red ball at 25cm or less
III.9.2.Follows moving adult at 3 meters	from 2 meters	from 1 meter	from <1 meter
IV. **Hearing**	**Listening Response**		
IV.9.1.Points at doll's features when asked at 45 cm behind both ear with minimum voice	questionable Rt Lt	loud voice only Rt Lt	no response Rt Lt
V. Speech	**Vocal Expression**		
V.9.1.Joins two words together to express	4-6 meaningful words	2-3 meaningful words	1 meaningful word
VI. Cognition	**Cognitive Function**		
VI.9.1 Assimilation of noun labels: association between two nouns (e.g. 'put spoon in cup'; 'give dolly to mummy')	with repeated prompting (>3 times)	at the one noun label	cannot follow instruction

Function	**Grade of risk of Impairment**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
VI.9.3.Matches shapes on board puzzle (circle, triangle, square)	with repeated demonstrations (>3 times)	1 shape	none
VI.10.1.Tower of eight cubes	tower of five cubes	tower of two cubes	none
VI.10.2.Identifies 5 pictures from picture card	=>2	1	none
VI.9.5. # Looks towards an object pointed at by examiner across the room: 'Oh! Look! There is the doll/ball/car' etc. ,	after repeated cues (>3 times)	attempts, but not appropriately	does not attempt
VI.9.6. # Points at an object when asked, eg. 'where is the light?'	after repeated request, (>3 times)	attempts, but not appropriately	does not attempt
VI.9.7. # Pretend play, eg. 'can you make a cup of tea?' then either feeds doll or self with cup	after demonstration	partial attempt, eg. Takes the object	does not attempt
VII. Behavior	**Characteristics of Behavior**		
VII.9.1. Displays positive affect	sometimes negative	mostly negative	constantly negative
VII.9.2.Good attention to tasks	most of the time	very poor attention but not hyperactive	poor attention and hyperactive
VII.9.3.Cooperative	most of the time	infrequent	never
VII.9.4.Sociable	most of the time	infrequent	never
VII.9.5.#Good eye contact	most of the time	infrequent	never
VII.9.6.Normal sleep patterns	some disturbance	considerable disturbance	constant problem
VII.9.7.No restricted, repetitive, stereotypic behavior, interest and activity	seldom	sometimes	frequent
VIII. Seizure	**Frequency**		
VIII.9.1.No seizure (provoked or unprovoked) (mother's recall)	more than one typical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past week

Name: **Sex:**

(36-<42) Months **Form 11**

Function	**Grade of Risk of Impairment**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
I. Gross motor	**Motor Activity**		
I.11.1.Jumping from height of 8 inches, both feet together	8 inches with one foot leading	<8 inches	no jumping
I.11.2.Climbs stairs, alternate feet, not holding	alternate feet, holding rail/both feet per stair, not holding rail	both feet per stair, holding rail	needs assistance
II. Fine motor	**Hand Activity**		
II.10.2.Unscrews lid, no clumsiness	clumsily	tries but unsuccessful	does not try
II.11.1.Throws ball with one hand, 5 feet.	one hand clumsily	two hands clumsily	no attempt
II.11.2.Laces 2 beads	2, but clumsily	1, but clumsily	no attempt
II.11.3.Draws a circle	incomplete (at least half circle)	tries (hold)	cannot hold cryon
III. Vision	**Quality of Visual Behavior**		
III.9.1.Fixate 100/1000 from 30 cm distance	fixate smartie at 30cm Rt Lt	fixate 1 inch cube at 30cm Rt Lt	fixate suspended 2 ½ inch red ball at 25cm or less Rt Lt
IV. Hearing	**Listening Response**		
IV.11.1.Points at pictures when asked at 45 cm behind the ear with minimum voice	questionable Rt Lt	loud voice only Rt Lt	no response Rt Lt
V. Speech	**Vocal Expression**		
V.11.1.3 words phrase	two words phrase	=>4 single words	2-3 single words
VI. Cognition	**Cognitive Function**		
VI.11.1.Assimilate noun label (3)	two label	one	none
VI.11.2.Matches 3 colors	two	one	none
VI.11.3.Builds Train	after repeated demonstration (4 or 5)	lines up the cubes (at least two)	does not try
VI.9.5. # Looks towards an object pointed at by examiner across the room: 'Oh! Look! There is the doll/ball/car' etc. ,	after repeated cues(>3 times)	attempts, but not appropriately	does not attempt

