

*Weighing methods according to  
the WHO child growth standards*

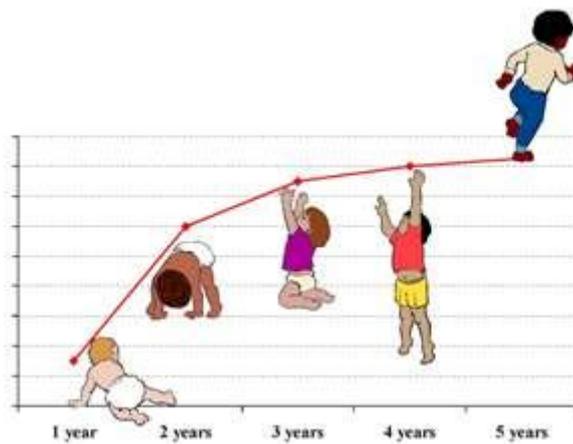
*Observations at the Nutritional Rehabilitation Home, Kathmandu, Nepal*



Veronica Nilsson  
January – June 2011

# *Weighing methods according to the WHO child growth standards*

*Observations at the Nutritional Rehabilitation Home, Kathmandu, Nepal*



**Thesis Nutrition and Dietetics**

Date: January – June 2011

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## *Preface*

One of the aims of my study at The Hague University is to work in a developing country. When the opportunity came to write my final thesis on a research project in Nepal, I grabbed the chance with both hands. As a result I spent one month at the Nutritional Rehabilitation Home (NRH) in Kathmandu, a home that nurses malnourished children back to health. During my stay I observed and evaluated the weighing methods used by the nursing staff, using the WHO Child Growth Standards for comparison. In addition I reviewed and evaluated the effects and implications of the implementation of these WHO guidelines within the scope of my own research. This report is meant to serve as an aid to improve the working methods at the NRH, so that the best care possible can be provided for the children receiving treatment there. The results might help other similar organizations as well.

I would like to thank the staff at the NRH for answering all my questions and providing me with the necessary information I needed for this project. A special thanks goes to the program manager Sunita Rimal, who shared her time and her expertise within the field of nutrition with me. I would like to thank the mothers and children who stayed at the NRH during my stay who taught me much about the living conditions in a country such as Nepal. I would also like to thank my warm and welcoming host family who, without complaining, let me out of the house at 5 am each morning to go and make my observations! Finally, I would like to thank my lecturers Rosemarijn de Jong and Ria van Kuijeren for guiding me through this process.

I wish you pleasant reading!

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## *Summary*

The aim of this rapport is to assure that the best care possible is provided for the children at the NRH, a home that treats children with malnourishment in Kathmandu, Nepal. In order to do so, the NRH asked me to evaluate the working methods performed by the nursing staff and to what extent they deviate from the WHO child growth standards. In addition, a review of relevant literature has been done to investigate what the implications of these standards are since their introduction in 2006.

The main method of the conducted research was through observation. The weighing times in the mornings were observed. The 4 regular nurses were observed on 8 occasions, leading to a total of 73 observation periods. The behavioural variables observed were decided beforehand based on the WHO child growth standards and were adjusted accordingly after a pilot observation. Besides the observations, an interview with the program manager, a discussion session with the nursing staff and a review of relevant literature were conducted.

Based on the results of the observations, several discrepancies were found in the working methods. A maximum margin of error was set to 5% by the program manager. This was not always met. The main cause of discrepancies was the use of the hanging (saltar) scale. Some discrepancies were caused by human faults.

Discrepancies can have enormous consequences for both people's health as for an entire society. Children might get sent home while still suffering from malnourishment. Not only can malnourishment cause reduced growth but it can also cause negative implications for cognitive and mental development. It increases the risk of infectious disease and can lead to death.

The literature review shows some contrasting results. Some research prove that the WHO child growth standards have a positive effect on identifying malnourishment in children below the age of 6 months, resulting in more children receiving treatment. However, the prevalence in children above 6 months is lower. This results in children being deprived from necessary treatment. The results on costs are also contrasting. Some studies argues that as more children at a younger age are being detected with malnourishment, quicker and shorter treatment can be given leading to less costs involved. Other studies show the opposite result saying that more malnourished children lead to higher medical and operational costs.

The conclusion drawn is that the working methods need to be improved. This will be done through the implantation of simple, easy to use work instructions. They explain step-by-step how to weigh a child with a minimum chance of error. Furthermore, is it recommended to have a meeting once a month, and once every 6 months execute a recapitulation of the WHO child growth standards. This is aimed at developing and maintaining better future work instructions for other tasks within the NRH. As well, the conclusion drawn is that since the introduction of the WHO child growth standards, more children are being admitted for treatment at the NRH. This leads to more costs involved.

Applied keywords: The WHO Child Growth Standards, child malnourishment, Nepal

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## **1. Introduction**

This first chapter describes the assignment and defines the problem and the research questions. It gives a short overview of the design and of the structure of the thesis.

### **1.1 The assignment**

The initiator of this project is the Nutritional Rehabilitation Home (NRH) in Kathmandu, Nepal. This is a center that nurses malnourished children back to health. When admitted to the NRH, the children are screened for malnourishment by the nursing staff. The screening is based on guidelines from the WHO, the so called Child Growth Standards. These standards were created in order to help health care workers measure children accurately. To be able to offer the children the best care, it is important that the tool is used in a correct way. Mistakes could have several implications, such as incorrect food intervention or sending children home while they are still malnourished. The program manager at the NRH has asked for an evaluation of the nursing staff's working methods in comparison to the WHO child growth standards, and would like to receive recommendations for improvements. The recommendations are to be worked out in a flowchart, as simple, easy to read work instructions.

In addition to the assignment at the NRH, a review of relevant literature has been done on the implementation of the WHO child growth standards. These standards were released in 2006 and were developed for the public health and other organizations world wide as a tool to monitor growth and development in children. In the review of literature, the effects and implications of these standards are analyzed. A reference is then made to the NRH and their experience with the implementation of the standards.

The objective of this thesis is to find out if the nursing staff's working methods deviate from the WHO child growth standards and how the usage of these standards can be improved. Hence, the aim of the thesis is:

*To assure that the best care possible are provided for the children staying at the NRH. This is done through:*

- ✓ *An evaluation of the working methods preformed by the nursing staff at the NRH, and the extend they deviate from the WHO growth standards*
- ✓ *An investigation of what the implications of these new WHO child growth standards are since their introduction.*

### **1.2 Relevancy**

The results from this study have relevance for all the NRH's in general and for the NRH in Kathmandu in specific. It gives the nursing staff an opportunity to review their ways of acting and working. It brings a certain awareness to light. Furthermore it gives the program manager an insight in a specific part of the operations that might need to be reviewed on a more regular basis.

This study could be relevant for other Nutritional Rehabilitation Centres who as well are working according to the WHO child growth standards.

### 1.3 Problem definition and research questions

#### Problem description

Organizations like the NRH use the WHO child growth standards as their guidelines to monitor the growth and development of the children. The growth standards are very precise and demand exact measuring. But measuring a child's length or weight correctly is not a simple task. The child has to stay still and the measurements have to be read and recorded correctly. In order to obtain the correct results, the same actions have to be executed exactly the same way each time the measurements are done. Different factors, like different members of the staff measuring the children, not enough knowledge or simply by human mistakes, could lead to differences and discrepancies in the working methods. In developing countries, where sources might be scarce, it can be difficult to always work as precise as the standards demands. All this could have an influence on the result of the screening which might in turn lead to incorrect treatment.

#### Research questions

The main research question of this assignment is formulated as follows:

*Do the NRH nursing staff's working methods deviate from the WHO child growth standards and how can the usage of these new standards be improved?*

In order to answer the main research question several sub questions have been formulated. The first part of the questions is linked to the WHO child growth standards while the second part is connected to the observations done at the NRH.

- *Why were new standards developed and what are the differences with the old method/s?*
- *What are the effects of the new standards on the prevalence of malnutrition?*
- *What other effects have been signalled?*
- *What is NRH's experience with implementing the new standards?*
  
- *Which discrepancies are found in the nursing staff's working methods?*
- *How often and why do the discrepancies occur?*
- *What could the discrepancies lead to?*
- *How can the discrepancies be kept to a minimum?*
- *In what way do the working methods change after the discussion session?*

### 1.4 Research design

The main research data is gathered through observations of the nursing staff. The behavioral variables observed are based on the WHO child growth standards. The reasons for choosing to use observations as research method are the language barrier and a less chance of getting socially desirable answers.

Furthermore, an interview was held with the program manager at the NRH where the outcomes of the observations were discussed. The opinion of the program manager is important to succeed with any improvements, or implementation, of new working methods. The outcomes of the observations were also shared with the nursing staff in a discussion session.

In addition, a systematic literature research has been done. It forms the base for the observations and helps answering the research questions.

## 1.5 Structure of the thesis

The first chapter of the thesis gives a general introduction to the research conducted. In chapter 2 the methods used for this rapport are described. Chapter 3-5 gives the base to the review of literature, starting with background information to Nepal and an overview on Nepal's nutritional situation in chapter 3. Chapter 4 gives background information to the NRH and explains its operations. The WHO child growth standards are described in chapter 5. Further, in chapter 6 are the results given. Chapter 7 contains the conclusion to this research and chapter 8 the recommendations. The thesis ends with the discussion in chapter 9.

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6	111 M. Pradhan	PEH	28 <sup>th</sup> March	16.2	85	100
7	111 F. Kulkarni	PEH	31 <sup>st</sup> March	17.5	118	100
8	211 F. Sulekumbha	CP, PEH	31 <sup>st</sup> April	18.4	97	100
9	154 M. Anandhappa	VSDE, PEH	12 <sup>th</sup> March	18.5	85	100
10	154 F. Rukam	PEH	31 <sup>st</sup> March	18.2	72	100
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## **2. Methods**

This chapter describes the different methods used in order to gather information to answer the research questions.

### **2.1 Data collection**

Data was collected through:

- Observations of the nursing staff at the NRH.

The research population included the 4 regular nurses working at the NRH in Kathmandu at the time of the observations. The purpose was to observe all 4 on 2 different occasions. However changes were made in the working schedule which meant 1 nurse was observed only once while another was observed on 3 occasions. The children are weighed each morning and this weighing time was the period observed.

A structured observation method was used. (1) This means that several beforehand decided behavioral variables were observed according to an observation sheet, see appendix I. These variables were daily tasks performed by the nurses in order to screen a child accordingly. Each task were observed and noted on the observation sheet. The tasks observed correspond to the WHO child growth standards, see paragraph 5.4, a pilot observation as well as additional literature, see paragraph 5.5. The pilot observation was carried out in order to make sure that the observation sheet was usable and to make sure the research questions could be answered. It was also used to determine the best location for observing, thus for repeatability. Some behavioral variables were changed after the try-out, mainly due to the use of a hanging scale.

It was decided to observe the weighing of 10 children per observation day, meaning 80 weighing moments in total. At the start of the observations, more children were present. 10 is a mean number set due to the possibility of arriving too late, the nurse starting earlier or the chance of children getting discharged. On 1 occasion did the nurse start the weighing time early. Less than 10 children were staying at the NRH on 2 observation moments due to discharge. In total were 73 weighing moments observed.

The reason to choose observations as my method was that the nursing staff speaks very little English. This makes an interview or a questionnaire difficult to use. Also, through observation there is less chance of a social desirable answer. (2) Direct observations as opposed to participant observations were executed. The reason to choose for direct observation was that it gives a more detached perspective. Another reason was that only some behavioral variables will be observed in this study and not the whole context. (3)

- In-depth interview with the program manager at the NRH.

Based on the outcome of the observations, the program manager on site was interviewed. An in-depth interview was conducted. The findings of the observations were shared, improvements were discussed and the design for the recommendations was formulated. This gave the program manager an opportunity to share her point of view. Her opinion is of great importance to succeed with improvements and implementation of new working methods. (2). The interview can be found in appendix IV.

- Discussion session with the nursing staff

A discussion session with the nursing staff was held. The outcome of the observations was shared and the nurses had a chance to voice their opinion. If the staff is not open to change or not aware to realize that things might have to improved, an implementation of new working methods could be unsuccessful. The session can be found in appendix V.

- Literature study

As background information, as a method to help support the observation questions and to help answering the research questions, a systematic research of literature was done. International, scientifically proven literature, found through the databases PubMed, Cinahl and Google Scholar, were used. Several internet sites from large health organizations where consulted, among others WHO's and Unicef's sites.

The choice of research methods was based on literature describing both qualitative and quantitative research methods.

## **2.2 Analysis of the collected data**

The analysis of the data involved the following steps:

- The data was checked on relevancy in comparison to the research questions.
- The collected data from the observations was compared to the WHO guidelines and other used literature.
- The collected data, researched literature and outcome of the interview with the program manager were used to answer the research questions. This includes the recommendations for improvements. The information was also shared with the nursing staff in a discussion session.

