



Daffodil
International
University

Internship Report
On
“Fellowship Training and Field Experience on
Nutrition and Health”

Submitted To

Dr. Md. Bellal Hossain

Professor & Head

Department of Nutrition & Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Submitted By

Md. Rayhan Asif Khan Shuvo

ID - 151-34-366

Department of Nutrition & Food Engineering
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Date of Submission

December 20, 2018

LETTER OF TRANSMITTAL

20th December 2018

Dr. Md. Bellal Hossain
Professor & Head
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Subject: Submission of internship report.

Dear Sir,

I would like to take this opportunity to thank you for the guidance and support you have provided me during the course of this report. Without your help, this report would have been impossible to complete.

To prepare the report I collected what I believe to be most relevant information to make my report as analytical and reliable as possible. I have concentrated my best effort to achieve the objectives of the report and hope that my endeavor will serve the purpose. The practical knowledge and experience gathered during report preparation will immeasurably help in my future professional life. I request you to excuse me for any mistake that may occur in the report despite of my best effort.

I would really appreciate if you enlighten me with your thoughts and views regarding the report. In addition, if you wish to enquire about an aspect of my report, I would gladly answer your queries.

Thank you again for your support and patience.

Yours Sincerely,

Md. Rayhan Asif Khan Shuvo

ID: 151-34-366

Letter of Authorization

20th December 2018

Dr. Md. Bellal Hossain
Professor & Head
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University

Subject: Declaration regarding the validity of the Internship Report.

Dear Sir,

This is my truthful declaration that the “**Internship Report**” I have prepared is not a copy of any Internship Report previously made by any other students.

I also express my honest confirmation in support to the fact that the said Internship report has neither been used before to fulfill my other course related nor it will be submitted to any other person in future.

Yours Sincerely,

Md. Rayhan Asif Khan Shuvo

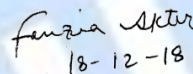
ID: 151-34-366

Approval Certification

On the behalf of the university, this is to certify that **Md. Rayhan Asif Khan Shuvo**, bearing ID: **151-34-366**, Program B.Sc. in Nutrition & Food Engineering is a regular student, department of Nutrition & food Engineering, Faculty of Allied health Sciences, Daffodil International University. He has successfully completed his Internship program of two weeks in ICDDR, B Mohakhali, Dhaka-1206, on Fellowship Training and Field Experience on Nutrition and Health. Then he completed this report on November 18, 2018 under my direction. We aware that **Md. Rayhan Asif Khan Shuvo** completed his internship report by observing our teacher. In addition, I ensure that his report is a worth of fulfilling the partial requirements of NFE program.



Dr. Md. Bellal Hossain
Professor & Head
Department of Nutrition and Food Engineering
Faculty of Allied Health Sciences
Daffodil International University
Dhaka

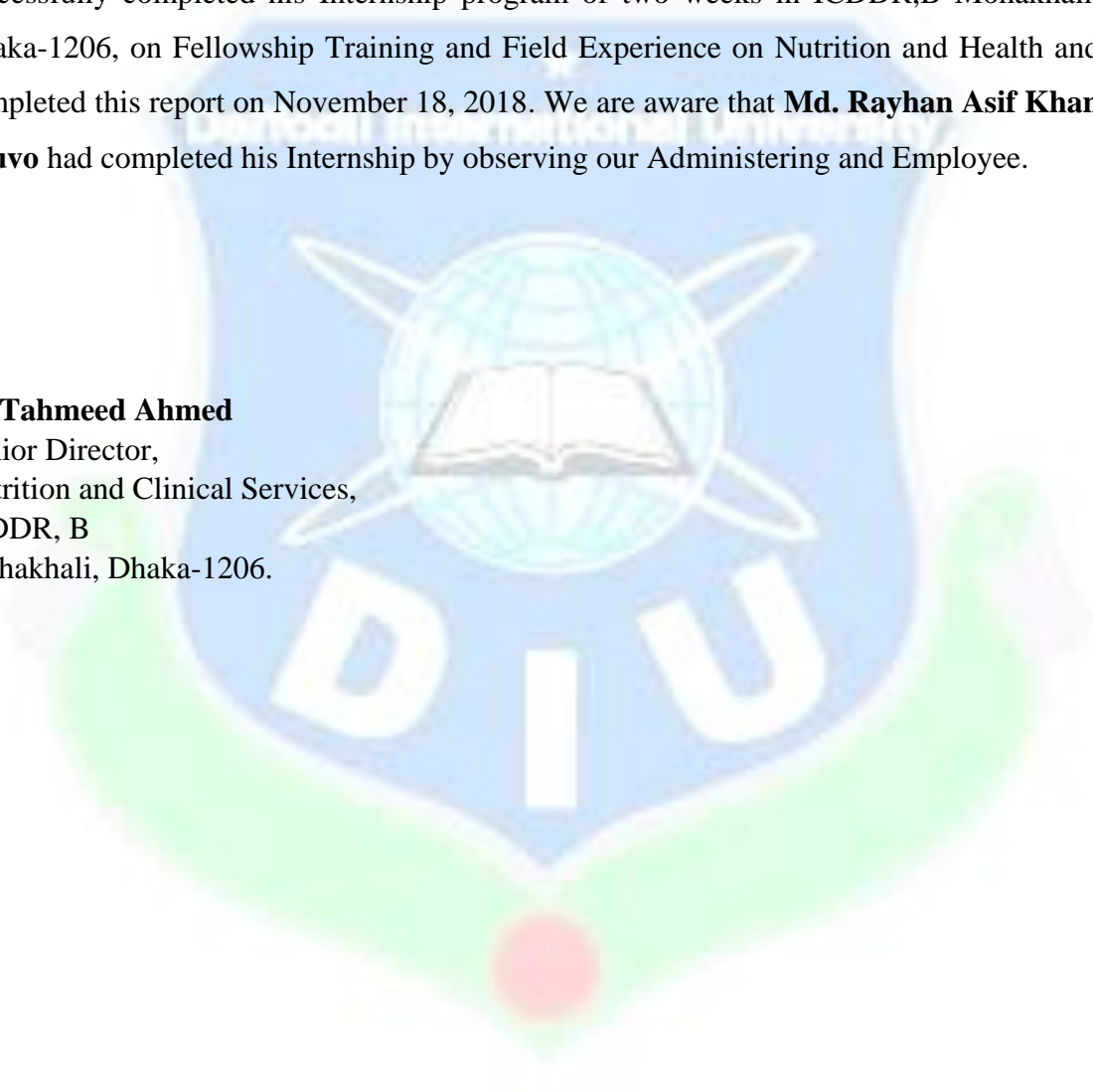

18-12-18

Fouzia Akter
Senior lecturer
Supervisor
Department of Nutrition Food Engineering
Faculty of Allied Health Sciences
Dhaka

Approval Certification

This is to certify that **Md. Rayhan Asif Khan Shuvo**, ID-151-34-366, Program B.Sc. in Nutrition & Food Engineering is a regular student department of Nutrition & food Engineering, Faculty Allied health Science Daffodil international University. He has successfully completed his Internship program of two weeks in ICDDR,B Mohakhali, Dhaka-1206, on Fellowship Training and Field Experience on Nutrition and Health and completed this report on November 18, 2018. We are aware that **Md. Rayhan Asif Khan Shuvo** had completed his Internship by observing our Administering and Employee.