Function	**Grade of Risk of Impairment**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
VI.9.6. # Points at an object when asked, eg. 'where is the light?'	after repeated request, (>3 times)	attempts, but not appropriately	does not attempt
VI.9.7. # Pretend play, eg. 'can you make a cup of tea?' then either feeds doll or self with cup	after demonstration	partial attempt, eg. Takes the object	does not attempt
VII. Behavior	**Characteristics of Behavior**		
VII.9.1.Displays positive affect	sometimes negative	mostly negative	constantly negative
VII.9.2.Good attention to tasks	most of the time	very poor attention but not hyperactive	poor attention and hyperactive
VII.9.3.Cooperative	most of the time	infrequent	never
VII.9.4.Sociable	most of the time	infrequent	never
VII.9.5.# Good eye contact	most of the time	infrequent	never
VII.9.6.Normal sleep patterns	some disturbance	considerable disturbance	constant problem
VII.9.7.No restricted, repetitive, stereotypic behavior, interest and activity	seldom	sometimes	frequent
VIII. Seizure	**Frequency**		
VIII.9.1.No seizure (provoked or unprovoked) (mother's recall)	more than one typical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past week

Name: **Sex:**

(42-<48) Months **Form 12**

Function	**Grade of risk of impairment**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
I. Gross motor	**Motor Activity**		
I.11.1.Jumping from height of 8 inches, both feet together	8 inches with one foot leading	<8 inches	no jumping
I.12.1.Stands on one leg for 2 secs	with minimum help	with a lot of help	can't stand even with help
I.12.2. Descends stairs, alternate feet, hold rail or both feet per stair, not holding rail	both feet per stair, holding rail	needs assistance	no attempt
II. **Fine motor**	**Hand Activity**		
II.11.1.Throws ball with one hand, 5 feet	one hand clumsily	two hands clumsily	no attempt
II.12.1.Screws bottle	Clumsily	tries	no attempt
II.12.2.Laces 3 beads.	2, clumsily	1, clumsily	no attempt
II.12.3.Draws a cross (with crayon on slate)	incomplete (at least T)	tries/hold	cannot hold crayon
III. **Vision**	**Visual Acuity**		
III.9.1.Fixate 100/1000 from 30 cm distance	fixate smartie at 30cm Rt Lt	fixate 1 inch cube at 30cm Rt Lt	fixate suspended 21/2 inch red ball at 25cm or less Rt Lt
IV. **Hearing**	**Listening Response**		
IV.11.1.Points at pictures when asked at 45 cm behind the ear with minimum voice	questionable Rt Lt	loud voice only Rt Lt	no response Rt Lt
V. Speech	**Vocal Expression**		
V.12.1.4 words phrase	3 words phrase	2 words phrase	only single words
VI. Cognition	**Cognitive Function**		
VI.11.1.Assimilate noun label (3)	two label	one	none
VI.12.1.Builds Bridge	after repeated demonstration (>3 times)	tries (not complete)	does not try
VI.12.2.Matches 4 colors	Three	two	one

Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
VI.9.5. # Looks towards an object pointed at by examiner across the room: 'Oh! Look! There is the doll/ball/car'	after repeated cues (>3 times)	attempts, but not appropriately	does not attempt
VI.9.6. # Points at an object when asked, eg. 'where is the light?'	after repeated request, (>3 times)	attempts, but not appropriately	does not attempt
VI.9.7. # Pretend play, eg. 'can you make a cup of tea?' then either feeds doll or self with cup	after demonstration	partial attempt, eg. Takes the object	does not attempt
VII. Behavior	**Characteristics of Behavior**		
VII.9.1.Displays positive affect	sometimes negative	mostly negative	constantly negative
VII.9.2.Good attention to tasks	most of the time	very poor attention but not hyperactive	poor attention and hyperactive
VII.9.3.Cooperative	most of the time	infrequent	never
VII.9.4.Sociable	most of the time	infrequent	never
VII.9.5. # Good eye contact	most of the time	infrequent	never
VII.9.6.Normal sleep patterns	some disturbance	considerable disturbance	constant problem
VII.9.7.No restricted, repetitive, stereotypic behavior, interest and activity	Seldom	sometimes	frequent
VIII. Seizure	**Frequency**		
VIII.9.1.No seizure (provoked or unprovoked) (mother's recall)	more than one typical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past week

Name: **Sex:**

(42-<48) Months **Form 12**

Function	**Grade of risk of Impairmenr**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
I. Gross motor	**Motor Activity**		
I.11.1.Jumping from height of 8 inches, both feet together	8 inches with one foot leading	<8 inches	no jumping
I.12.1.Stands on one leg for 2 secs	with minimum help	with a lot of help	can't stand even with help
I.12.2. Descends stairs, alternate feet, hold rail or both feet per stair, not holding rail	both feet per stair, holding rail	needs assistance	no attempt
II. **Fine motor**	**Hand Activity**		
II.11.1.Throws ball with one hand, 5 feet	one hand clumsily	two hands clumsily	no attempt
II.12.1.Screws bottle	Clumsily	tries	no attempt
II.12.2.Laces 3 beads.	2, clumsily	1, clumsily	no attempt
II.12.3.Draws a cross (with crayon on slate)	incomplete (at least T)	tries/hold	cannot hold crayon
III. **Vision**	**Visual Acuity**		
III.9.1.Fixate 100/1000 from 30 cm distance	fixate smartie at 30cm Rt Lt	fixate 1 inch cube at 30cm Rt Lt	fixate suspended 21/2 inch red ball at 25cm or less Rt Lt
IV. **Hearing**	**Listening Response**		
IV.11.1.Points at pictures when asked at 45 cm behind the ear with minimum voice	questionable Rt Lt	loud voice only Rt Lt	no response Rt Lt
V. Speech	**Vocal Expression**		
V.12.1.4 words phrase	3 words phrase	2 words phrase	only single words
VI. Cognition	**Cognitive Function**		
VI.11.1.Assimilate noun label (3)	two label	one	none
VI.12.1.Builds Bridge	after repeated demonstration (>3 times)	tries (not complete)	does not try
VI.12.2.Matches 4 colors	Three	two	one

Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
VI.9.5. # Looks towards an object pointed at by examiner across the room: 'Oh! Look! There is the doll/ball/car'	after repeated cues (>3 times)	attempts, but not appropriately	does not attempt
VI.9.6. # Points at an object when asked, eg. 'where is the light?'	after repeated request, (>3 times)	attempts, but not appropriately	does not attempt
VI.9.7. # Pretend play, eg. 'can you make a cup of tea?' then either feeds doll or self with cup	after demonstration	partial attempt, eg. Takes the object	does not attempt
VII. Behavior	**Characteristics of Behavior**		
VII.9.1.Displays positive affect	sometimes negative	mostly negative	constantly negative
VII.9.2.Good attention to tasks	most of the time	very poor attention but not hyperactive	poor attention and hyperactive
VII.9.3.Cooperative	most of the time	infrequent	never
VII.9.4.Sociable	most of the time	infrequent	never
VII.9.5. # Good eye contact	most of the time	infrequent	never
VII.9.6.Normal sleep patterns	some disturbance	considerable disturbance	constant problem
VII.9.7.No restricted, repetitive, stereotypic behavior, interest and activity	Seldom	sometimes	frequent
VIII. Seizure	**Frequency**		
VIII.9.1.No seizure (provoked or unprovoked) (mother's recall)	more than one typical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past week