## **2.3 Quality aspects**

The chance of getting social desirable answers is limited through an observation, though the possibility of the research population acting in a 'desirable' way is present. To prevent this, the same nurse was observed on 2 different occasions (one nurse was observed only once and another 3 times). It is important that the research population is representative to the whole population hence only regular nursing staff (and not students, volunteers or other personnel) were observed. A pilot observation was done in the first week to check the observation sheets on suitability. Adjustments were made accordingly. A logbook was kept with all notes and collected data. Not only to ensure the validity of the study but also the reliability. Each week the progress of the study and the results of the study were discussed with the program manager. This enhances both the validity as well as the reliability. (1) The observation sheet was clear and usable with no margin for guessing. The collected data from the observations were compared to the WHO guidelines and other used literature. (1) To observe the nurses on 2 different occasions proved the reliability of the observation as it rules out random errors. All collected data were double-checked. (3)

The repeatability of the study was ensured by the following process:

Observing the weighing moment in the nurses office:

- Be at the NRH 5.50 am as the weighing starts at 6 am.
- Sit straight in front of the nurse and the scale, where it is also possible to see the medical journals where the nurse notes the measurements (while walking into the room the sitting space for observations is the examination table in front of you).
- Bring and use the correct observation sheet.
- As the scale is turning (it is a hanging scale) it might be necessary to leave the seat to be able to read the weight.
- Decline if asked to participate.

For the literature review, scientific publications have been used to ensure validity and reliability. Sources used may not be older than 20 years due to relevancy. To secure the objectivity, as far as possible, independent sources have been used. Only original publications have been used, this excludes the use of summaries and reviews.



### 3. Nepal and its nutritional status

This chapter gives background information to Nepal. In addition, it describes the country's nutritional situation.

#### 3.1 Background information Nepal

Nepal is a South Asian country, landlocked between India and China. It is divided into 3 regions: the plains of Terai in the south, the hills in the middle and the mountains in the north. (4) In 2009 the population of Nepal was estimated to approximately 29 million. Almost half the population is under the age of 15 and a redoubling in the population is estimated to occur in the coming 20 years. Life expectancy at birth is 67 years with a high infant and maternity mortality. (5)

Nepal is characterized by low levels of human developments and incomes. It's one of the poorest countries in South Asia. More than 30% of the Nepali population lives below the poverty line of US\$12 per person per month. (6) More than 80% of the population reside in rural areas and make a living out of farming. Most of the rural households have little or no access to primary health care, education, clean drinking water and sanitation services. The illiteracy rate is high, families are large and they are often landless or own only small landholdings (an average of 0.8 hectare). (7)



Figure 1: Map of Nepal

The agriculture sector is the single largest sector in the Nepalese economy. In the non-agricultural sector, manufacturing, trade and commerce, transport and communication are important sub-sectors. (4) Development of the mountain area is hard due to its topography with rudimentary infrastructure and poor communications. The country is ecological fragile, often hit by earthquakes, drought or heavy rainfalls. (6)

During a period of 11 years, Nepal experienced a turbulent political situation due to conflicts between the Maoist rebellions and the government. This inflicted a considerable physical, psychological, social and economic damage. (4) More than 14,000 people were killed and about 600,000 were internally displaced or made homeless. In 2006 a peace accord were signed between the government and the Maoists but even though the conflict has ended, peace and the political situation remains fragile. (6)

## 3.2 Nutritional situation

### Food and eating habits in Nepal

The main meal eaten in Nepal is dal bhat. This dish, which is served twice a day as breakfast and dinner, consists of rice (bhat), lentil soup (dal) and tarkari (vegetables in curry). Usually it is served with a pickle (achar) and sometimes with meat (masu). The lentil soup can be cooked with different types of lentils. Common used vegetables are potatoes, cauliflower and spinach. Preferable types of meat are chicken and buffalo.

The food is often served on a 'thal', a plate with separate compartments for the different types of food. Nepali people usually eat with their right hand. In between the two main meals snacks as bread, beaten rice, curried vegetables and milk tea are consumed. (8)

The composition of the Nepali meal is that of a typical diet in populations with a high prevalence of malnutrition. The diet consists predominantly of a starch-rich staple such as cereal (rice, grains, maize). The amounts of fruit, vegetables, legumes and pulses are often limited. It consists of little or no animal-source food. Such a diet is bulky, has a low density of energy and nutrition and is low in minerals. (9)

### Malnourishment

Even though progress has been made with the introduction of nutritional programs, malnutrition is a serious problem in Nepal. It is a major threat to the health of infants and children. The following numbers gives an indication of the severity of the nutritional situation in children under the age of 5. All the following conditions are caused by insufficient intake of macro- or micro-nutrients, or both. (10)

- 49% are suffering from protein energy malnourishment (PEM), meaning malnourishment due to lack of protein and energy.
- 39% are underweight, meaning the weight is too low for one's age.
- 49% are stunted, meaning the length/height is too short for one's age.
- 13% are wasted, meaning the weight is too low for one's length/height.

### Key causes of malnutrition in Nepal

As already mentioned, most people in Nepal live in rural areas. Only 40% of these rural households produce enough food to meet their year round needs. (11) Further, the limited availability and high prices of food forces households to consume less sufficient and nutritious food. A low consumption of fruit and fresh vegetables contributes to nutritional disorders such as vitamin A, iodine and iron deficiencies. (4)

The nutritional status and breastfeeding practices of mothers influence the nutritional status of a child. In Nepal almost 30% of all children are born with a low birth rate. (12) The reason is a low maternal nutritional status and high prevalence of anemia among pregnant women. (13) In addition, the feeding practices in Nepal are sub-optimal. Less than 50% of infants below 6 months are exclusively breast-fed. Almost 40% above 6 months are not fed according to recommended food groups, or not fed enough. Many women continue breastfeeding after 6 months without introducing complementary food or not feeding the child enough which, again, leads to insufficient nutritional sources for the child. (10) (12)

Several beliefs around food exists in rural areas. Pregnant women and small children are not given green leafy vegetables like spinach as it is believed to cause diarrhea. (14) These beliefs can be linked to a lack of education. Poor people cannot afford education which leads to a high illiteracy rate (around 50% in Nepal). Not being able to read or write limit people's knowledge about nutrition, health, sanitation and care practices. (15) (16) This situation in turn leads to a high prevalence in easily preventable and/or treatable infectious diseases. (17) A recognized infection that plays a key cause to malnourishment is intestinal parasites infection. The prevalence among children is very high and in some rural areas up to 75% of the population is infected. Intestinal parasites can cause persistent and poor nutritional status causing loss of appetite and a reduction in digestion and absorption, leading to nutrient losses. (17)

Based on above literature the conclusion drawn is that poverty is one of the key factors to malnourishment in Nepal. Due to poverty, people do not have access to proper health care nor education. Food sources available are limited and low in quality. Poverty is causing sub-optimal feeding practices. This link is demonstrated in the figure below.



Figure 2: Poverty as key cause to malnourishment

### **Consequences of malnourishment**

Malnutrition has several consequences not only for a person's health but also for a society as a whole. It increases the vulnerability to infectious diseases and the risk of mortality is high. (18) Several studies prove that an inadequate nutritional intake leading to deficiencies have serious effects on the cognitive and mental development of the child (16) and malnourished children often have lower IQ than children that are not. (19) (20) A severe iron deficiency can lead to reduced cognitive development in children influencing their achievements in school. (21) (9) An adequate intake of iodine is very important for development and growth. Deficiencies could also lead to health problems like goiter (enlarged thyroid gland), mental retardation, deaf-mutism and an increase in pre- and post-natal mortality. (19) A deficiency in vitamin A can lead to blindness and increases the risk of disease and death from common infections, such as diarrhea and measles. (22)

Furthermore, the maternal nutritional status is of large importance. Poor status and an inadequate intake during pregnancy might result in a premature birth and low birth rate. This is a major determinant for death. More than half of all new born and infant deaths in the world have malnutrition as underlying cause. In survival, the chance of a child born premature with intrauterine growth retardation is large. This will have an impact on a child's early development and on its health throughout life. (23) (24)

Almost needless to say, malnutrition has enormous implications. Low birth rate and disease caused by malnourishment results in substantial costs to the health sector and imposes a significant burden on a society as a whole. (24) (25) Malnutrition affects adult earnings through reduced lean body mass, including shorter height, and a decreased productivity in jobs requiring manual labor. (20) Both macro- and micronutrient deficiencies cause a huge problem not only health wise but contributes to reduced work productivity and economic output. As the Nepali economy is based largely on physical labor, malnourishment has large implications on the development of the country. (21) (26)



## **4. The NRH**

This chapter gives background information to the NRH and describes how it is operated. This is followed by an insight to the dietary regime.

### **4.1 Background information**

The NRH in Kathmandu has been in operation since 1998. It is set up and funded by the Nepal Youth Foundation (NYF), an American NGO. The purpose of the home is to nurse (severely) malnourished children back to health. The need for a home like this was recognized by the NYF. In Nepal the hospitals don't have the capacity to help malnourished patients. Patients are being sent home after being treated for their illness that brought them to the hospital in the first place, yet they might still be malnourished. Being recognized for helping vulnerable children, the NRH has successfully expanded over the years. Another 8 NRH's are now being operated throughout Nepal, all in connection to a hospital or health clinic. The NRH in Kathmandu works closely with Kanti children's hospital and most children are referred from there. However, to be able to reach more children, the NRH works with the local authorities in villages around Kathmandu where they set up reach-out camps. Children who visit a camp and are found underweight get the opportunity to stay and be treated at the NRH.

A child will stay at the NRH together with a caretaker. It could be a parent, grandparent or a guardian. At the NRH in Kathmandu, there is room for 26 child/caretaker pairs. The length of the stay depends on how malnourished and/or ill the child is but most stay for 5-6 weeks. During this time the child and the caretaker are fed healthy, nutritious food. An important part of the program is to educate the caretaker in health and nutrition. The purpose is that through knowledge the caretaker can prevent the child from becoming malnourished once back home again. Furthermore, the caretaker learns how to share the knowledge with others back in the home village. Through sharing knowledge, malnourishment can be prevented. (27)

The NRH recognize that once a child has been discharged, follow ups are very important to make sure it is well taken care of and that the caretaker is practicing what he/she learned. Each child is entitled to 3 follow ups. A slight loss of weight is common after the discharge. At the NRH the children are fed therapeutic milk, see paragraph 4.4, which is not available in the villages. At home children are also more physical active than at the NRH. The fieldworker will discuss the child's health and nutritional status with its caretaker and, if necessary, give advice. If a child is losing more than 10% of its weight, it will be advised to come back to the NRH again. (28)

### **4.2 Mission**

The mission of the NRH is included in the mission of the NYF: NYF transforms the lives of impoverished Nepali children by providing them with what should be every child's birthright – education, housing, medical care, and loving support. (29)

### **4.3 The operations**

The NRH is run by the program manager. She is managing the personnel, consisting of 2 part-time doctors, a dietitian and a teacher, 4 nurses, 2 fieldworkers, one office assistant and kitchen staff. In this chapter a summary of the most important players and their tasks are described. The work of the fieldworkers has already been mentioned.

The doctor plays an important role in the treatment of the children. With a lower immune system, malnourished children are more prone to infectious diseases. (18) Chest infections are common among the children at the NRH, as well as diarrhea and urinal infections. The doctor, who visits twice a week, checks up on the children, advice the caretakers and distributes medication.

The dietitian visits the NRH together with the doctor. She consults the children and the caretakers. She calculates the calorie and protein intake per child, based on the child's age, level of malnutrition and stage of treatment. Furthermore, she monitors the intakes so that the children actually are getting the planned calorie intake. As she is not on site every day, she works with the nurses and instructs them on appropriate feeding amounts. The dietitian is also involved in working out recipes as well as instructing the kitchen personnel.

The nursing staff oversees the daily health of the children, including monitoring food intake, medicine and vitamin intake and the growth and development of each child.

The nursing staff also keeps an eye on the hygiene. Children and caretakers must be clean, the communal areas must be kept clean and clothes have to be washed.

Furthermore, they are responsible for the admission and discharge. At admission, an intake form must be filled in containing information about the child's personal and medical history, and its feeding practices. The anthropometric measurements are taken down.

A child is discharged when it has gained weight at a normal increasing rate and its weight has been above 90% of the median reference value in the past 15 days. The child should have no vitamin or mineral deficiencies and be eating an adequate amount of food. The caretaker is given advice on danger signs should the child fall back into malnourishment again.