Dr Tahmeed Ahmed
Senior Director,
Nutrition and Clinical Services,
ICDDR, B
Mohakhali, Dhaka-1206.



ACKNOWLEDGEMENT

All praises and gratitude to almighty, the most beneficent and the merciful who manages each and everything soundly and enables me to complete in this training.

I would like to thank and acknowledge rendered by ***Dr Tahmeed Ahmed***, Senior Director Nutrition and Clinical Services, ICDDR, B. I would like to thanks my honorable teacher ***Prof. Dr. Md Bellal Hossain***, **Head of the Department of Nutrition and Food Engineering**, and ***Ms. Fouzia Akter*** Senior lecturer **Department of Nutrition and Food Engineering, Faculty of Allied Health Sciences**, who had given me the opportunity to attend this training program. This program will help me to build my bright future carrier. It is great pleasure to express my great full thanks to ***Dr. Md Iqbal Hossain***, **Head Child Malnutrition Unit**, ***Dr. Sayeeda Hujee***, **Clinical Lead, Nutrition Unit**, ***Ms Anowara Haider***, **Senior Dietician**, ***Ms. Sajeda Perveen***, **Breast-feeding Counsellor**.

My feelings during this training was great and I enjoyed it very much. This could only be possible for generous contribution of all ICDDR, B people. My achievement during this training will definitely help me in my professional field. Thanks to all employee of ICDDR, B for their friendly co-operation and Helping me during my training period.



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1. Introduction

It was estimated that diarrhea and malnutrition an underline cause of about 60% childhood death. Bangladesh is a country where most of the children are suffering from malnutrition. ICDDR, B is working on this major problem and they are trying to reduce the malnutrition and mortality rate in Bangladesh. This report is prepared for describe the working system of ICDDR, B. Role of ICDDR, B to heal the vulnerable group or the mass people. The invention oral rehydration solution for diarrheal patient is saving more 50% mortality rate in Bangladesh. ICDDR, B also work to cure acute malnutrition, providing them (patients) different therapeutic diet at low cost to improve their nutritional status. ICDDR, B has breast-feeding counselling center, children who do not get proper breast milk or mothers are not providing breast milk to their children due to some problem, there breastfeeding counsellor counselling them. By following these protocols ICDDR, B has reduced the 50% mortality of children in Bangladesh.





icddr,b

2. Overview of ICDDR, B

ICDDR, B (International Centre for Diarrheal Disease Research, Bangladesh) is an international health organization, which is located in Dhaka, Bangladesh. The main purpose of this organization is Diarrheal Disease Research. Therefore, they are dedicated to saving lives through treatment, research and training. Several donor like Sweden (SIDA), Canada, and Bangladesh supports ICDDR, B for solving the problem of malnutrition and diarrheal disease. In addition, ICDDR, B is committed to serve the people who are come to this hospital for treatment.

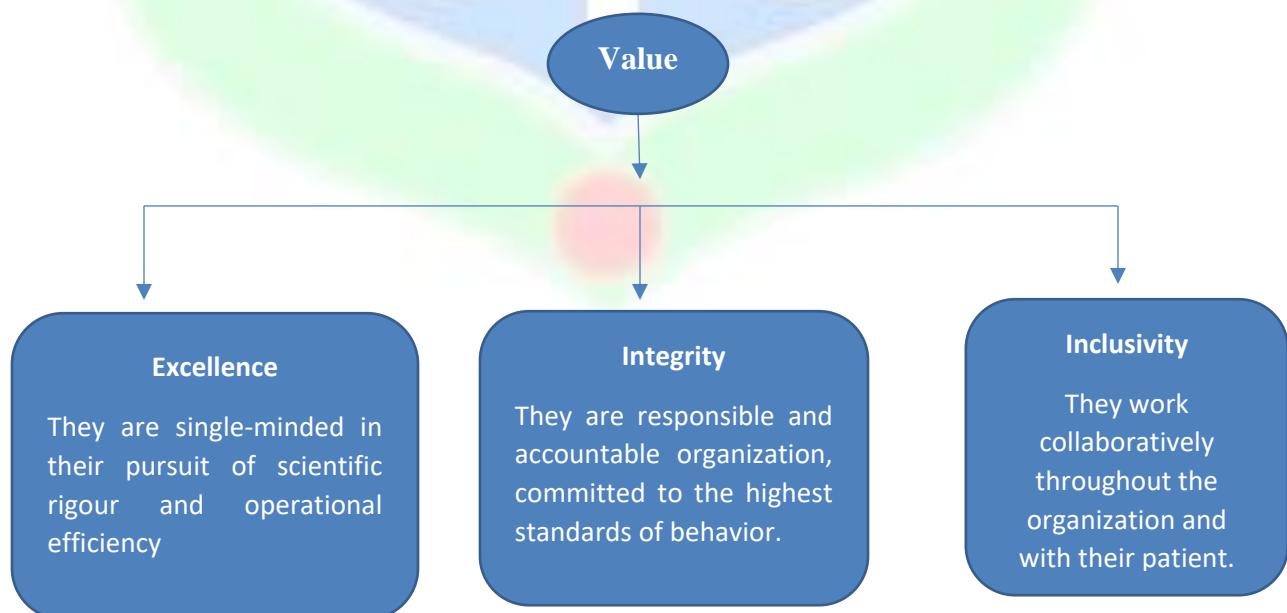
ICDDR, B is the world's leading global health research institute, which is situated in Bangladesh.

2.1 Mission

To solve public health problems through innovative scientific research.

2.2 Vision

A world in which more people survive and enjoy healthy lives.



3. Diarrhea

Diarrheal disease is the second leading cause of death. Children who are under five years they are mortality rate is higher. This diarrheal disease is treatable and also preventable. It is estimate that every year 525000 under children are died due to this diarrheal disease. Malnutrition is arise from this diarrheal disease.

A condition where water like smooth and liquid faeces are discharge frequently.