Name: **Sex:**

(48-60) Months **Form 13**

Function	**Grade of Risk of Impairment**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
I. Gross motor	**Motor Activity**		
I.11.1.Jumping from height of 8 inches, both feet together	8 inches with one foot leading	<8 inches	no jumping
I.12.2. Descends stairs, alternate feet, hold rail or both feet per stair, not holding rail	both feet per stair, holding rail	needs assistance	no attempt
I.13.1.Stands on one leg for 4 secs	momentarily	with help	can't stand even with help
I.13.2.Hops on one foot on the spot 2 times	1 times	can stand on one leg	can't stand on one leg
II. **Fine motor**	**Hand Activity**		
II.12.1.Screws bottle, no clumsiness	clumsily	try	no attempt
II.13.1.Laces beads (>3) no clumsiness	3 with clumsily	two with clumsily	one or none
II.13.2.Throws ball with one hand, 10 feet, no clumsiness	< 10 feet with clumsily	=<5 feet with clumsily	=<2 feet clumsily
II.13.3.Draws a square(with crayon on slate)	incomplete (at least two joined lines)	tries	cannot hold crayon
III. **Vision**	**Visual Acuity**		
III.9.1.Fixate 100/1000 from 30 cm distance	fixate smartie at 30cm Rt Lt	fixate 1 inch cube at 30cm Rt Lt	fixate suspended 2 ½ inch red ball at 25cm or less Rt Lt
IV. **Hearing**	**Listening Response**		
IV.11.1.Points at pictures when asked at 45 cm behind the ear with minimum voice	questionable Rt Lt	loud voice only Rt Lt	no response Rt Lt
V. Speech	**Vocal Expression**		
V.12.1.4 words phrase	3 words phrase	2 words phrase	single words
VI. Cognition	**Cognitive Function**		

Function	**Grade of Risk of Impairment**		
Normal = 0	**Mild = 0.5**	**Moderate = 1**	**Severe = 2**
VI.12.2.Matches 4 colors	Three	two	one
VI.13.1.Assimilate noun label (4)	3 words label	2 words label	1 word label
VI.13.2.Builds 3 steps	with repeated demonstration (>3 times)	tries, does not complete	no attempt
VI.9.5. # Looks towards an object pointed at by examiner across the room: 'Oh! Look! There is the doll/ ball/car' etc. ,	after repeated cues (>3 times)	attempts, but not appropriately	does not attempt
VI.9.6. # Points at an object when asked, eg. 'where is the light?'	after repeated request, (>3 times)	attempts, but not appropriately	does not attempt
VI.9.7. # Pretend play, eg. 'can you make a cup of tea?' then either feeds doll or self with cup	after demonstration	partial attempt, eg. Takes the object	does not attempt
VII. Behavior	**Characteristics of Behavior**		
VII.9.1.Displays positive affect	sometimes negative	mostly negative	constantly negative
VII.9.2.Good attention to tasks	most of the time	very poor attention but not hyperactive	poor attention and hyperactive
VII.9.3.Cooperative	most of the time	infrequent	never
VII.9.4.Sociable	most of the time	infrequent	never
VII.9.5.#Good eye contact	most of the time	infrequent	never
VII.9.6.Normal sleep patterns	some disturbance	considerable disturbance	constant problem
VII.9.7.No restricted, repetitive, stereotypic behavior, interest and activity	seldom	sometimes	frequent
VIII. Seizure	**Frequency**		
VIII.9s.1.No seizure (provoked or unprovoked) (mother's recall)	more than one typical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past year	more than one unprovoked seizure/atypical febrile fit in the past week

ASSESSMENT B SUMMARY SHEET AB

Refer to the guide on the following page for scoring functional impairment

Functional Domain	Impairment (ICF)	Disability by Grade	Description in words of impairment (if any)
AB1.Gross Motor	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB2. Fine Motor	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB3.Vision	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB4. Hearing	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB5.Speech	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB6. Cognition	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB7. Behaviour	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB8. Seizure	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB9. Stunting	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB10. Wasting	Yes............1 No.............2	None........................1 Mild........................2 Moderate........................3 Severe........................4 Uncertain / Don't know........................8	
AB11. *Record the end time.(24 hours) Hour and minutes__ __ : __ __*			☐ *CF7*