The teacher visits twice a week and give classes to the caretakers. The subjects taught varies and might be about nutrition, hygiene, child care, STD's or how to make incense. (30)

### **4.4 Dietary regime**

The food given corresponds to the food available for the children and caretakers at their homes. It is also food that is easy to prepare. The standard Nepali fare consists of dhal bat tarkari (lentils, rice and vegetables). Twice a week meat is served. Also germinated (sprouted) legumes are eaten twice a week, being served due to its high vitamin C content. The dhal bat is served twice a day. In between meals snacks as fruit and eggs are given. All children are fed therapeutic milk throughout the stay, starting with F75 to swift over to F100 when their nutritional status allows it. (30) Again, depending on the nutritional status of the child, some are fed therapeutic milk several times a day, even during the night. Children who are lactose resistant or refuse to drink the milk are given a super flour porridge called lito. This porridge is made from pulses and grains grounded to flour. Often vegetables and ghee (clarified butter) are added. (31) All junk food is discouraged and will not be served at the NRH. (30)

## 5. *The WHO Child Growth Standards*

This chapter describes the development, implementation and effects of the WHO child growth standards.

### 5.1 Background information

Growth charts are important instruments in assessing health and nutritional status of children. They help to determine the degree to which physiological needs for growth and development are met during the important childhood period. (32) Since the end of the 1970s many countries and international health organizations have used the National Center for Health Statistics (NCHS) international growth reference charts. This reference was developed as a clinical tool for health professionals to determine the physical growth of children.

Over the years, several limitations with the NCHS references have been documented and as it became clear that the references didn't adequately represent early childhood growth, the need of new references grew. (32) In the end of the 1990s, the WHO set up a research group which over several years collected data from a study population of more than 8000 children. (33) This project led to the new WHO child growth standards which were released in 2006, replacing the NCHS reference. (34)

### 5.2 The WHO child growth standards versus the NCHS reference

The fundamental approach of these new guidelines is that they are standards and not a reference, describing how children *should* grow rather than *how* they grew at a specific time and place. (35) The standards are a tool for assessing growth and development of children from birth to the age of 5. The standards are based upon that with correct feeding practices, good health care and under optimal environmental conditions, all children over the world have similar growing and developing patterns. (34)

A key feature of the WHO standards is that they are based on predominantly breast-fed infants, while the NCHS reference was based on predominantly formula-fed infants. (36) This is seen as a limitation in the NCHS reference as breastfed infants grow less rapidly, thus they deviate from the NCHS reference. This led to a higher risk in health workers making faulty decisions regarding the adequate growth of breastfed infants. Mothers were mistakenly advised to supplement their infants, or stop with breastfeeding altogether. Given the health and nutritional benefits from breastfeeding, this potential misinterpretation of growth pattern of healthy breastfed infants might have had great public health significance. (37)

Apart from breastfeeding, the WHO standards are developed based on optimal conditions for child growth. This includes nutritious, healthy food, vaccinations and good health care and non smoking mothers during and after pregnancy. (38)

Another key characteristic of the new standards is that they are developed using data from children from 6 different nations: Brazil, Ghana, India, Norway, USA and Oman. The standards are created to represent the whole world and with the purpose of being used internationally. Even though the NCHS reference was internationally used, it was based on data from children from one single country only, the US. The reference has over the years received criticism for not being internationally representative. (35)

Furthermore, changes have been made when it comes to the growth charts and the classification of malnutrition. The NCHS reference was based on the percentage of the median, meaning the ratio of the weight of an individual child to the reference mean weight, for a given height and sex. The WHO standards is based on the Z-score, meaning that Z-score is the number of standard deviation from the weight of an individual child to the reference mean weight, for a given height and sex. It has proven that the Z-score is a more accurate measurement than the percentage median. (36) The WHO has developed several different growth charts, with separate charts for boy's and girls. This is very important as boys and girls grow differently. The NCHS reference used only one set of growth indicators to monitor the growing trends, the weight-for-age.

Finally, the WHO standards provide tools to improve the knowledge and practical skills among health professionals. The purpose is to make it easier to detect both sub-optimal and excessive weight gain in children and to play an active role in the prevention of under nutrition and overweight, and in the health problems that arise from both. (39)

### **5.3 Impact and implications**

Research has been done on the effects and implications of the WHO child growth standards. Even though results from numerous studies shows that a significant larger number of children are identified as being malnourished while using the WHO child growth standards, in comparison with the NCHS reference, (36) (35) (40) (41) several concerns exist. Surveys done by Cattaneo (42) and Vesel et al. (43) show that even though more infants under 6 months are identified as malnourished with the WHO child growth standards, the prevalence of (acute) malnourishment among older infants is lower. This is supported by Schwarz et al, arguing that children that were classified as malnourished with the NCHS reference are now classified within a normal weight range. Affected children might be denied potential interventions. (44) Binns et al. is concerned that with an increase in infants below 6 months being detected with malnourishment, mothers will stop breastfeeding and infants might be exposed to unnecessary complementary food instead. This rapport from Binns argues that the new standards could lead to a reduction in overall breastfeeding, while the purpose of the standards is the opposite. (37)

On a positive note, De Onis et al. (35) and Isanaka et al. (40) recognize that the new standards provide a better tool to monitor the rapid and changing growth in infants. The demographic profile, nutritional status and treatment response of children would significantly change. Children identified with the new WHO standards would be younger and have higher z-scores on admission than children identified with the NCHS reference. They would have a lower frequency of death, quicker recovery and there would be less of a need for inpatient care due to a decrease in medical complications. In the study of Isanaka et al., (40) which is supported by other studies, it is suggested that the new WHO standards could be a useful tool in early detecting of acute malnourishment. Children can be treated easily and effectively before becoming complicated cases. (36) (41) This leads to a reduction of qualified nurses, doctors and specialized inpatient wards. (41)

In contrast however, Bilukha argues in his study that the increased number of malnourished children would lead to an increase in not only medical costs but also operational expenses, such as feeding programs, trained staff and feeding commodities. Agencies and organizations will have to increase their funding and substantial financial investments are needed for development of food programs. If not, the author cautions, the quality of the care might be compromised. (36) This conclusion is backed-up by Kerac who says that treatment supply is not sufficient for even the current demand. Only 9% of all children with severe acute malnourishment receive treatment. (45) More therapeutic food is needed, which is often the largest cost component in feeding programs.

Resources are also needed to maintain logistics and supply chains for such food. Substantial support is needed for the local health systems and staff who are involved in treatment. (45) Cattaneo et al. expresses concern for especially low income countries when it comes to adopting new standards, given the costs involved in replacing old charts, training of health workers and the implementation of using several anthropometric indicators. (42) On a further note, very few studies have been done on the practical use of the standards when it comes to weight and length management. With the implementation of the standards, the working methods of health care workers would change too. This seems to be overlooked by not only the WHO itself but also by independent researchers.

Schwarz et al. investigate the impact of the background data used in the development of the WHO growth standards and reach the conclusion that the standards should not be adopted blindly. There are concerns about the fact that the study population was selected for ideal growth conditions. They might therefore set too high standards that cannot realistically be achieved by many children. Further Schwarz et al. argue that the prevalence of stunting and underweight-for-age in their study might be due to a deviation in feeding patterns. The study is conducted in Gabon where early introduction to complementary food is common (as in most Central and West African countries) whereas the standards are based on predominantly breast-fed infants. Schwarz et al. is also concerned about the fact that, according to the standards, child growth is determined by living conditions rather than ethnicity. The question if not ethnic differences might have an impact on child growth remains unanswered. (44)

#### **5.4 Summary of the Child Growth Assessment course**

A training course on the WHO growth standards has been developed, meant as an implementation tool of the standards into health organizations. The course, called *Training Course on Child Growth Assessment*, is intended for health care workers, dietitians and nursing staff who measure and assess the growth of children. It teaches how to measure weight, length and height, how to interpret growth indicators, investigate causes of growth problems and how to counsel caregivers. (39) (46) The following is a summary of the growth indicators which the training course contains:

##### **Measuring weight**

The WHO recommends using an electronic, tarred scale that measures to a precision of 0,1 kg (100g). Tarred scale means that that the scale can be re-set back to zero ('tarred') with the person, for instance the mother, just weighed still on it. When the child is given to the mother, only the baby's weight will appear. This is very useful for weighing small children who are often agitated. It is also easy to use and reliable. Other scales that can be used include an electronic baby scale or pediatric beam balance scale. It is not recommendable to use a bathroom scale as they are often not accurate. A saltar (hanging) scale is also not recommended by the WHO as they are not reliable when weighing agitated babies.

According to the guidelines, a baby should be weighed naked and a child in underwear, culture permitting. If weighed with clothes on, it should be noted on the growth chart. Children that are older than 2 years and will stand still are weighed alone. The child is asked to stand in the middle of the scale with feet slightly apart. The child must remain still until the weight appears on the display. Weights should always be recorded to the nearest 0,1 kg. (47)

### **Measuring length or height**

If a child is less than 2 years old, recumbent length is measured using a length board with a moveable footboard. If a child is 2 years or older and able to stand, standing height is measured, using a height board. According to the guidelines, the child must not wear any shoes, socks nor hats or hair ornaments while being measured. Length/height is recorded to the last completed 0,1 cm. (47)

### **Growth charts and plotting**

The measurements should be plotted on the growth charts provided by the WHO, using separate charts for boys and girls. This is very important as boys and girls grow differently.

Plotting is used to monitor the growing trends of a child using growth indicators. The WHO recommends the following:

*Plot length/height for age:* This reflects growth in length/height in comparison to the child's age at a given point. This can help identify children who are stunted (too short for their age) due to undernourishment or repeated illness.

*Plot weight-for-age:* This indicator reflects body weight in relation to a child's age at a given point. It's used to assess whether a child is underweight or severely underweight. This indicator is commonly used as weight is easily measured but it cannot be relied upon if the child's age is unknown. Besides, a child can be underweight due to stunting (short height/length) or thinness or both.

*Plot weight-for-length/height:* This indicator reflects body weight in proportion to attained growth in length/height. It is a useful indicator where the age is not known. It helps to identify children who may be wasted or severe wasted.

*Plot BMI-for-age:* The BMI can be determined using the WHO charts or just a calculator. This indicator is not commonly used with underweight. (47)

### **Observing a child for clinical signs of marasmus, kwashiorkor and oedema**

Recognizing signs of marasmus and kwashiorkor is vital as they require urgent specialized care, including special feeding regimens, monitoring of food and liquid intake and medications.

Marasmus is a form of severe malnourishment where the child is severely wasted with a 'skin and bone' look. The face might look like one of an old man and the ribs are easily seen.

Weight-for-age and weight-for length are likely to be low. Kwashiorkor is a form of malnourishment where the child's muscles are wasted but the wasting may not be apparent due to oedema. The child is withdrawn, irritable, and obviously ill and will not eat. Due to oedema the face is round and the hair is sparse and discolored. Oedema in both feet is automatically considered severely underweight, regardless no other signs of kwashiorkor are present or what the scale says. If a child has oedema, it should be indicated on the growth chart. (47)

### **Interpreting trends and avoiding errors**

Correct measurement, plotting and interpretation of results are essential for identifying growth problems. Error in measurement and plotting is common among health workers. Many countries don't routinely assess linear growth however this assessment is very important to determine wasting or stunting. (39)

Trends on a child's growth chart may indicate that a child is growing well or that there is a growth problem. So when trends are interpreted, it is important to stay alert as some situations could indicate a problem or suggests a risk. Any sharp incline or decline in a child's growth chart needs attention. If a child has been ill, a sharp incline is expected as the child gets well again. But also, a sharp incline might be an indicator that feeding practices are not in order. If a child is gaining weight rapidly, the height must be looked at as the child might indicate a catch-up growth from a

previous malnourishment. A sharp decline in the growth line should always be investigated as it could indicate a growth problem. When reading trends, the whole situation of the child must be considered. In addition, it is important to keep in mind that trends actually might not be trends but due to a human measuring mistake. The WHO growth child standards recommends to always re-measure the child in case of a sharp incline or decline as a measurement might have been taken down wrongly. (48)

### 5.5 The NRH and the WHO child growth standards

In the daily operations, the NRH uses the above mentioned tool to assess growth and development of the children. The program manger has followed the 4 days training course. She then shared information from this training with the nursing staff.

Before the implementation of the WHO child growth standards, the NRH used the NCHS reference. (49)

The current growth indicators used by the NRH are as follows:

- *Weight-for-length*: This indicator is used for the in-takes and for the every day weighing.
- *Weight-for-age*: This indicator is used when a child does not score high on malnutrition using weight-for-length but does look malnourished. It is used as a double check. If the child scores high with this indicator, treatment is offered. (28)
- *Plotting on growth charts according to the z-score*: The NRH uses the WHO's separate boys and girls z-score reference cards to determine a child's degree of malnourishment. However they use their own grow charts rather than the recommended from the WHO. These are not separate boys and girls growth charts.
- *Observing clinical signs of marasmus, kwashiorkor and oedema*: This is done in the in-take. Oedema is controlled in the every day growth assessment.