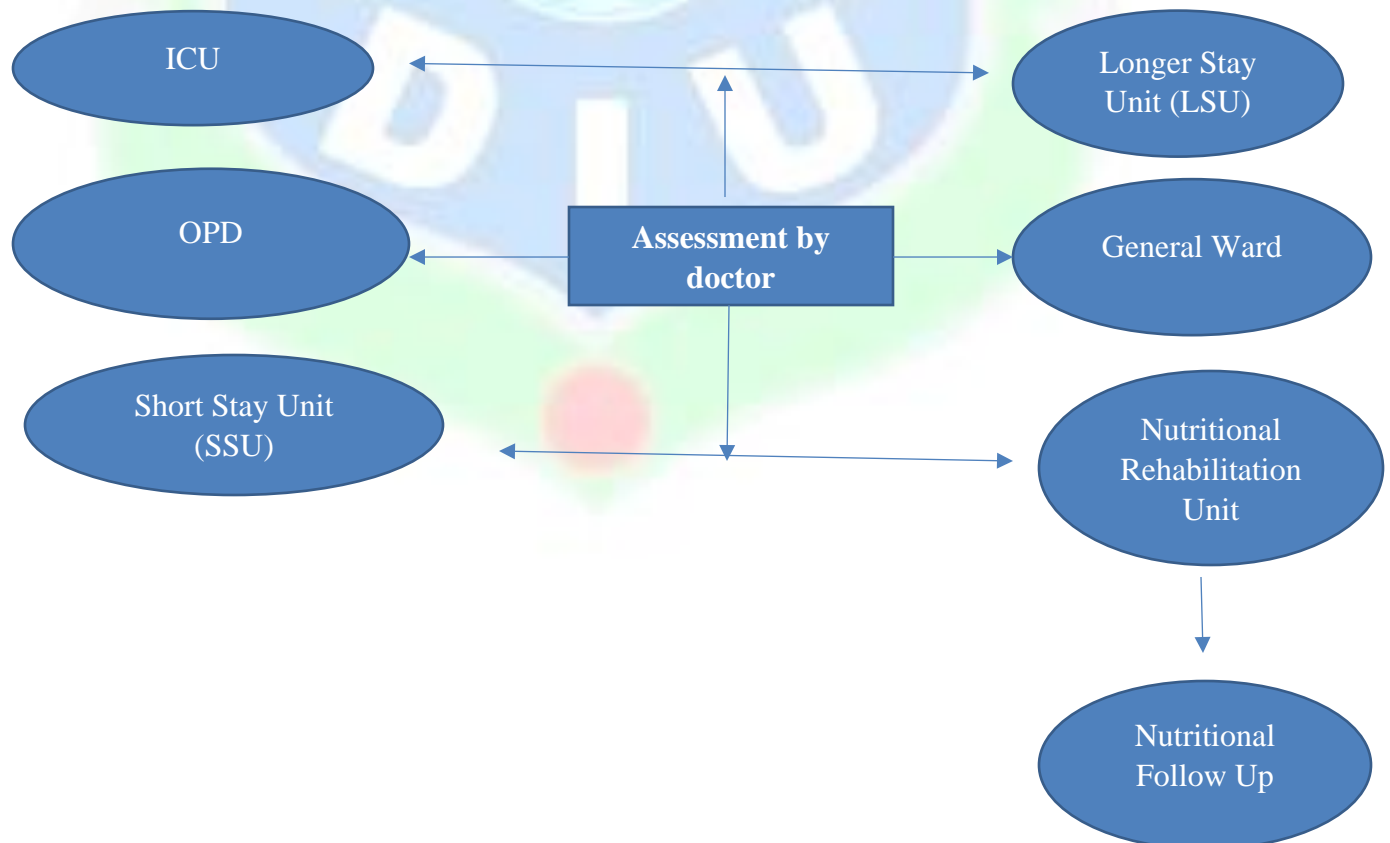
During diarrhea, water and electrolytes (sodium, chloride, and potassium) are also releases from body through stool.

3.1 Types of diarrhea

- ❖ Acute watery diarrhea – last several for hours and includes diarrhea.
- ❖ Acute bloody diarrhea – known as dysentery.
- ❖ Persistence diarrhea – lasting 14days or more without interval less the 48 hours.

4. Treatment process at ICDDR, B

At first people, bring their patients at the outdoor or assessment table. A doctor is always present there. After primary checkup doctor referred them in different units. Referring units are



5. Assessment process

In assessment, area doctor first see the patient & takes some history of patient. Like

- ❖ Patient name.
- ❖ Age.
- ❖ Weight.
- ❖ Starting time of diarrhea.
- ❖ How often diarrhea occurred per day.
- ❖ Color, Frequency, Consistency, Volume of stool.
- ❖ Watery stool or blood secret with stool.
- ❖ Fever
- ❖ Vomiting
- ❖ Abdominal pain
- ❖ Diet style before and after diarrhea.

The doctor will go on some physical examination like,

- ❖ Dry mucous
- ❖ Lips color (pale)
- ❖ Pulling up stomach skin then release it (if it is flattened within 3seconds then it is good otherwise it will flattened slowly). This is not applicable for under 5 year's children.
- ❖ Frontal nil reduced.

According to the condition of the patient-doctor, send the patient in different unit, which are already mention above (↑). These units are not in sequence. Because sometimes they have to take decisions within seconds according to the patient's condition. Like sometimes, patients are so critical that they have send them to the ICU. Sometimes they do not need to send them in SSU cause their condition is better and they only suffering from diarrhea. That purpose sending of patients in different units are varies.

6. Different unit at ICDDR, B

6.1 Out Patient Department (OPD)

When a patient visit the doctor after that if they do not find any sign or symptoms except diarrhea than they referred them to the OPD. In OPD health workers and doctors monitor each patients for two hours. If patients condition is not improve then they keep them for six hours. After ending of this period if they realize that patient's condition is improving then they provide them diet plan and if any medicine required and finally permit them to go home.

If in this six hours patient's health condition is not recovering then they suggest admitting in Longer Stay Unit (LSU) or Short Stay Unit (SSU) according to their health condition.

6.2 Short Stay Unit (SSU)

When patients are come into this Short Stay Unit (SSU), they have stay here at least for 24hours. If health condition is not properly improve then they have to stay there another 24hours. In this total 48hours if doctors found them in good health condition then they allow them to go home with providing the diet plan also suggest medicine if needed. If health condition become more deteriorate then patients are suggest to admit in Longer Stay Unit (LSU).

6.3 Longer Stay Unit (LSU)

In Longer Stay Unit (LSU) patients has to stay for two days maximum seven days. Normally patient's health condition improve within these seven days. Because in this unit they are getting more care. Because patients who are admitting here are in very crucial stage. They need more care. So all the time they are getting food from hospital, which are fresh with perfect nutritional value according to their physical condition.