Item wise grading sheet (25-60 months)

For each item, use one of the following codes: Normal = 1, Mild = 2, Moderate =3, Severe = 4

I. Gross Motor:

Item #	Grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
I.9.1/25-<30		I.10.1/30-<36		I.11.2/36-<42		I.13.1/48-60			
I.9.2/25-<30		I.10.2/30-<36		I.12.1/42-<48		I.13.2/48-60			
I.9.3/25-<30		I.11.1/36-60		I.12.2/42-60					

II. Fine Motor:

Item #	grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
II.9.1/25-<30		II.10.1/30-<36		II.11.1/36-<48		II.12.2/42-<48		II.13.3/48-60	
II.9.2/25-<30		II.10.2/30-<42		II.11.2/36-<42		II.12.3/42-<48			
II.9.3/25-<30		II.10.3/30-<36		II.11.3/36-<42		II.13.1/48-60			
II.9.4/25-<30		II.10.4/30-<36		II.12.1/42-60		II.13.2/48-60			

III. Vision:

Item #	grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
III.9.1/25-60									
III.9.2/25-<36									

IV. Hearing:

Item #	grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
IV.9.1/25-<36									
IV.11.1/36-60									

V. Speech:

Item #	grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
V.9.1/25-<36									
V.11.1/36-<42									
V.12.1/42-60									

VI. Cognition:

Item #	grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
VI.9.1/25-<36		VI.9.5/25-60		VI.10.2./30-<36		VI.12.1/42-<48			
VI.9.2/25-<30		VI.9.6/25-60		VI.11.1/36-<48		VI.12.2/42-60			
VI.9.3/25-<36		VI.9.7/25-60		VI.11.2/36-<42		VI.13.1/48-60			
VI.9.4/25-<30		VI.10.1/30-<36		VI.11.3/36-<42		VI.13.2/48-60			

VII. Behavior:

Item #	grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
VII.9.1/25-60		VII.9.3/25-60		VII.9.5/25-60		VII.9.7/25-60			
VII.9.2/25-60		VII.9.4/25-60		VII.9.6/25-60					

VIII. Seizures:

Item #	grade	Item #	grade	Item #	grade	Item #	grade	Item #	grade
VIII.9.1/25-60									

ASSESSMENT C (60 + months)	**AC**
Enter Age of child in months ____ ____ . ____ ____	
Gross Motor	
AC1. Walks	Able ....1 Not able 2
AC2.Climbs stairs with alternate feet, not holding	Able ....1 Not able 2
Fine Motor	
AC3.Holds small object with pincer grasp in right hand	Able ....1 Not able 2
AC4.Holds small object with pincer grasp in left hand	Able ....1 Not able 2
AC5.Places a tiny object in the ½ inch bored container with right hand	Able ....1 Not able 2
AC6.Places a tiny object in the ½ inch bored container with left hand	Able ....1 Not able 2
AC7. Laces Beads (4 beads)	Able ....1 Not able 2
AC8. Draws shapes with tripod grasp	Able ....1 Not able 2
AC9 Unbuttons and buttons shirt	Able ....1 Not able 2
AC10.Throws a ball with one hand	Able ....1 Not able 2
Vision	
AC11. Vision	Normal....................1 Abnormal 2
Hearing	
AC12. Hearing	Normal....................1 Abnormal 2
Expressive Language	
AC13. Sentences of 4-6 word	Able ....1 Not able 2
AC14. Repeats complex sentences.	Able ....1 Not able 2
AC15.Uses pronoun (my, your)	Able ....1 Not able 2