As the NRH assesses the children according to the WHO child growth standards, the observations done in this report are therefore based upon these standards. However it was noticed that the nursing staff use a hanging scale rather than the recommended tarred scale. As a fact, the standards don't give any advice on how to use a hanging scale at all. As the NRH is using this type of scale, other sources for information have been used. Other sources recommend when using the hanging scale, to wait and read the record until the child is settled and is keeping still. It is important to not touch the child during the weighing. In addition, the child should not touch or hold on to something. (50)



## **6. Results of the observations**

This chapter is describing the results that were obtained from the observations, the interview with the program manager and the discussion session with the nursing staff. Complete overviews can be found in appendices III, IV and V.

### **6.1 Introduction**

The purpose of the observations is to assure that the best care possible can be given to the children being treated at the NRH. This is done through an evaluation of the working methods performed by the nursing staff at the NRH. The working methods are compared to the WHO child growth standards.

The observations took place during 8 days between 14<sup>th</sup> and 25<sup>th</sup> of March 2011. All 4 nurses working at the NRH were observed, 3 on 2 occasions and 1 on 1 occasion. In total were 73 observations executed, which means 73 children were weighed and their results were recorded during the observations.

### **6.2 Results from the observations**

All children are weighed at the same time every day, between 6-7 am. The weighing always takes place before breakfast. The children are weighed with their clothes on. There is little consistency in what kind of clothing and the amounts of clothing the children are wearing. For instance, it happened twice that a child was wearing trousers but on a later occasion it did not. The amount of layers of clothes differs as well. The nurses did not seem to reflect on this.

At the NRH, the children are weighed on a saltar (hanging) scale. As the scale is hanging, it is also moveable which helps the nurse to read the result properly. She can move with the scale. The nurses failed to stand in front of the scale 5% of the time, while reading a result. To use the hanging scale, the children will be put in a fabric bag which in turn is hung on the scale. The child should lie straight in the bag with no body parts hanging outside. Usually the mothers put their child in the bag and hang it on the scale. In 8% of the observed weighing moments the child was laid in the bag incorrectly. The nurse did not reflect in this. It happened in 19% of the observations that the nurses held on to the bag/child while reading the result. The reason observed for this was that the children were so agitated and moved so much that the needle did not keep still. But to be able to read an accurate result, the child needs to keep still. In 19% of the recorded observations the children would not keep still long enough for the nurse to be able to read an accurate result. The nurse did record a result though. This occurred with the children below 18 months of age.

At every intake the median weight (the weight the child should have) and 90% of that weight of the child is determined, using the WHO child growth standards. Separate charts for boys and girls are used. This is then noted on each child's individual growth chart. Each time a child has been weighed, the result is recorded on the chart and therefore also compared to the WHO growth standards. It is important that the measured result is correctly recorded, meaning that what the nurse reads on the scale corresponds to what she writes on the chart. 3% of the measured results were incorrectly recorded by the nurse.

The following figure demonstrated how many times a nurse correctly performed a task out of the 73 observations.

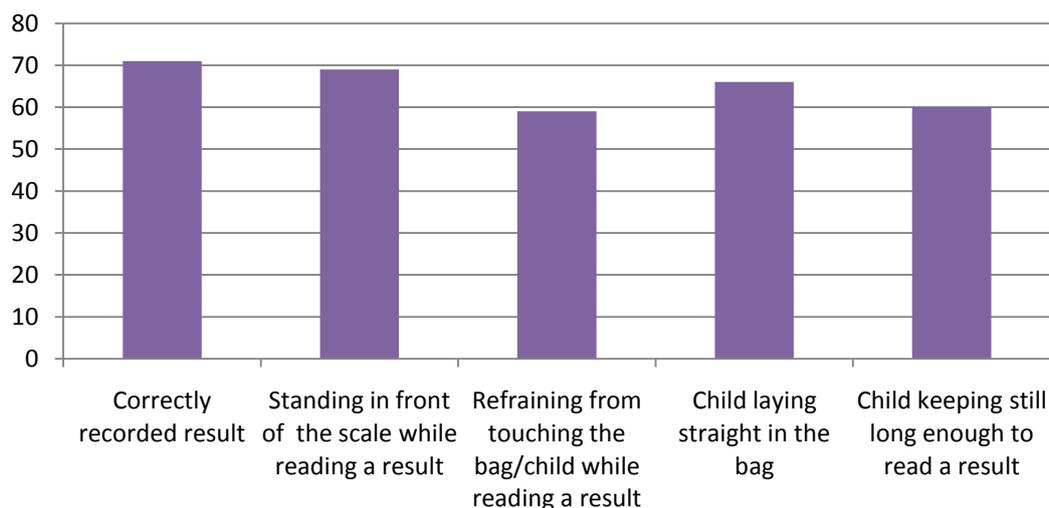


Figure 3: The results of the observations explaining how many times a nurse correctly performed a task out of the 73 observations.

### Other observations

While observing, other issues were noticed that could have an impact on weight management, children's health and the working environment for the nurses. When it comes to the hanging scale, it was noticed that it is time consuming to use. Each child has to get in and out of the bag. It has to be lifted and hung while the child is inside it. And it needs to hang still before the nurse can read a result. The bigger children had to lift their feet to not drag them on the ground. The whole process is physical demanding for both the mother and nurse.

There are 2 bags used on the hanging scale, one large and one small. For the large bag the nurse deducted 200 gram while no weight is deducted for the small one. On a later stage the small bag was weighed, and it shows a weight of 100 gram. Several children (how many children it concerns was not recorded) were one day weighed in the small bag and on the day after in the big bag. This was not noted by the nurse.

Furthermore, on six occasions it was noticed that a child showed a sharp incline/decline in weight in comparison with the previous day. The nurse did not always re take the measurements; however, on three occasions when this happened, the nurse did re-measure.

The nurse's room was often busy with not only the child being measured and its caretaker but with other children and mothers as well. The room is very small and it was observed that the busyness made it difficult for the nurse to perform her tasks properly and efficiently.

Finally, observations done during mealtime showed that weight loss could lead to the children being force fed by its caretaker. On some occasions (how often was not recorded) was this (assumed) weight loss caused by incorrect measuring or recording.

### **6.3 Results from the interview**

To be able to improve the working methods, the opinion and ideas from the program manager are very important. She would know what is workable within the organization. In this interview, the findings of the observations were shared, improvements were discussed and the design for the recommendations was formulated.

The program manager didn't expect any major issues with the working methods, except for an inconsistency in the amount of clothes the children are wearing at weighing point. She knew that this was an issue and that the nurses have difficulties asking the caretakers to dress the children in a consistent way. It is important that the nurses step up towards the caretakers.

For the other results, such an inconsistency was not expected. According to her, the nurse should know to always stand in front of the scale while weighing and never touch the child while reading the result. In a sharp incline or decline of weight, the nurse must re-measure.

As it is made clear that the use of a hanging scale is causing several of the discrepancies, the program manager doesn't see any issues with using the uniscale instead. When told that the small bag used for the hanging scale actually weighs 100 gram, the program manager is surprised. This must be deducted from the child's weight.

When asked about the force feeding, the program manager exclaims that the health and wellbeing of the child is the most important at the NRH. The responsibility of the nurses is to create a safe and happy environment for the children where they can become healthy again. Mealtimes should be a pleasant experience and this kind of behavior is not acceptable. The nurses should keep an eye on this and explain to the caretaker that forcing is only making the situation worse. It might affect the growth development of the child.

The program manager shares the following thoughts on the consequences of the found discrepancies: the calculated calorie and protein intake could be a problem with an incorrect weight. The dietitian could get confused as according to the record a child is gaining weight but doesn't eat enough food, or the opposite. It could also have an impact on how long a child is staying at the NRH. If a child is heavier according to the records than what it actual is, the child might be sent home while still being underweight. So the results have to be accurate.

To summon, the program manager wants to see the following implementations:

- The margin for discrepancies should be set at 5%.
- When it comes to clothes, the children can wear 1 layer in the summer and 2 layers in the winter.
- Re-measure the child at an incline or decline in weight of 200 gram or above in comparison with the previous day.
- The uniscale is to be used rather than the hanging scale.
- If the small bag is used, deduct 100 gram from the child's weight.
- The nurses must give the caretakers proper counseling.
- No force feeding.
- The eating environment must be pleasant.

### **6.4 Results from the discussion session with the nursing staff**

The purpose of this session was to discuss the findings from the observations with the nursing staff, to hear their opinion and what is workable for them. The program manager had already shared the results with them and some changes and improvement were already made.

The nurses think it's good that the observations have been done. They are open for improvements. The implementations done so far are that they now stand in front of the scale at each weighing moment while reading the result. They are no longer touching the child while reading the result. The hanging scale is still used but they have gotten a new digital baby scale. A digital standing scale will be bought soon too. However, they don't use the new digital baby scale as it is too large for the nurse's room. It is only used downstairs for the new in-takes. The hanging scale has been pinpointed as being the cause of several of the discrepancies, however despite these findings the impact is not proving reason enough for them to use the new scale. Space is a problem for them, they say. And with space being a problem, the nurses do recognize that during the weighing moments their room is too busy with people, making it difficult to work efficiently. They will try to be more firm on this matter and ask people to wait on their turn outside. The problem the nurses are facing is that the caretakers are not always listening to them. This goes for the consistency in clothing as well. They have told the caretakers that consistency in clothing is important but it is not always followed. The nurses agree to that 1 layer in the summer and 2 layers in the winter are manageable and will be controlling that the caretakers follow accordingly.

At first, the nurses didn't really seem to grasp the far reaching consequences of the issue of force feeding and the impact of the result of negative communication. It is normal they say, as the caretaker gets anxious if the child is not eating well. After explaining that forcing has the opposite desired effect, the nurses agree that they have to explain better to the caretaker that the weight can fluctuate.

The nurses understand the importance of re-measuring a child if the discrepancy in weight is too large compared to the previous day. They agree to re-measure a child with a 200 gram weight loss or gain.

The nurses did not realize there was an issue with the weight of the small bag for the hanging scale. When told, the nurses did not believe it brings the bags for weight checking (on the new digital scale). The small bag is actually 140 grams and the big, which they thought was 200 gram, is 320 gram! This was a rather embarrassing moment for the nurses. It's agreed that from now on, the correct weight from both bags will be deducted.

The nurses are aware of what the discrepancies in their working methods can have as consequences. They all say that there is a risk of sending children home too early while still being underweight and malnourished. Children could be deprived from getting a service they are entitled to. This shouldn't happen.



## 7. Conclusions

This chapter answers the research questions. First the sub questions will be answered, leading to the answering of the main research question.

### 7.1 Sub questions

#### **Why were new WHO growth standards developed and what are the differences with the old method/s?**

The previous internationally used NCHS reference didn't adequately represent early childhood growth. (32) The WHO standards are developed based on optimal conditions for child growth, meaning the data population had a similar background in health, nutrition and living environment. Infants were predominantly breast-fed whereas the NCHS reference is based on predominantly formula fed infants. The data population came not from 1 but from 6 different nations. (38) The fundamental approach of the new guidelines is that they are standards and not a reference, describing how children *should* grow rather than *how* they grew at a specific time and place. (35)

Furthermore, changes have been made when it comes to the growth charts and the classification of malnutrition. The z-score is used rather than the percentage of the median. (36) Several different growth charts are developed. The new standards use different growth indicators to monitor the growing trends while the NCHS only used one. This will rise the chance of detecting more malnourished children. Finally, the WHO standards provide tools to improve the knowledge and practical skills among health professionals.

#### **What are the effects of the new standards on the prevalence of malnutrition?**

The results from different studies are contrasting. The WHO standards do have a positive impact on identifying malnourishment, especially in younger infants below the age of 6 months. (40) (45) This means that more children could be treated and at an earlier stage, they would recover quicker and less inpatient care would be needed. Mortality rates would be lower. (35) (40) However some studies indicate that the prevalence in infants above 6 months is lower using the WHO standards. (42) (43) This could lead to children who were classified as malnourished using the NCHS reference are now being classified within a normal weight range. Affected children might be denied potential interventions. (44)

#### **What other effects have been signalled?**

Again, contrasting effects have been signaled. Some studies claim that due to an early detection and quick recovery, medical costs would be lower due to less medical complications. (35) (40) Less inpatient care results in a reduction of qualified nurses, doctors and specialized inpatient wards. (41) However several studies claim the opposite and say that the increased number of malnourished children would lead to an increase in medical and operation expenses. (36) Especially low income countries would face difficulties with the implementation of the new standards given the costs involved in replacing old charts, training of health workers and the implementation of using several anthropometric indicators. (42)

Other studies are critical to the study population criteria used for the WHO growth standards and argue that they might not be representative to the whole world's population. The concern is that many children do not grow under ideal conditions and are not breast fed according to the recommendations. Further, ethnicity might have an affect on growth which is something WHO might have failed to recognize. The standards set are so high and cannot realistically be achieved by many children. (44)

### **What is NRH's experience with implementing the new standards?**

With the WHO growth standards in place, The NRH use more indicators than only weight-for-age. This helps identifying more cases of malnourishment and more children can be treated at the NRH. This in hands adds to the costs, especially for the expensive therapeutic food that all children are given. Another cost involved would be for the training course. It has only been done by the program manager and not by the nursing staff even though it is the nursing staff using the standards. (49) A concern for the NRH would be that the sub-optimal feeding practises in Nepal, see paragraph 3.2, do not correspond to the criteria used for the WHO child growth standards which might lead to deviations in interpreting growth results. (44) However, further investigations is needed to rule this out.