6.4 General Ward

If patients health condition is not improve within those seven days then have to stay in general ward. In this ward doctors and health workers are more conscious about their patients. They take care to their patients to stabilize their health condition like previous by giving them proper diet and medicine if needed.

6.5 Nutritional Rehabilitation Unit (NRU)

All the children under five years are admit here in this unit. This unit is very much important because children who are suffering from Severe Acute Malnutrition (SAM) especially for the weight for age (wasting), containing Z score -3 are admit here for 3 to 7 days. Here possibility of losing life 12 times higher more than others unit.

Patients who have diarrhea they stay in Longer Stay Unit (LSU) or General Ward. When they get rid of from diarrhea then admit into Nutritional Rehabilitation Unit (NRU) but there are some criteria to admit into NRU.

6.5.1 Admission Criteria in NRU

- ❖ Weight-for-length (WL)/weight-for-height (WH) <-3 Z score
- ❖ Weight-for-age (WA) <-4 Z score
- ❖ Edema

6.5.2 Discharge Criteria from NRU

- ❖ No edema
- ❖ Weight-for-length (WL)/weight-for-height (WH) <-2 Z score
- ❖ Weight gain minimum 15% to 20%

6.6 Nutritional Follow-up Unit (NFU)

Patients who are discharge from Longer Stay Unit (LSU) or Short Stay Unit (SSU) or Nutritional Rehabilitation Unit (NRU) have to visit this unit. Aim of this unit is to reduce the severe acute malnutrition (SAM) and improve the physical and mental growth. Health workers are suggest the patients for come to first visit one-week interval and then two weeks interval then one-month until they WH>90% and WA>65%. Normally this success come in six to eight months. After that parents are suggest to visit two times in a year until 3years. When health workers found patients health improving then they forbid them to come again. Health workers also encouraged parents to visit NFU without appointment.

6.6.1 Admission Criteria in NFU

- ❖ Children discharged from NRU
- ❖ Weight-for-age (WA) <-3 Z score
- ❖ Weight-for-length (WL)/weight-for-height (WH) <-2 Z score

6.6.2. Discharge Criteria from NFU

- ❖ Weight-for-length (WL)/weight-for-height (WH) >-1 Z score
- ❖ Weight-for-age (WA) >-2 Z score

In these NRU and NFU, doctors and health workers not only treat them for being well, but also they guiding parents or attendants how they will prepare those diet at home when they discharge from hospital.

7. Role of Diet Department in ICDDR, B

Balance diet in most necessary for living healthy life. Otherwise, many types of complications can visible. For that, we all need to maintain proper diet plan in our daily life.

When disease occurred like diarrhea then it is mandatory to maintain the proper diet. Otherwise, this complication can increase. To maintain this problem diet department is always active in ICDDR, B. When patient admit in hospital then doctor prescribe them the required type of diet then following that order dietitian prepare that diet and provide it to the patient.

Before provide the meal there are some other things, which should considered. This is related with anthropometric measurement.

8. Anthropometry

The term “**Anthropometry**” which is combination of two words. These ‘Anthropos’ means MAN and metrics means Measurement. The scientific study and measurement of human health is called “Anthropometry”.

Anthropometry is depends on some indicators. These are also called building of anthropometry.

- ❖ Age
- ❖ Sex
- ❖ Height and
- ❖ Weight

Some indices are associate here. These are:

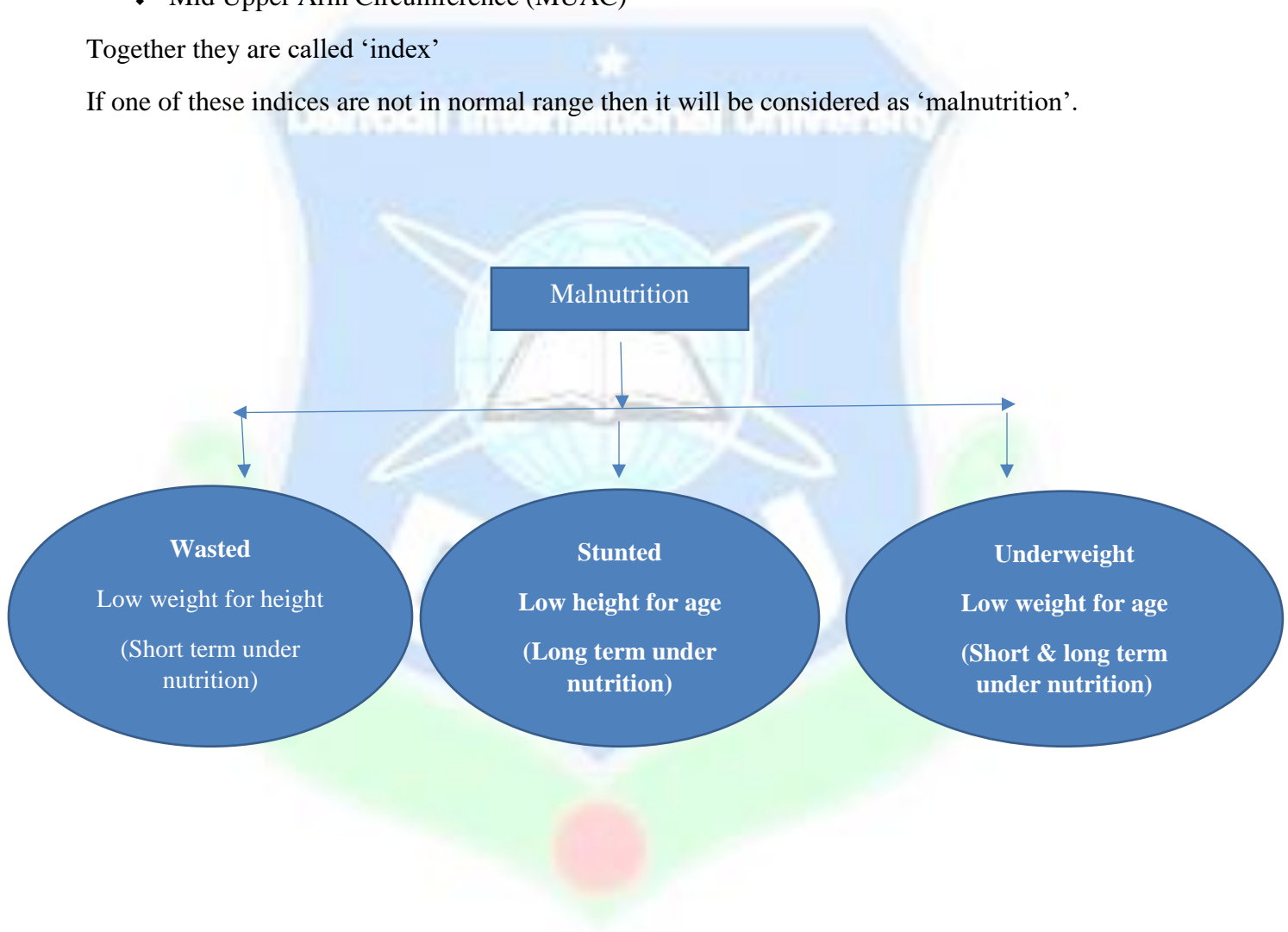
- ❖ Weight for height
- ❖ Height for age
- ❖ Weight for age