AC16. Uses past and future tense	Able ....1 Not able 2
AC17. Uses preposition (on, under, in front, behind)	Able ....1 Not able 2
AC18. Takes part in conversation	Able ....1 Not able 2
Cognition	
AC19. Matches shapes (circle, square and triangle)	Able ....1 Not able 2
AC20.Matches colours (red, yellow, green and blue)	Able ....1 Not able 2
AC21. Understands (big/small, more/less, right/left)	Able ....1 Not able 2
AC22: Draws a man (head, body, arms and legs)	Able ....1 Not able 2
AC23. Builds 3 steps (5yrs)	Able ....1 Not able 2
AC24. Draws a square (5 yrs)	Able ....1 Not able 2
AC25. Builds 4 steps (6 yrs)	Able ....1 Not able 2
AC26. Builds house (6yrs)	Able ....1 Not able 2
AC27. Draws triangle (6yrs)	Able ....1 Not able 2
AC28. Draws diamond (7yrs)	Able ....1 Not able 2
AC29. Names 7 days (7-9 yrs) (4, random)	Able ....1 Not able 2
AC30. Names 12 months (7-9 yrs) (6,random)	Able ....1 Not able 2
AC31. How many days in a week (9 yrs)	Able ....1 Not able 2

AC32. How many months in a year (9yrs)	Able ....1 Not able 2
AC33. If a banana is cut in the middle how many parts will you get? (7-9 yrs)	Able ....1 Not able 2
AC34. If you have 2 pencils and I give you 2, now how many do you have? (7-9 yrs)	Able ....1 Not able 2
AC35. If you have 5 pencils and you give me 2, now how many do you have? (7-9 yrs)	Able ....1 Not able 2
Behaviour (Observation and recall of accompanying adult)	
AC36.Poor peer play	Yes ....1 No........2
AC37. Act very aggressively towards other people	Yes ....1 No........2
AC38. Acts extremely withdrawn and shy	Yes ....1 No........2
AC39. Shows odd/unusual behaviour	Yes ....1 No........2
AC40. Temper tantrum	Yes ....1 No........2
AC41. Hyperactive	Yes ....1 No........2
AC42. Inattentive	Yes ....1 No........2
AC43. Extreme fear	Yes ....1 No........2
Self care (Recall of accompanying adult)	
AC44. Feeds self	Yes ....1 No........2 Don't know 8
AC45. Drinks by self with cup/glass	Yes ....1 No........2 Don't know 8
Dressing (Recall of accompanying adult)	
AC46. Takes shoes on/off independently	Yes ....1 No........2 Don't know 8
AC47. Can undress and dress except to lace shoes, back button (7-9 yrs)	Yes ....1 No........2 Don't know 8
Toileting and Washing (Recall of accompanying adult)	

AC48. Bladder toilet trained independently	Yes .... 1 No .... 2 Don't know 8
AC49. Bowel toilet trained independently	Yes .... 1 No .... 2 Don't know 8
AC50. Washes and dries hands and face	Yes .... 1 No .... 2 Don't know 8
AC51. Washes body using water (7-9 yrs)	Yes .... 1 No .... 2 Don't know 8
AC52. Brushes teeth	Yes .... 1 No .... 2 Don't know 8
AC53. Brushes hair (7-9 yrs)	Yes .... 1 No .... 2 Don't know 8
Seizure (Recall of accompanying adult)	
AC54. Has seizures (unprovoked)	Yes .... 1 No .... 2 Don't know 8

ASSESSMENT C SUMMARY SHEET			AC
Refer to the guide on the following page for scoring functional impairment			
Functional Domain	Impairment (ICF)	Disability by Grade	Description in words of impairment (if any)
AC1.Gross Motor	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC2. Fine Motor	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC3.Vision	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC4. Hearing	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC5.Speech	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC6. Cognition	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC7. Behaviour	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC8. Seizure	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC9. Stunting	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC10. Wasting	Yes............1 No.............2	None..............................1 Mild ....2 Moderate..............................3 Severe ....4 Uncertain / Don't know..................8	
AC11. Record the end time.(24 hours) Hour and minutes		__ __ : __ _	CF7

ASSESSOR'S OBSERVATIONS

SUPERVISOR'S OBSERVATIONS

Annex H

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