### **Which discrepancies are found in the nursing staff's working methods?**

Several discrepancies are found. The NRH does not follow the recommendation of how children should be dressed while being weighed. (47) There is very little consistency in the clothing. The nurses' actions do not reflect on this aspect. The nurses are weighing the children on a hanging scale while this is not recommended by the WHO. However the WHO guidelines do not even give advice on how to use it, should it be the type of scale used. Other sources instruct to always stand in front of the scale while reading the result, never touch the child while reading the result and a result should not be read and recorded until the child is still and stable long enough that the health care worker is sure the result shown is accurate. (50) Several mistakes herewith were made. In addition, while using the hanging scale, the nurses did not take any weight off from the small bag while they did this for the larger bag. The small bag weighs 100 gram. This means that each child being weighed in the small bag is actually lighter than recorded. This could have an impact on food intervention and the child might get sent back home before being fully recovered.

Furthermore, the measured results were not always correctly recorded by the nurse. WHO recognize this as a potential problem even with the most experienced health worker. (39) Besides this, the WHO recommends the health care worker to re-measure in case of any major incline or decline in weight. The nurses at the NRH did not always re-measure even though on some occasions the discrepancy was significant. (48)

### **How often and why do the discrepancies occur?**

The children are always weighed with clothes on, with no consistency in clothing. The nurses know they should ask the caretakers to dress the children the same at each weighing moment but they don't.

3% of the measured results were not correctly recorded by the nurse. In the case of 5% of the observations, the nurses did not stand straight in front of the scale while reading a result. The reasons are human mistakes and a room busy with people who do not necessarily have to be there, creating a stressful working environment. Even though the nurses were asking people to wait outside, they do not comply.

In 19% of the observations it did happen that the nurse was holding on to the child or the bag while reading a result. In 19% of the observations the children were not still long enough for the nurse to read an accurate result. The smaller children were often agitated while being weighed. As they were not keeping still, the needle of the scale kept moving. This forces the nurse to hold the bag or child. In all observations, the nurse did record a result but that could not always have been an accurate result.

A larger weight gain or loss is not always reflected upon. The reason for this is pure ignorance from the nurse's side.

The nursing staff uses 2 different bags for the hanging scale. The large bag weighs 200 grams which is deducted from the weight. No weight is taken off from the small bag, even though it weighs 100 gram. The nurses did not think the bag would have an influence on the weight as it is so light.

The maximum margins of error of 5%, as set by the management, are not met. The conclusion is that the ways the nursing staff is working must be improved.

### **What could the discrepancies lead to?**

Within the NRH, the discrepancies could lead to an incorrectly calculated calorie and protein intake, as this is based on weight. The dietitian could get confused when, according to the records, a child is gaining weight but does not eat enough food. It could also have an impact on how long a child is staying at the NRH. If a child is heavier according to the records than what it actual is, the child might be sent home while still being underweight. Children could be deprived from getting a service they are entitled to, see appendices IV and V. A negative weight result due to discrepancies in measuring, led in some cases to the caretaker force feeding its child. This could have a negative impact on the child and recovering could be prolonged.

Malnutrition causes several consequences for a person's health. Reduced growth and reduced cognitive and mental development are common consequences. (16) Low IQ levels lead to lower school achievements. (19) (20) Malnourishment increases the vulnerability to infectious diseases and could lead to death. (18) On a long term this has enormous implications for a country. It results in substantial costs to the health sector. (25) And it affects adult earnings through reduced work productivity and economic output, as the Nepali economy is based largely on physical labor. (21) (26)

### **How can discrepancies of the working methods be kept to a minimum?**

Discrepancies can be kept to a minimum with the implementation of simple, easy to follow work instructions, see appendix VI. The instructions are based on the already existing working methods of the nursing staff, on the outcome of the observations and the outcome of the discussion with the program manager. The steps were also discussed with the nursing staff to make sure it is workable for them. The instructions explain step-by-step how to weigh a child with chance of minimum error. If a step in the process can not be executed in a correct way, the instructions give an explanation to what procedure to follow.

### **In what way do the working methods change after the discussion session?**

After the interview with the program manager, the findings were shared with the nursing staff. The biggest change according to the program manager is that the nurses are now more aware of the consequences of the discrepancies in their working methods. Two of the issues were addressed by them immediately:

- Not touching the child/bag while reading the result.
- Always stand in front of the scale while reading the result.

Further, it's up to the program manager to guide the nursing staff through the recommendations and make sure necessary changes in their working methods are done.

## 7.2 Main research question

The main research question has been phrased as follows:

*Do the NRH nursing staff's working methods deviate from the WHO growth standards and how can the usage of these new standards be improved?*

The WHO child growth standards focus on perfect ways of working leaving no space for discrepancies. The practicalities around measuring children are not taken in to consideration. This is not workable in all environments. In a country as Nepal where resources are scarce, it is not always possible to use the tools required to work perfectly according to the standards. Nor might there be enough sources for education. This leads to deviations between the working methods and the growth standards.

The WHO child growth standards are usable for the NRH as, if used correctly, more children can be detected with malnourishment. This leads to that more children can be treated. On a positive note, it fills up the yearly target set by the NRH, see appendix IV. However it will be costly as more therapeutic food is necessary.

The most important with this project is the awareness it brought, to both the nurses themselves and to the program manager. It brought awareness on their actual working methods and what the consequences discrepancies might lead to. This is the first step towards improvement. The second step is to improve the working methods. A simple work instruction guide has been developed and will guide the nursing staff through the weighing process, reducing the chance of errors. The final step is to review the work instructions on a regular basis to make sure they stay workable.



## 8. Recommendations

In addition to the work instructions described in chapter 7, further recommendations on how to secure the health of the children being treated at the NRH, are given in this chapter. Recommendations for future research are found here as well.

### 8.1 Short term implementations

The work the nurses perform can be improved with a meeting once a month. Any issues they are facing can be discussed, ideas on improvements can be shared and in general just to catch up on the daily operations of their work. In addition to the once a month get together, a recap of the WHO growth standards once every six months could be useful.

Further, if the budget permits, a recommendation would be to have the nursing staff follow the WHO Child Growth Assessment course, see paragraph 4.4, themselves. In the end, they are the ones working with the standards on a daily basis.

The program manager finds it important that the nurses can advise and counsel the caretakers. As a help, the program manager can share ideas with the nursing staff from the WHO Child Growth Assessment course. (51) This course gives advice on how to counsel a caretaker who is following its child's growth assessment.

### 8.2 Future research

The work instructions are developed for measuring weight only. Similar instructions can be developed for other screenings, like measuring length, for the in-takes, for the follow-ups in the villages and for the reach out camps. This would secure the health and nutritional status of the children being treated at the NRH further.

An assessment concerning the therapeutic food would be recommended. At the moment all children get therapeutic food throughout the whole stay. This is a rather large cost component for the NRH. The question is if children not being acute malnourished to be need feed therapeutic food throughout the whole stay. To assess each child and its nutritional intake would be recommended.

At the moment, the NRH is not using separate boys and girls' growth charts for plotting weight. This is very important to use as they grow differently. A research for the future could to analyse the use of separate charts and give recommendations for implementation.



## **9. Discussion**

This chapter will discuss a number of topics raised while writing this thesis. Firstly, limitations will be mentioned, followed by a discussion on the usability of the WHO child growth standards and the usability of this study. The chapter will end with a discussion on this report's added value for the dietitian.

### **Limitations**

This report has a number of limitations. Firstly, it has been a challenge to find appropriate literature. Little research has been done on the WHO child growth standards. And no available literature was found on the practical use of the standards. It seems to be a rather under investigated area. Further in this chapter, a discussion here over will follow.

Secondly the observations had some limitations. Before starting, I had conducted one pilot observation. However while observing, other variables were noticed which could have been interesting to observe as well. With a second pilot this could have been developed. Besides, I could have spent more time before starting with the observations to familiarize myself with the personnel and the operations of the NRH. That would have helped to better understand the role of the WHO child growth standards and how they fit in to NRH's ways of working.

While observing, I was sitting very close to the nurses. They were very aware of my presence. The program manager had not told them I was evaluating their working methods but they realized I was 'watching' them. This made them anxious. It is hard to say how much this influenced their ways of working. If I had had the opportunity to observe on a further distance and being less present, the results might have been different.

Cultural issues might also have had an influence on the methods used in this project. It was chosen for observations in order to keep social desirable answers to a minimum. This did cause some issues during the interview and discussion session. I had the feeling that answers given often were social desirable. Besides, during the discussion session the answers the nurses gave might have been influenced by the present of the manager. They agreed to most I said and had a difficult time answering when I asked them for their opinion.

Apart from the observations, I tried to gain as much knowledge about the operations of the NRH, the nutritional status in Nepal and other things involving the caretakers and children staying at the NRH. However I found it difficult to communicate with the staff. Often I got different answers to the same question or I got answers they thought I wanted to hear.

### **Usability**

In my study, I have looked at the practicalities of working with the WHO child growth standards. Unfortunately has very little research been done on this subject. Even the WHO doesn't seem to have any available research of the practical use of the standards and other independent researchers have mainly been focusing on comparing growth data. Since the introduction in 2006, more than 100 countries have implemented these standards. Exceptions do exist. As an example, the Netherlands and Belgium have decided to only use their locally developed charts, which are based on years of research data. The reason for not using the WHO child growth standards is the deviation in weight. (52) Still, this decision has nothing to do with the practical use of the standards. It seems like many countries as well as large organisations have no available information on the practical use and are blindly copying what the WHO says. Or do they find their own ways to work around the

standards to fit them into health sectors? This is what has happened at the NRH who is using the WHO child growth standards but not to completion and not without discrepancies.

This raises the question of what the consequences would be if organizations cannot properly work with the standards. Countries like the Netherlands and Belgium are wealthy and have the possibilities to use other measurements. But in low income countries where little money are spent on research and where sources are scarce for training of personnel or purchasing the correct measurement tools, the use of the standards would be sub-optimal. And more importantly, malnourished children might not get incorrect food interventions and being sent home while still being malnourished. Or children might stay longer in rehabilitation taking up space for others.

In my research I have enlightened the importance of working accurately with the standards. My research also shows that it is not always possible to do so. So the importance lays in reviewing working methods on a regular basis and to enforce solutions that not only provides the best care possible but also is workable within the organisation and its staff. If not and if no attention is spent on the practical use of the standards, I don't think the purpose of these standards can be completely fulfilled.

Another question that has to be asked, which is mentioned in this study, is if the standards are really representative to the whole world's population. In Belgium they do not think so. As most infants are formula fed in Belgium, the weight deviates from the WHO child growth standards. (52) This could be the case in a country as Nepal too, where breast feeding practises are far from optimal. In addition, in the Netherlands different growth charts are used for children from a Turkish and Moroccans background. It is recognised that they grow differently from children with a Dutch background. (53)

Having all this said, I still believe that the WHO child growth standards is a usable tool, offering more dimension to growth assessment than what the NCHS reference did. And for some countries and organisations no other options are available. In Nepal, the government has implemented the use of the standards in the public health as well as in other organizations assessing child growth. However each country or organisation using them should on a regular basis review not only linear growth but also the practical use of the standards. Work instructions helping the health workers performing their tasks accurately would be meaningful.

I would recommend other NRHs throughout Nepal to use this rapport as a support to review their working methods. Implementation of the work instructions would be possible too, as their working methods would be similar. This rapport can also be interesting for other Nutritional Rehabilitation Centres in similar low income countries. Not only brings it awareness to the issues with inaccurate working methods and what the consequences could be but it is also an usable tool for assessing working methods. It is usable because discrepancies found at the NRH are likely being found in other similar settings. Other low income countries would be facing the same issues with scarce resources, lack of education and lack of necessary growth assessment tools.