Others:

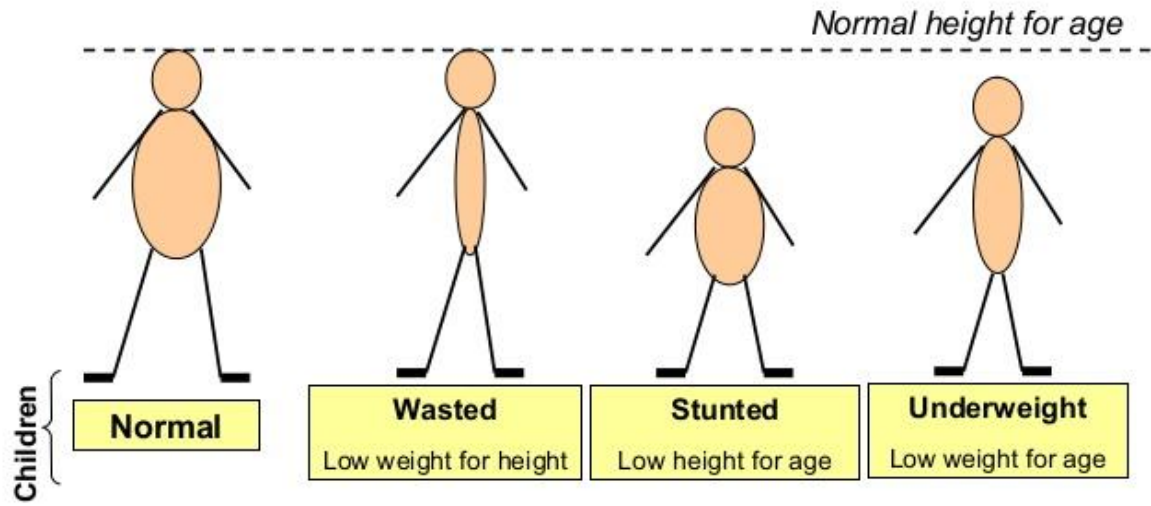
- ❖ Body Mass Index (BMI)
- ❖ Mid Upper Arm Circumference (MUAC)

Together they are called 'index'

If one of these indices are not in normal range then it will be considered as 'malnutrition'.



Different Types of Childhood Malnutrition





 BOYS		AGE	 GIRLS	
Weight(Kg)	Height(Cm)		Weight (Kg)	Height (Cm)
3.3	50.5	At the time of birth	3.2	49.9
6	61.1	3 months	5.4	60.2
7.8	67.8	6 months	7.2	66.6
9.2	72.3	9 months	8.6	71.1
10.2	76.1	1 year	9.5	75
12.3	85.6	2 year	11.8	84.5
14.6	94.9	3 year	14.1	93.9
16.7	102.9	4 year	16.0	101.6
18.7	109.9	5 year	17.7	108.4
20.7	116.1	6 year	19.5	114.6
22.9	121.7	7 year	21.8	120.6
25.3	127	8 year	24.8	126.4
28.1	132.2	9 year	28.5	132.2
31.4	137.5	10 year	32.5	138.3
32.2	140	11 year	33.7	142
37	147	12 year	38.7	148

Fig: Normal range for weight and height according to age.

These indices are briefly describe below.

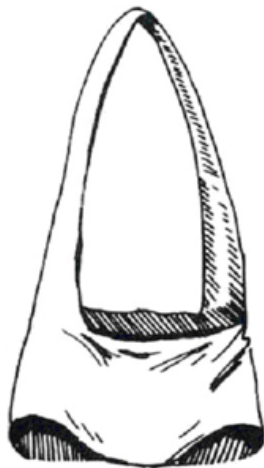
❖ **Weight for height or weight for length (WH or WL)**

Low weight corresponding to age height or length is deficit. Because it is expected, that weight should in normal range according to their height of a person in same sex. Otherwise, it will consider as 'WASTING'.

Length is taking for the children who are equal to 2years or less then 2years ($WL \geq 2\text{yrs}$). Height is taking for whose age is greater than 2years. If anyone is unable to stand then his or her length is considered.

- This method is useful when exact age is difficult to determine.
- Acute/recent undernutrition
- Appropriate for examining short-term effect.