### **Added value for the dietitian**

For the dietitian, the WHO child growth standards are useful. It gives a good insight in feeding patterns and how children are growing and developing. And the fact that it is promoting breastfeeding is very positive. As a dietitian you often work according to different guidelines and standards. This study shows that even though guidelines are necessary, as a dietitian you do have to view them with a critical eye. They don't always work perfectly in practise. As a dietitian in the public health sector in the Netherlands you will work according to the Dutch dietary guidelines. However these guidelines are not always fully usable in all settings or for all segments of a population. It is important to realise this and, without losing the purpose of the guidelines, be open minded about other solutions and ways of thinking. And most important, always keep in mind what kind of consequences actions can have. This reflects the way dietitians and other health workers should behave when it comes to using the WHO child growth standards as well.

Furthermore, to experience a different country and culture has a large added value for the dietitian. To be able to take part in other ways of working and thinking is important for understanding and developing within the field. A dietitian in a country as Nepal is facing completely different issues then a dietitian in the Netherlands. The food habits are very different and an understanding hereabout brings value to the dietitian working with foreign patients at home. It also gives a perspective on how it would be to work as a Western dietitian in a country as Nepal, with our knowledge, and norms and values. For instance the Nepali standard meal is in our western eyes not considered a nutritious balanced meal. But it is something so rooted in tradition and culture that advising differently would be highly unacceptable.



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## Appendices

### Appendix I: Example of the observation sheet (weight)

Observation sheet Weight

<b>Observation sheet Weight</b>	Name and title staff member:		Date:							
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? (>2 years naked, <2 years underwear)										
If a child is weighed with clothes, is it noted on the chart?										
Does the weighing take place at the same time every day?										
Does the weighing take place before eating?										
Is the measured result correctly recorded?										
Is the weight compared to the WHO growth standards?										
Is the nurse standing straight in front of the scale while reading the result?										
Is the nurse touching the child or the bag?										
Is the child laying straight in the bag?										
Is the child keeping still long enough to be able to read a result (needle not moving)?										
Comments:										

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

## Appendix II: The observations

### Observation sheet Weight

Observation sheet Weight	Name and title staff member: Bhagawati, nurse		Date: 14/3							
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? <sup>1</sup> (>2 years naked, <2 years underwear)	no	no	no	no	no	no	no	no	no	no
If a child is weighed with clothes, is it noted on the chart?	no	no	no	no	no	no	no	no	no	no
Does the weighing take place at the same time every day? <sup>2</sup>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Does the weighing take place before eating? <sup>3</sup>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the measured result correctly recorded? <sup>4</sup> (what nurse reads on scale and what she writes in journal)	yes	yes	?	?	yes	yes	yes	?	yes	yes
Is the weight compared to the WHO growth standards?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse standing straight in front of the scale while reading the result? <sup>5</sup>	yes	yes	no	no	yes	yes	yes	no	yes	yes
Is the nurse touching the child or the bag? <sup>6</sup>	yes	no	no	no	no	yes	no	no	no	no
Is the child laying straight in the bag? <sup>7</sup>	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Is the child keeping still long enough to be able to read a result (needle not moving)? <sup>8</sup>	no	yes	yes	yes	yes	no	yes	yes	yes	yes
<p>Comments:</p> <p>1. At the NRH all children are weighed with clothes. This is the first observation. In the following observations I will try to look for a consistency in the clothes the children are wearing.</p> <p>2. The children are weighed between 6-7 am every morning</p> <p>3. The breakfast is served at 7 am</p> <p>4. On 3 occasions I couldn't read a result as room is small, it was busy and the scale was moving away from my direction. I don't know if the result was recorded correctly.</p> <p>5. On 3 occasions the nurse was not standing straight in front of the scale while reading the result. This because the room is really small, it's busy with people and the scale is moving. There wasn't enough room for her to move with the scale.</p> <p>6. On 2 occasions the nurse was touching the bag while reading the result</p> <p>7. 1 child was not hanging straight on the scale (bag was hung incorrectly)</p> <p>8. 2 children were agitated which meant needle was moving, the nurse was holding the bag still to be able to read a result. On these 2 occasions the nurse wouldn't have been able to read an accurate result.</p> <p>Further:</p> <p>A negative result of 2 children led to the parents 'force feeding' their children later that day. Some more education is needed for the parents to be able to support a child that won't eat. It's possible this happens but as much goes on in Nepali I don't understand what is being said.</p> <p>Twice the nurse double checked a child that had lost weight, to make sure that she had measured correctly.</p>										

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

Observation sheet Weight

<b>Observation sheet Weight</b>	Name and title staff member: Bhagawati, nurse						Date: 15/3			
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? <sup>1</sup> (>2 years naked, <2 years underwear)	no	no	no	no	no	no	no	no	no	no
If a child is weighed with clothes, is it noted on the chart?	no	no	no	no	no	no	no	no	no	no
Does the weighing take place at the same time every day?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Does the weighing take place before eating?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the measured result correctly recorded? (what nurse reads on scale and what she writes in journal)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the weight compared to the WHO growth standards?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse standing straight in front of the scale while reading the result?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse touching the child or the bag? <sup>2</sup>	no	no	yes	no	yes	no	no	no	no	no
Is the child laying straight in the bag? <sup>3</sup>	yes	yes	no	no	yes	no	no	yes	yes	yes
Is the child keeping still long enough to be able to read a result (needle not moving) <sup>4</sup>	yes	yes	no	yes	no	yes	yes	yes	yes	yes
<p>Comments:</p> <p>1. Today 2 children were weighed without trousers while yesterday they wore trousers. Scale showed weight loss. The nurse doesn't reflect on this.</p> <p>2. The nurse was touching the bag twice as children were very agitated and were moving a lot.</p> <p>3. On 4 occasions the children were not straight in the bag. The mothers put the children in the bag. Feet/legs were hanging outside on 3 children and 1 child has its head outside.</p> <p>4. Twice the child was moving so much, and so was the needle so it wasn't possible for me to read an accurate result and the nurse did it herself very quickly. The result recorded cannot have been accurate.</p> <p>Further: 1 child that showed weight loss, the nurse weighed again to make sure the result was correct. 200 gram is taken off the weight for the bag</p>										

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

Observation sheet Weight

Observation sheet Weight	Name and title staff member: Bhawana, nurse					Date: 16/3				
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? (>2 years naked, <2 years underwear)	no	no	no	no	no	no	no	no	no	no
If a child is weighed with clothes, is it noted on the chart?	no	no	no	no	no	no	no	no	no	no
Does the weighing take place at the same time every day?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Does the weighing take place before eating?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the measured result correctly recorded? <sup>1</sup> (what nurse reads on scale and what she writes in journal)	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the weight compared to the WHO growth standards?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse standing straight in front of the scale while reading the result?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse touching the child or the bag? <sup>2</sup>	no	no	yes	yes	no	no	no	yes	no	no
Is the child laying straight in the bag? <sup>3</sup>	yes	yes	yes	yes	yes	yes	yes	no	yes	yes
Is the child keeping still long enough to be able to read a result (needle not moving)? <sup>4</sup>	yes	yes	no	no	yes	yes	yes	no	yes	yes

Comments:

1. Twice the nurse wrote down an incorrect result but noticed her mistake and corrected herself. Once I couldn't see the result as scale was moving the other direction so don't know if the correct result was recorded.

2. The nurse is touching the bag on 3 occasions. Children are agitated and she tries to sooth them and is also taking her time for this. As the children are upset, it's also hard to read a result as needle keep on moving – hence nurse holding the bag. Extra notice: it's only the babies that won't lay still, with the bigger children (4-6 years old) it's not a problem. At the moment 5-6 babies (under 2 years, counting Monisha as baby too) stay at NRH.

3. 1 child is lying the wrong way in the bag, nurse didn't notice this. 1 child had its head hanging outside the bag; the nurse put the head inside the bag.

4. On 3 occasions the child was not keeping still long enough so it wasn't possible to read an accurate result, even though the nurse recorded one.

Further: nurse seems to be insecure of having me observing her and keeps asking me if she is doing it correctly (in a nonverbally way – sort of nodding with her head 'am I doing good?' I only smiles back at her without saying anything (Bhawana is the youngest of the nurses).

I try to look for consistency in the clothes the children are wearing but find it hard. The children that yesterday didn't wear trousers did wear them today though. One of the children without trousers keep on gaining weight while the other isn't. Difficult to know the impact of amount of clothes on weight. 2 babies didn't wear any hats today while on the other days they did.

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

## Observation sheet Weight

Observation sheet Weight	Name and title staff member: Bhawana, nurse				Date: 17/3					
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? (>2 years naked, <2 years underwear)	yes	yes	yes	yes	yes	yes	yes	yes		
If a child is weighed with clothes, is it noted on the chart?	no	no	no	no	no	no	no	no		
Does the weighing take place at the same time every day? <sup>1</sup>	yes	yes	yes	yes	yes	yes	yes	yes		
Does the weighing take place before eating?	yes	yes	yes	yes	yes	yes	yes	yes		
Is the measured result correctly recorded? <sup>2</sup> (what nurse reads on scale and what she writes in journal)	yes	yes	yes	yes	yes	yes	yes	yes		
Is the weight compared to the WHO growth standards?	yes	yes	yes	yes	yes	yes	yes	yes		
Is the nurse standing straight in front of the scale while reading the result? <sup>3</sup>	yes	yes	yes	yes	yes	no	yes	yes		
Is the nurse touching the child or the bag? <sup>4</sup>	no	yes	no	no	no	no	yes	no		
Is the child lying straight in the bag?	yes	yes	yes	yes	yes	yes	yes	yes		
Is the child keeping still long enough to be able to read a result (needle not moving)? <sup>5</sup>	yes	no	yes	yes	yes	yes	yes	no		
<p>Comments:</p> <p>1.The nurse had started before 6 am so I missed some children, hence only result for 8 children.</p> <p>2.The nurse made one mistake but corrected herself.</p> <p>3.On one occasion the nurse wasn't standing straight in front of the scale as the scale was moving and the room was busy with people.</p> <p>4.2 children were very agitated and wouldn't lie still so nurse had to hold the bag still to be able to read a result.</p> <p>5.Twice the child was moving so much that it couldn't have possible to read an accurate result.</p> <p>Further:</p> <p>Today the nurse was less concerned about my observing her, she seemed less nervous.</p> <p>1 child was wearing 3 layers of shirts today, the other days that child was wearing 1 layer only.</p>										

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

## Observation sheet Weight

<b>Observation sheet Weight</b>	Name and title staff member: Ruku, nurse		Date: 21/3							
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? (>2 years naked, <2 years underwear)	no	no	no	no	no	no	no	no		
If a child is weighed with clothes, is it noted on the chart?	no	no	no	no	no	no	no	no		
Does the weighing take place at the same time every day?	yes	yes	yes	yes	yes	yes	yes	yes		
Does the weighing take place before eating?	yes	yes	yes	yes	yes	yes	yes	yes		
Is the measured result correctly recorded? <sup>1</sup> (what nurse reads on scale and what she writes in journal)	no	yes	yes	yes	yes	yes	yes	yes		
Is the weight compared to the WHO growth standards?	yes	yes	yes	yes	yes	yes	yes	yes		
Is the nurse standing straight in front of the scale while reading the result?	yes	yes	yes	yes	yes	yes	yes	yes		
Is the nurse touching the child or the bag? <sup>2</sup>	yes	no	yes	yes	no	yes	no	no		
Is the child lying straight in the bag?	yes	yes	yes	yes	yes	yes	yes	yes		
Is the child keeping still long enough to be able to read a result (needle not moving)? <sup>3</sup>	yes	yes	no	yes	yes	no	yes	yes		
<p>Comments:</p> <p>1. The nurse noted 7,3 kg while I noted 7,4 kg.</p> <p>2. The nurse was touching/holding onto the bag while reading the result of 4 children. 2 of them had gained a lot of weight since yesterday (7 year old boy gained 400 gram and a 4 year old girl 300 gram). The nurse didn't reflect on this nor did she re-measure the children.</p> <p>3. 2 children were very agitated and wouldn't lie still. It was impossible for me to read an accurate result even though the nurse managed to read one. Nurse didn't try to calm the children down to be able to measure correctly. She was yelling at them!</p> <p>Further: Several children have gone home, only 8 left.</p> <p>The children don't wear the same amount of clothes each day. It's really hard to determine who is wearing what and how many layers. But I noticed 2 children that wore undergarments the other days, didn't had them on today (Nepali children wear thick vests and long-johns under their normal clothes.) Monisha has been wearing her trousers the last days. She is also gaining weight but again, it's hard to tell if it has to do with what she is wearing (as well as her eating)</p>										

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

## Observation sheet Weight

<b>Observation sheet Weight</b>	Name and title staff member: Bhawana, nurse						Date: 22/3			
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? (>2 years naked, <2 years underwear)	no	no	no	no	no	no	no			
If a child is weighed with clothes, is it noted on the chart?	no	no	no	no	no	no	no			
Does the weighing take place at the same time every day?	yes	yes	yes	yes	yes	yes	yes			
Does the weighing take place before eating?	yes	yes	yes	yes	yes	yes	yes			
Is the measured result correctly recorded? (what nurse reads on scale and what she writes in journal)	yes	yes	yes	yes	yes	yes	yes			
Is the weight compared to the WHO growth standards?	yes	yes	yes	yes	yes	yes	yes			
Is the nurse standing straight in front of the scale while reading the result?	yes	yes	yes	yes	yes	yes	yes			
Is the nurse touching the child or the bag? <sup>1</sup>	no	no	no	no	no	yes	no			
Is the child lying straight in the bag? <sup>2</sup>	yes	y/n	yes	yes	yes	yes	yes			
Is the child keeping still long enough to be able to read a result (needle not moving)? <sup>3</sup>	yes	yes	yes	yes	yes	yes	yes			
<p>Comments:</p> <p>1. The nurse touched the bag once but let go while she read the result.</p> <p>2. 1 child had its head outside the bag but nurse corrected this.</p> <p>3. 2 of the children were moving but it was still possible to read an accurate result.</p> <p>Further: Again, difficult to see how much clothes the children are wearing – lots of layers.</p> <p>Hanging scale: very heavy with the older children (Sudhal and 12 year old boy with CP). Backbreaking for both the mother and the nurse to get the child hanging.</p> <p>1 child gained 400 gram yesterday – today had had 'lost' it all again. Nurse did react to this but didn't re-measure the child.</p> <p>1 child gained 300 gram yesterday – today she had 'lost' 200 gram. Again nurse reacted but didn't re-measure.</p>										

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

## Observation sheet Weight

Observation sheet Weight	Name and title staff member: Sushwana, nurse					Date: 23/3				
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? (>2 years naked, <2 years underwear)	no	no	no	no	no	no	no	no	no	no
If a child is weighed with clothes, is it noted on the chart?	no	no	no	no	no	no	no	no	no	no
Does the weighing take place at the same time every day? 1	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Does the weighing take place before eating? 2	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the measured result correctly recorded? 3 (what nurse reads on scale and what she writes in journal)	yes	?	yes	yes	yes	?	yes	no	yes	yes
Is the weight compared to the WHO growth standards?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse standing straight in front of the scale while reading the result?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse touching the child or the bag? 4	no	no	no	y/n	no	no	y/n	no	no	no
Is the child lying straight in the bag?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the child keeping still long enough to be able to read a result (needle not moving)? 5	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
<p>Comments:</p> <p>1.The nurse had started before 6 am so I never saw the weighing of the babies.</p> <p>2.The children are never given any food before weighing. Yesterday a large group of new children were admitted. During the bus ride to the NRH from the village the children were given bananas and crackers. Some children were walking around with cracker packages this morning so there is a chance that they had been eaten before getting weighed. How many children it would concern and how much they had eaten is not possible to know.</p> <p>3.The room was very crowded with 2 nurses, 3 volunteers, several children and mothers. Twice it was not possible to see if a measured result was correctly recorded – this was done by second nurse and I couldn't always see the record book. One child I read 5,6 kg of the scale while 5,5 kg were recorded.</p> <p>4.Twice the nurse was holding the bag to keep it still but let go when she read the result.</p> <p>5.The observations today were of bigger children (no babies/small children) and no-one was upset or agitated. They all kept still.</p> <p>Further:</p> <p>22 new children arrived yesterday from a village and were weighed for the first time at the NRH this morning. It was rather chaotic with lots of people in the room and I often had to get out of my seat to read the results. The 2 nurses were helping each other which made it difficult to follow as they spoke in Nepali together (normally the nurse would say the result in English).</p> <p>One of the volunteers kept on asking questions to the nurse which made her nervous.</p> <p>Today they were weighing the children in another bag than usually. It's smaller than the standard bag. No grams were taken off the weights for this bag.</p>										

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

## Observation sheet Weight

Observation sheet Weight	Name and title staff member: Sushwana nurse		Date: 24/3							
	Child:									
	1	2	3	4	5	6	7	8	9	10
Is the child weighed without clothes? (>2 years naked, <2 years underwear)	no	no	no	no	no	no	no	no	no	no
If a child is weighed with clothes, is it noted on the chart?	no	no	no	no	no	no	no	no	no	no
Does the weighing take place at the same time every day?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Does the weighing take place before eating? <sup>1</sup>	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the measured result correctly recorded? (what nurse reads on scale and what she writes in journal)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the weight compared to the WHO growth standards?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse standing straight in front of the scale while reading the result?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the nurse touching the child or the bag? <sup>2</sup>	y/n	no	no	no	no	no	n/y	no	n/y	no
Is the child laying straight in the bag?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Is the child keeping still long enough to be able to read a result (needle not moving)? <sup>3</sup>	yes	no	yes	yes	yes	yes	yes	no	yes	yes
<p>Comments:</p> <p>1. I didn't see any children this morning with packages or wrappers.</p> <p>2. The nurse holds on to the bag 3 times but let go when she reads a result.</p> <p>3. 2 children were moving so much that it wasn't possible to read an accurate result. I don't know how nurse could read a result though she did.</p> <p>Further:</p> <p>The new children were not wearing the same clothes as yesterday. They had all gotten outfits from the NRH which to me looks heavier than their own clothes.</p> <p>The hanging scale looks so time consuming to me with each child that has to get in and out of the bag, the bag needs to be hanged and the bag needs to hang still before the nurse can read a result. For bigger children it's not handy as they have to lift their feet to not drag them on the ground.</p> <p>Yesterday all children were weighed in a small bag but today the nurse used the bigger bag (and took 200 grams off from the weight). Several (don't know how many) were much heavier today than yesterday (300-500 gram).</p>										

Observation filled in with Y (yes), N (no) or – (not known/not relevant)

### **Appendix III: An overview of the results from the weighing observations**

**1. Is the child weighed without clothes?:** No all the children are weighed with their clothes on. There is little consistency in the clothing. Sometimes a child is wearing trousers and sometimes not. The nurses didn't seem to notice. In Nepal it is still winter and several children wear layers of clothing. This makes it difficult for the observer to see how much a child is wearing. Noticeable though was one small child wearing one layer of shirts one morning and 3 layer the next. Also 2 children wore undergarments of the first observations and then one day they didn't. One morning 2 children were weighed without any trousers on and both showed weight loss. The day after the 2 children wore trousers again.

The new children that came in from the village on the 22<sup>nd</sup> of March were the first morning weighed with their own clothes. The second morning they were wearing clothes from the NRH, which are made of a heavier material.

No weight is taken off the result for clothes.

**Problem:** A consistency in the clothing is hard to determine but it's clear that the children are not wearing the same clothes or the same amount of clothes every day. The nurses don't seem to reflect on this. There is no weight taken off for clothes. This means that the read and recorded result can't be accurate.

**Consequences of discrepancy:** It might look like a child is losing/gaining weight while it isn't. This could have an influence on advised calorie/protein intake. An inaccurate result might be recorded. It could lead to a prolonged or shorter stay for the child. In the case of a shorter stay, a child that is still malnourished might be sent back home.

In one case where this discrepancy took place, a child had lost weight (was wearing less than before). The mother (in her frustration) was later force feeding her child which (obviously) had the wrong effect. For days after, the child and mother were struggling at each meal.

**Recommendation:** The children need to wear the same amount of clothes each morning. My advice would be to only wear one set, the undergarments (trousers and vest). This has to be communicated to the caretakers so they don't dress the children in more. If they do, the nurses should ask the caretakers to re-dress the child. If the children are cold they can be wrapped in a blanket while waiting.

It's also important how a negative result is communicated to the caretakers to prevent any harm for the child. The advice for the nurses would be to explain to the mother that weight loss sometimes occurs for no particular reason and supporting the child works better than forcing.

**2. If a child is weighed with clothes on, is it noted on the chart?:** No, as all children are weighed with clothes on. There is no weight taken off for the clothes.

The children are weighed on a hanging scale in a fabric bag. There are 2 kinds of bags, one large and one small. For the large bag the nurse will take off 200 gram but no weight is taken off the small one.

The children from the village were on the first day weighed in the small bag while 10 of them were weighed in the big bag the day after. This was not noted.

**Problem:** see above, consistency in the clothing is hard to determine but it's clear that the children are not wearing the same clothes or the same amounts every day.

**Consequences of discrepancy:** The discrepancy could lead to that an inaccurate result is recorded. It could lead to wrong food intervention. It could lead to a prolonged or shorter stay for the child. In the case of a shorter stay, a child that is still malnourished might be sent back home. Or again, it

could frustrate the parent which can lead to force feeding (see observation question 1).

Recommendation: Consistency in clothing (as mentioned above) is necessary. If the caretaker refuses to dress the child accordingly, my advice would be to make a note on the chart of what the child is wearing.

The weight of the small bag is 100 gram (I measured it myself). This should be subtracted from the weight of the child when this bag is used. There should be a consistency in using the small or the big bag.

**3. Does the weighing take place at the same time every day?:** The weighing takes place at the same time every day, between 6-7 am. The nurse make sure that all children are weighed.

**4. Does the weighing take place before eating?:** Yes the breakfast is served after the weighing, at 7 am. Only once did it happen that children might have been eaten before weighing. This concerns the group of children from the village. They were given crackers on the way to the NRH which some children might have saved for later and eaten the same morning before the weighing (some children were walking around that morning with wrappers).

Problem: Eating before getting weighed might influence the result.

Consequences of discrepancy: The discrepancy could lead to that an inaccurate result is recorded. It could lead to wrong food intervention. It could lead to a prolonged or shorter stay for the child. In the case of a shorter stay, a child that is still malnourished might be sent back home. Or again, it could frustrate the parent which can lead to force feeding.

Recommendation: Usually the children are not fed before weighing, nor have they access to food themselves. So I don't consider this to be a problem at the NRH.

**5. Is the measured result correctly recorded (comparison what nurse reads on scale and what she writes on the chart)?:** On only 2 occasions out of 73 did I read a different result than what the nurse recorded. This record for 3% of the observations.

On 5 occasions I wasn't able to read a result at all as the scale was moving in the other direction from my position, there were too many people in the room for me to walk around and the nurse was too quick and had already read the result (and child was taking off the scale) before I had a chance to see the result. I wasn't able to read a result of 7% of the total observations.

On one occasion, 2 children had gained a lot of weight (a 7 year old boy gained 400 gram and 4 year old girl gained 300 gram in 24 hours) and the nurse didn't reflect on this nor did she re-measure the children.

Problem: Due to being human, a mistake can be made. Even though the nurses are very accurate in recording a result, it's important to always stay focused.

Consequences of discrepancy: The discrepancy could lead to that an inaccurate result is recorded. It could lead to wrong food intervention. It could lead to a prolonged or shorter stay for the child. In the case of a shorter stay, a child that is still malnourished might be sent back home. Or again, it could frustrate the parent which can lead to force feeding.

Recommendation: It's important for the nurse to stay sharp and alert while measuring. Sometime this is difficult as the room is often very busy. My advice would be to only have one child and caretaker at the same time in the room. Ask the others to wait outside on their turn.

I would also recommend to re-measure a child if the discrepancy is larger than +/- 200 gram in comparison with the previous day.

**6. Is the weight compared to the WHO growth standards?:** Yes. At every intake the median weight and 90% weight of the child is determined, using the WHO growth standards (separate for boys and girls). This is then noted on each child's individual growth chart. Each time a child has been weighed; the result is recorded on the chart and therefore also compared to the WHO growth standards.

**7. Is the nurse standing in front of the scale while reading the result?:** At the NRH they weigh the children using a hanging scale. As the scale is hanging, it's also moveable. So the nurses can move the scale to be able to read it properly. Out of the 73 observations, it only happened 4 times that the nurse didn't stand straight in front of the scale while reading the result. In 5% of the observations the nurses did not stand straight in front of the scale while reading a result.

**Problem:** If the nurse is not reading the result standing straight in front of the scale, the chance of discrepancy is large. It's very difficult to read an accurate result if you don't stand straight in front.

**Consequences of discrepancy:** The discrepancy could lead to that an inaccurate result is recorded. It could lead to wrong food intervention. It could lead to a prolonged or shorter stay for the child. In the case of a shorter stay, a child that is still malnourished might be sent back home. Or again, it could frustrate the parent which can lead to force feeding.

**Recommendation:** Always stand in front of the scale. Sometimes the room is very busy with people. My advice would be to only have one child and caretaker at the same time in the room. Ask the others to wait outside on their turn. This would give the nurse more space to read the scale.

**8. Is the nurse touching the child or the bag while reading the result?** Of the 73 weighing being observed, the nurses held on to the bag 14 times while reading the results. 4 times the nurses were holding the bag but let it go while reading the results. The reason for holding on to the bag is that the child is upset and moves around that the needle won't keep still and it's not possible to read a result. Noticeable is that the last 2 observations were of older children (above 24 months) and they all kept still.