Weight pant



spring (salter) scale



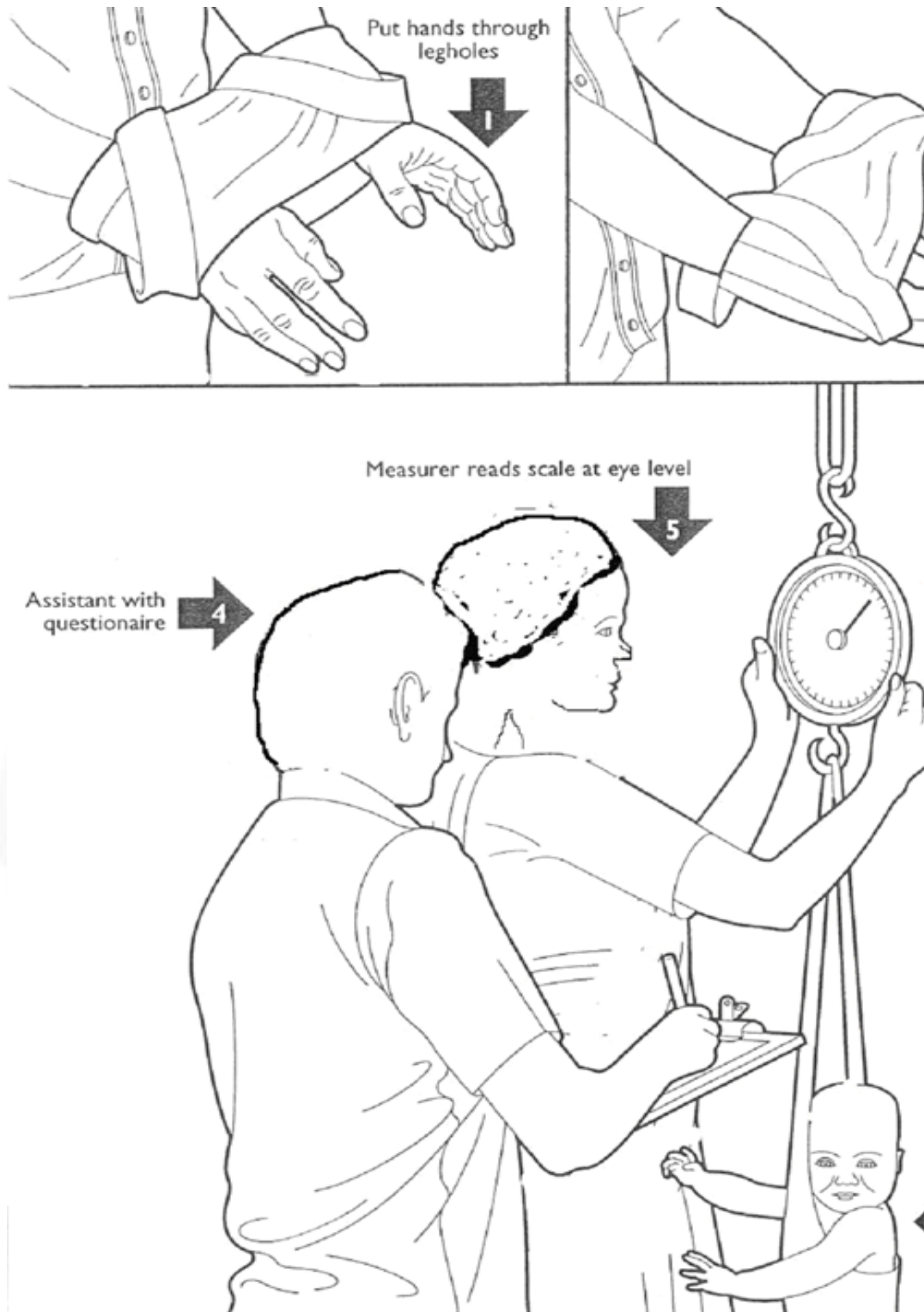


Fig: salter-hanging scale

This weighing scale is normally used for infant or children who are not able to stand. This scale can measure up to 25kgs with 100g precision.



By this type of floor weighing scale can measure 150kgs with 100g precision.



This scale gives 1g precision.

❖ **Height for age**

If any infant or child are facing low height corresponding to their age, it means they are suffering from malnutrition. Which is mention by “STUNTED”. It is the result of long-term under nutrition.

People who are living beside or in coastal area, they may not get proper nutrition from their food due to poverty, socio-economic status, disaster, poverty etc. As a result, they suffering from long-term undernutrition for which children are having low height corresponding to their age compared to the standard height of their age with same sex.

As a result, they are becoming “STUNTED”. People call them stunted child.

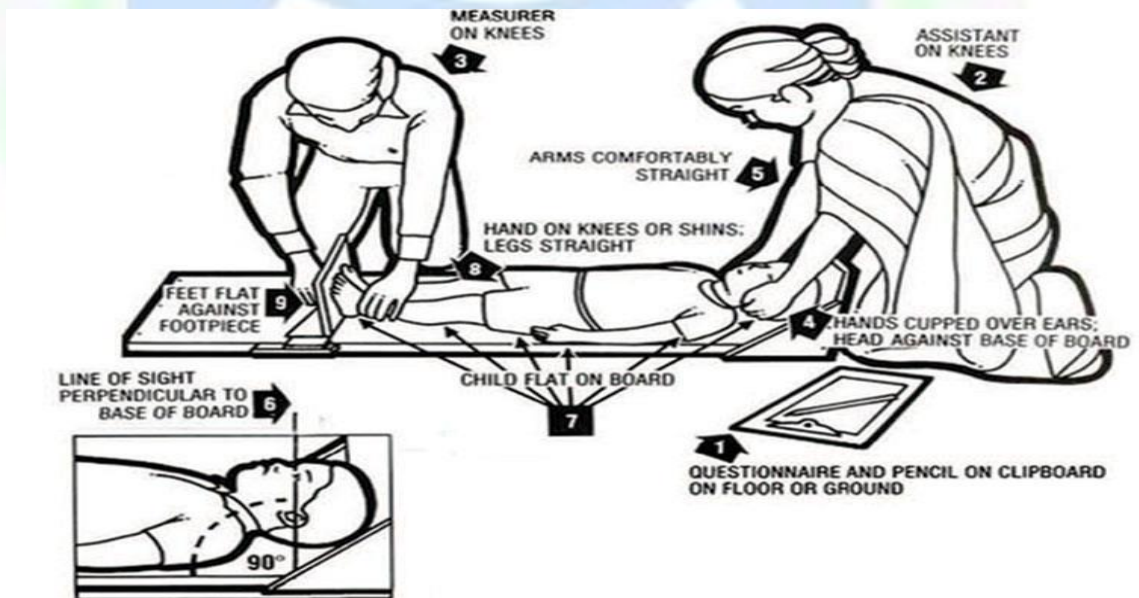


Fig: length-measuring scale

This scale is use for measuring length for infant, children who are under 2years and for who too ill to stand. By this scale can measure till 0.1cm precision.

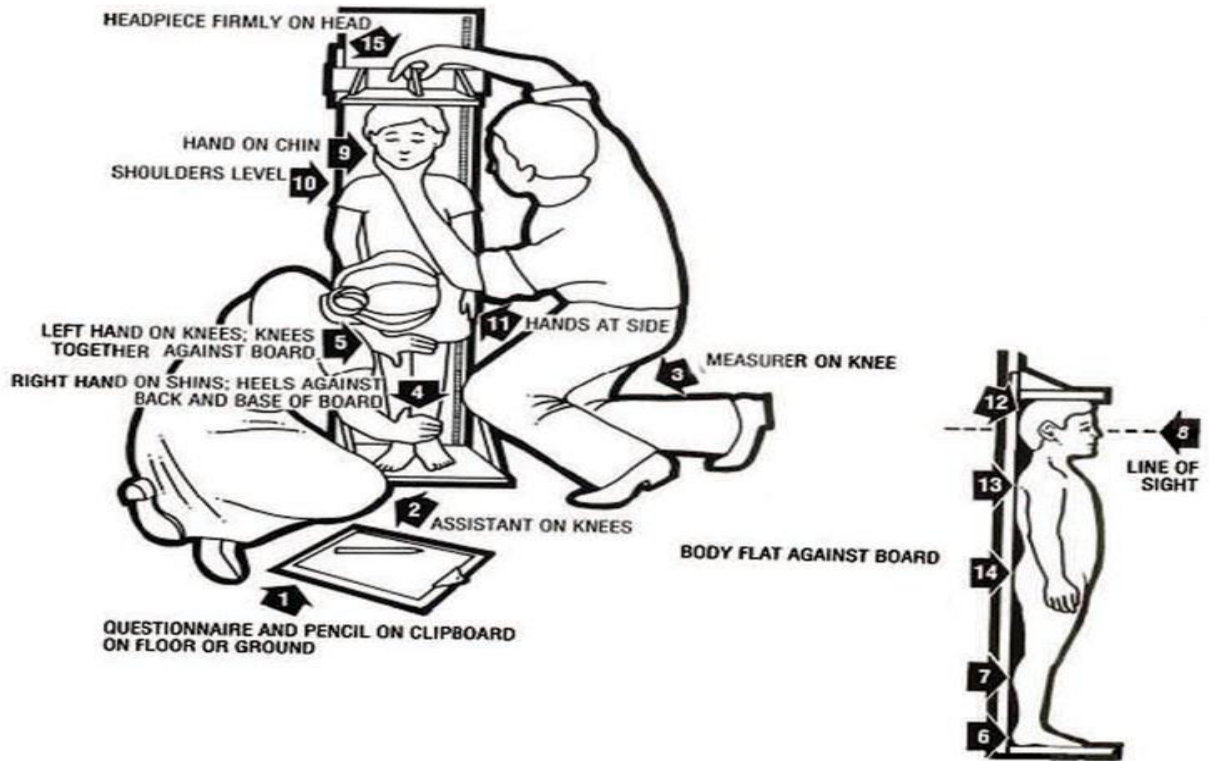


Fig: height-measuring scale.

This scale is use for measuring height whose age is greater than 2years. Moreover, with 0.1cm precision.



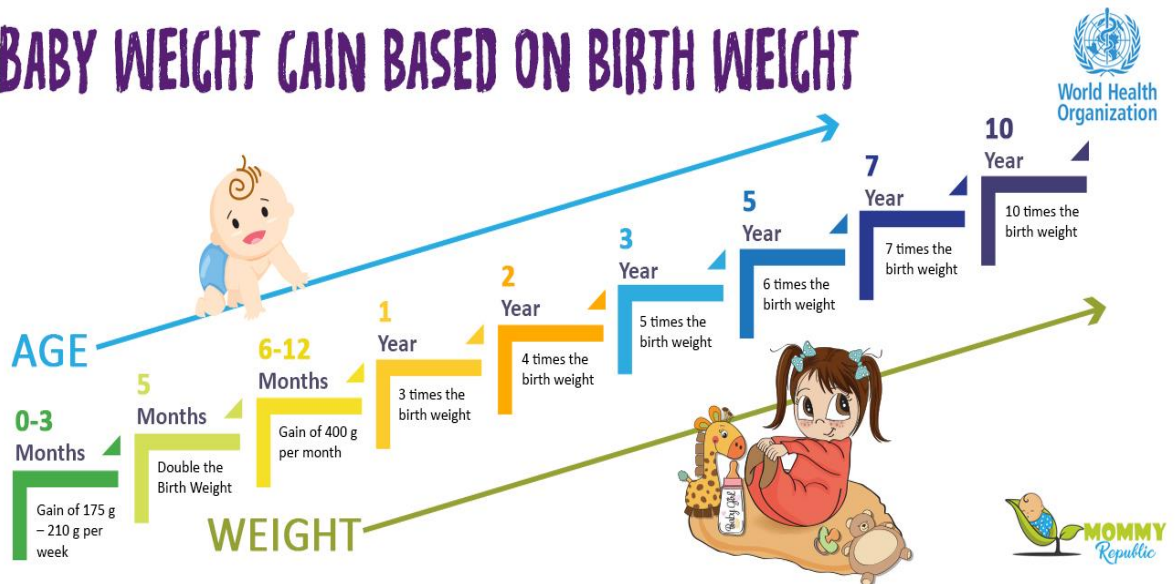
Fig: height-measuring scale.

❖ **Weight for age**

When any infant or children are suffering from low weight corresponding to their age it means, they are suffering from the mix of short and long-term undernutrition. Which is known as “UNDERWEIGHT”.

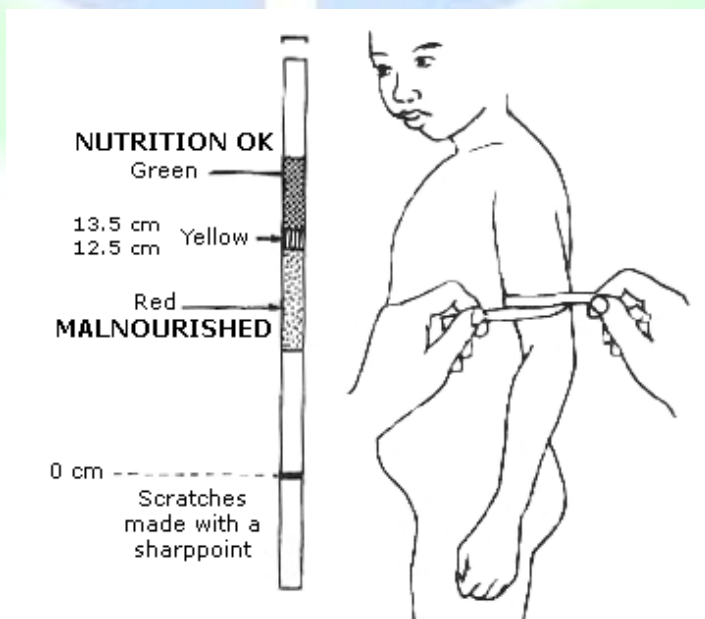
In any specific area where infant or children are with low weight, corresponding to their age compared to the standard weight corresponding their age with same sex then they are considered as underweight children.

BABY WEIGHT GAIN BASED ON BIRTH WEIGHT



❖ **Mid Upper Arm Circumference (MUAC)**

This technique is use for children whose age from 6months to 5years. This is using in screening and in the community.



MUAC TAPE - Child



Color Code As Per WHO Growth Standards

Color	Measurement
RED	0.00 - 11.5 cm
YELLOW	11.5 - 12.5 cm
Green	12.5 - 26.5 cm



- Result in green zone means child is well nourished.
- Result in yellow zone means child is in the risk of malnutrition.
- Result in red zone means the child is suffering from severely malnutrition.

Mid-upper arm circumference for Adults

➤ As with children, MUAC can be used to grade the degree of body wasting in adults.

Appropriate cut-off points of MUAC for adults are given below:

Male	≥23 cm	Normal
	<23 cm	Malnourished
Female	≥22 cm	Normal
	<22 cm	Malnourished

Saturday, April 18, 2015

KIMS, Hubli

Fig: standard value for MUAC.

POSTER 4- CHILD MID-UPPER ARM CIRCUMFERENCE MEASUREMENT



❖ **Body Mass Index (BMI)**

Body mass index can be calculated by:

$$\text{BMI} = \text{weight in kg} / (\text{height in m})^2$$

BMI is normally used for adult people.