The hanging scale is time consuming to use as each child has to get in and out of the bag, the bag needs to be hung and the bag needs to hang still before the nurse can read a result. For bigger children it's not handy as they have to lift their feet to not drag them on the ground. It's also backbreaking for the mother and nurse to get the older children hanging in the bag.

In 19% of the cases, the nurses were touching the bag while reading the result.

In 5% of the cases the nurses were holding on to the bag but let go when reading the result.

**Problem:** If the nurse is holding/touching the bag while reading a result, the result might not be accurate.

**Consequences of discrepancy:** same as the others: The discrepancy could lead to that an inaccurate result is recorded. It could lead to wrong food intervention. It could lead to a prolonged or shorter stay for the child. In the case of a shorter stay, a child that is still malnourished might be sent back home. Or again, it could frustrate the parent which can lead to force feeding.

**Recommendation:** My advice would be to not use the hanging scale. The NRH has recently got 2 new electronic weighing scales. One is a baby scale (up to 30 kg) and one is a tarred uniscale. So

my recommendations would be to use the baby scale to weigh children up to 2 years of age, or up to 30 kg if they are above 2 years of age but not able to stand on their own. Use the uniscale for children above 2 years of age that are able to stand by themselves.

WHO's advice is as well to use the uniscale and to not use a hanging scale when weighing small children as they are often agitated.

**9. Is the child lying straight in the bag?:** Usually the mothers are putting her child in the bag and also hang it on the scale. The child doesn't always lie straight. The nurses corrected this on some occasions but not always. Sometimes the feet or head are sticking out of the bag. Again, most of the times the nurses corrected this but not always. In total I observed 6 occasions where the child was not corrected to lie straight in the bag with no head or feet sticking out.

This counts for 8% of all the observations.

**Problem:** If the child is not lying straight, this could lead to the nurse reading an inaccurate result.

**Consequences of discrepancy:** The discrepancy could lead to that an inaccurate result is recorded. It could lead to wrong food intervention. It could lead to a prolonged or shorter stay for the child. In the case of a shorter stay, a child that is still malnourished might be sent back home. Or again, it could frustrate the parent which can lead to force feeding.

**Recommendation:** My advice would be to always double check that the child is straight in the bag and that the head or feet are not sticking out.

**10. Is the child keeping still long enough to be able to read the result?:** At the time of the observations, most children were quite small. They were not happy to lie still in the bag. As they became agitated they also moved a lot. This makes it hard to read an accurate result as the needle keeps moving and the nurse will have to hold the child/bag still. Out of the 73 children observed, 13 of them were not keeping still long enough for the nurse to read an accurate result (according to me, the nurses did record a result).

One nurse tried to soothe the upset children and also took her time for the child to calm down.

Another was yelling at the children which didn't really help.

19% of the recorded observations the child would not keep still long enough for the nurse to be able to read an accurate result.

**Problem:** The small children get so upset while being weighed on the hanging scale that it's not possible to read an accurate result. The needle of the scale keeps on moving.

**Consequences of discrepancy:** Firstly, to be able to read a result, the nurse will hold the bag/child still. This also might lead to an inaccurate result. Further, same as the others: The discrepancy could lead to that an inaccurate result is recorded. It could lead to wrong food intervention. It could lead to a prolonged or shorter stay for the child. In the case of a shorter stay, a child that is still malnourished might be sent back home. Or again, it could frustrate the parent which can lead to force feeding.

**Recommendation:** The advice would be to not use the hanging scale but the baby scale for the smaller children (under 2 years of age) and the standing scale for the bigger children.

Soothing and trying to calm down the child will also help. The mother could play a role here trying to calm her child down.

## **Appendix IV: Interview with the program manger, the NRH**

In-depth interview with Sunita Rimal, program manager at the NRH. The interview was executed on 1<sup>st</sup> of April 2011 at the NRH in Kathmandu, Nepal.

**What are your ideas on the current situation?** The biggest problem, I think, is the inconsistency in clothing. The children are not wearing the same amounts of clothes at the weighing point and the nurses ignore this. They should keep an eye on it and tell the mothers to always dress the children in the same amount of clothes each morning. If the nurses were more involved with the mothers this wouldn't be a problem but at the moment the nurses are too shy to tell the mothers how to do things.

**The inconsistency in clothing was noticed in my observations as well. What is your reaction to this?** I am not surprised. This is what I feared. The nurses have to be more firm with the mothers.

**What is your recommendation?** In the winter the children can wear 2 layers of clothing and in the summer 1 layer. The nurses must keep an eye on this and tell the mothers to dress accordingly.

**What other improvements do you think are necessary?** I am not expecting any other major issues and I don't expect there to be any problems with the recording of the results. I don't think discrepancies occur very often. Though things might not be perfect and improvements are always necessary.

**These are my results:**

**3% of the measured result was incorrectly recorded**

**5% of the time was the nurse not standing in front of the scale while reading a result**

**19% of the time did the nurse touch the child/bag while reading the result**

**8% of the time did the child not lie correctly in the bag**

**19% of the time did the child not keep still long enough so a result could be read**

**What is your reaction to these results?** 5% is an acceptable margin when it comes to faults. Above that is not acceptable. The following must be implemented: clearly never to touch the child while reading the result and always stand in front of the scale while reading a result. There are no excuses why the nurses shouldn't do this.

**Why are the nurses using the hanging scale rather than the uniscale?** We always use the hanging scale. The uniscale is downstairs.

**As several of the mentioned discrepancies occurs due to the hanging scale, I would recommend to use the uniscale instead. Do you think that would be workable?** The nurses could use the uniscale for children above 4 years old and the hanging scale for children below 4 years, unless agitated. If agitated, use standing scale and if children are under 2, let the caretaker hold the child on the scale. Though this must be noted so the nurses knows which scale to use.

**Yes, but the problem with the hanging scale is weighing the small children as they don't keep still. Why not used tarred weighing?** Yes, that is also possible.

**I have weighed the small bag that the nurses use on the hanging scale. It weighs 100 grams. The nurses are not taking any weight off for it. This must change. The nurses must take weight off from the small bag as well.**

**I have noticed that if a child shows a substantial weight gain or loss, the nurses don't always re-measure the child. What do you think about that?** This is not possible. If a child shows a large discrepancy in weight gain or loss, the nurses have to re-measure that child. Again, consistency is so important.

**When must the nurses re-measure?** With an incline or decline of 200 gram.

**I have noticed that weight loss sometimes leads to the children being force fed by the caretaker. But sometimes the weight loss was actually due to incorrect measuring/recording and not to an actual loss of weight. Where you aware of this?** The nurses have to give good counseling to the caretakers. Most important is the health and wellbeing of the child. It's our responsibility here at the NRH to create a safe and happy environment for the children where they can become healthy again. Mealtimes should be a pleasant experience and this kind of behavior is not acceptable. The nurses should keep an eye on this and explain to the caretaker that forcing is only making the situation worse. It might affect the growth development of the child.

**What are your thoughts on consequences of the found discrepancies?** The calculated calorie and protein intake could be a problem with the wrong weight. The dietitian could get confused as according to the record a child is gaining weight but doesn't eat enough food, or the opposite. It could also have an impact on how long a child is staying at the NRH. If a child is heavier according to the records than what it actual is, the child might be sent home while still being underweight. Here at the NRH we are doing real work and we are not here for pretending. The results have to be accurate. I expect the following from the nursing staff:

Consistency must be maintained

No force feeding

The nurses must give the caretakers proper counseling

The eating environment must be pleasant

**Do you think that the results of the observations might lead to longer stays of the children and could it have an impact on the operations?** It is not a problem if a child needs to stay longer than the average 5-6 weeks. We have space enough. The capacity per year is 250 children staying at the NRH. The goal is 90% of this, which we reach each year. Depending on the season we are sometimes more busy but again, having children staying longer wouldn't create any problems.

**Would a possible prolonged stay of a child have any impact on the financial support from your donors?** No, this wouldn't have any impact at all as I set the target myself, not the donors. The donors have no influence on the working methods.

**In what way can the improvements of the working methods be implemented?** Some kind of easy to follow work instructions would help the nurses to minimize discrepancies in their working methods.

**For the future, this kind of work instructions could also be developed for other screening, like measuring length, follow ups in the villages and for the reach out camps.** Yes that could be useful for us.

**The nurses could also benefit from a meeting up once a month to discuss any issues they are facing. Is this feasible?** We have a monthly team meeting where they can share any issues. But off course, the nurses could benefit from such a meeting.

## **Appendix V: Discussion session with the nursing staff, the NRH.**

Discussion session with the nurses Bhagwati and Ruko, 15<sup>th</sup> of April at the NRH, Kathmandu, Nepal. Also present at the discussion were program manager Sunita Rimal, fieldworker Lalit and administrator Tika. Most of the replies from the nurses were in Nepali and were translated in to English by the program manager.

The purpose of this session was to discuss the findings from the observations with the nursing staff. The findings had already been discussed in an interview with the program manager Sunita Rimal 2 weeks earlier. She had then shared the findings with the nurses and was expecting direct changes and improvement.

**What do you think about my findings?** Some things have to change and improvements can be made. It is good that the observations have been done. This has never happened before. After Sunita spoke to us, some changes have already been implemented. At each weighing moment we are now standing in front of the scale while reading the result. Also, we are not touching the child while reading the result any longer.

**Do you still use the hanging scale?** Yes, it is still used but we have gotten a new digital scale. It's an electric baby scale that could be used for children weighing up to 30 kg. A digital standing scale will be bought soon.

**Why don't you use the new scale?** We only use it downstairs for the new intakes. We have no space to put it in the nurse's room.

**But the hanging scale is causing several of the issues we are facing. Wouldn't that be reason enough to use the new scale?** Space is a problem.

**Why don't you use the uniscale you already have? That will fit easily in the nurse's room.** It is not accurate.

**During weighing, your room is often very busy with mothers and children. Does it not make it hard to work efficiently?** Yes it does. We will try to be more firm on this matter and ask people to wait on their turn outside. A problem we are facing is that the caretakers are not always listening to us or the caretakers don't come when being asked.

**You are weighing the children with clothes on. I have noticed that there is no consistency in the amount of clothes the children are wearing.** The problem we are facing is that the caretakers are not listening to us. We have told the caretakers that consistency in clothing is important but it's not always followed. We have to be more firm towards the caretakers.

**Sunita has decided that that 1 layer in the summer and 2 layers in the winter is manageable. What is your opinion?** Yes this is manageable.

**I have noticed that the communication of a negative result is not always ultimate and in some cases it has lead to children being force fed. What do you think about this?** We don't really understand what the issue is.

**I give you an example. Monisha is force fed by her mothers because she has lost weight.** That is just something the caretakers do when they get anxious the child is not eating enough. The caretakers have lots of other things to worry about at home that they do anything to make their child

eat.

**I can understand that. But forcing is hardly the right way.** No, that is true. We have to explain better to the caretaker that the weight can fluctuate. As an example we could say that whether a child has been to the toilet that morning or not could have an impact on the weight.

**Another finding is that when a child shows a sharp incline or decline in weight, the child is not always re-measured. Why is that?** I always do it, says Bhagwati.

**I have agreed with Sunita that if the discrepancy is 200 gram more or less, the child will be re-measured.** This would be workable for us.

**While weighing the children on the hanging scale, you use 2 different bags. The large bag weighs 200 gram, which is taken off the child's weight. For the small bag no weight is taken off. Though during the observations, I discovered that the small bag weighs about 100 gram. Did you know this? No, we don't believe it.** The bags must be measured (the small bag is actually 140 grams and the big, which they thought was 200 gram, is 320 gram!) This was not expected. From now on, the correct weight from both bags will be taken off.

**Do you know what the consequences of the found discrepancies can lead to?** There is a risk we send children home too early and that they are still underweight and malnourished. Children could be deprived from getting a service they are entitled to. This shouldn't happen.

**I would like to advice you to meet up once a month to discuss issues they are facing. Sharing thoughts and information could help to minimize the discrepancies.** Each day at the hand over between shifts we exchange information. But it could be useful for all of us to get together and discuss issues.

**Finally, just out of curiosity, I would like to know what you think are the most common reasons for malnourishment among the children staying at the NRH.** Poverty is the main reason, often in combination with diseases like chest infections, diarrhea and tuberculosis. Also the lack of knowledge on how to prepare nutritional food is an important factor. Many of the caretakers are farmers and they grow their own vegetables but most of it they would sell on the market rather than use it themselves. Being farmers mean long ours of work which in turn means that the children don't get fed often or regular enough. Other problems are sanitation and lack of proper healthcare. Hospitals are often far away and when children fall ill, they are not always brought there on time. Many children are born stunted due to the fact that the mothers are malnourished themselves.

## Appendix VI: Working instructions

Working instructions on how to weigh a child on a digital standing scale and on a digital baby scale.