Normal range of BMI= 18.5-25

Undernutrition

- Marginal= 17-18.5
- Moderate= 16-17
- Severe= less than 16

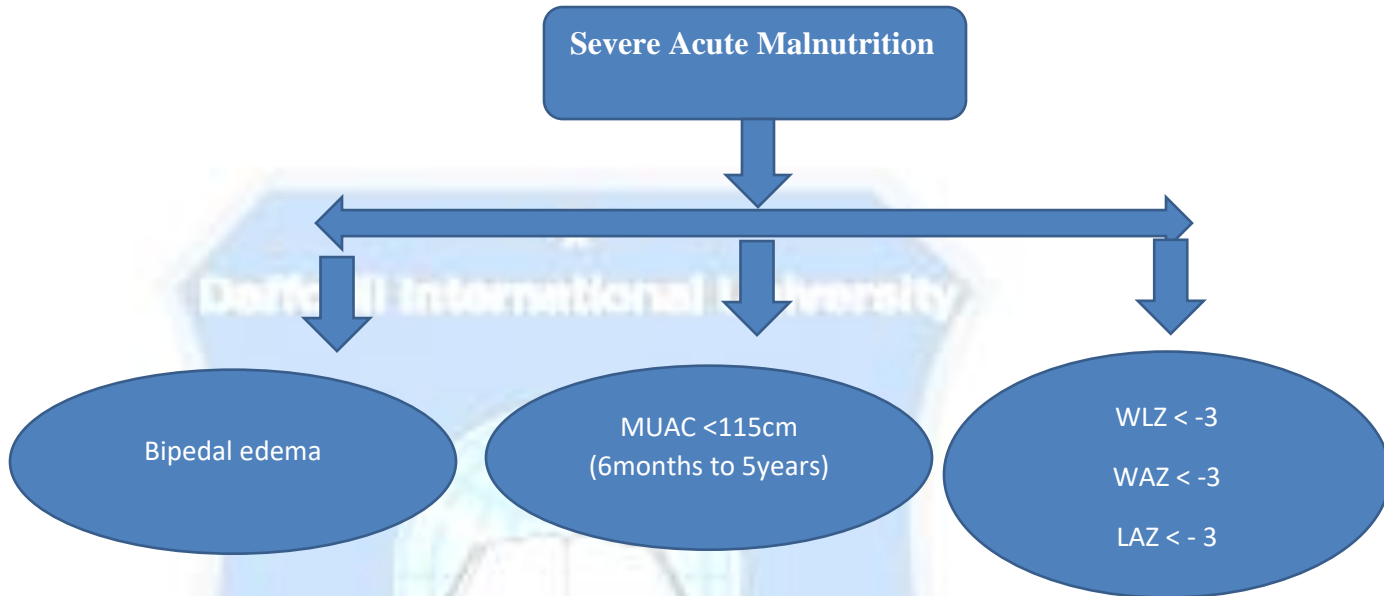
Over weight/obese

- Over weight= 25-30
- 1° (mild) obese= 30-35
- 2° (moderate) obese= 35-40
- 3° (severe) obese= greater than 40

These are the several indices. When any one of these is not in normal condition then the deficiency term as malnutrition or ‘severe acute malnutrition’.

9. Severe Acute Malnutrition (SAM)

Very low weight corresponding to height/length where Z score is $WH < -3$ or presence of bipedal edema, Z score for length/height for age < -3 . These things are decreasing the child mortality.



Severe acute malnutrition related diseases are:

- ❖ **Hypoglycemia** means low blood sugar. It means when it decreases the sugar level in blood compared to normal range
- ❖ **Hypothermia** when body losses temperature then normal. Like normal temperature is 37°C and when body losses temperature it falls down to 35°C .
- ❖ **Dehydration** means low amount water present in body or water and fluid is secret from body. Body does not has enough amount of water and fluid present.
- ❖ **Electrolytes** are sodium potassium calcium chloride.

Time frame for the management of a child with SAM

Step	Phase		
	Stabilization		Rehabilitation
	Day 1-2	Day 3-7	Weeks 2-6
Hypoglycemia	→		
Hypothermia	→		
Dehydration	→		
Electrolytes	→		
Infections	→		
Micronutrients	→		
Cautious feeding	→		
Catchup growth		→	
Sensory stimulation	→		
Prepare for follow up		→	

Z score

Calculation of Z score is one of the most important thing in to find out the patient condition. To determine actually in which condition that malnourished patient in is living life. Measurement of Z score is quite difficult task. Some background is necessary before find out this Z score. Like knowing, the standard deviation result and find out the median.

Classification table of Z-score:

Different Measurements	Classification
Weight for Age Z score	
$-1 < WAZ < 0$	Normal (Well Nourished)
$-2 < WAZ < -1$	Marginally Underweight (Mildly Malnourished)
$-3 < WAZ < -2$	Moderately Underweight/malnourished
$WAZ < -3$	Severely Underweight/malnourished
Height for Age Z Score	
$-1 < HAZ < 0$	Normal (Well Nourished)
$-2 < HAZ < -1$	Marginally Stunted (Mildly Malnourished)
$-3 < HAZ < -2$	Moderately Stunted/malnourished
$HAZ < -3$	Severely Stunted/malnourished
Weight for Height Z Score	
$-1 < WHZ < 0$	Normal (Well nourished)
$-2 < WHZ < -1$	Marginally Wasted (Mildly Malnourished)
$-3 < WHZ < -2$	Moderately Wasted/malnourished
$WHZ < -3$	Severely Wasted/malnourished

Classification	Z-score values
Adequate	$-2 < Z\text{-score} < +2$
Moderately malnourished	$-3 < Z\text{-score} < -2$
Severely malnourished	$Z\text{-score} < -3$

Calculation of Z score

$$\frac{\text{Measured value} - \text{average value of the reference population}}{\text{Standard deviation of the reference population}}$$

By using this formula, we can calculate Z score of a person.

Example

Calculation of Height for age

Age= 3years, Sex= girl, height= 82.2cm (reference height= 95.1cm; SD= 3.9)

$$\frac{82.2 - 95.1}{3.9}$$

= -3.3 Z score

Like this way can measure the Z score.

Height (cm)	-3 SD weight	-2 SD weight	Median weight (kg)	Standard deviation
78.5	7.7	8.4	9.9	0.8
79.0	7.8	8.4	10.0	0.8
79.5	7.8	8.5	10.1	0.8
80.0	7.9	8.6	10.2	0.8
80.5	8.0	8.7	10.3	0.8
81.0	8.1	8.8	10.4	0.8
81.5	8.2	8.9	10.6	0.9
82.0	8.3	9.0	10.7	0.9
82.5	8.4	9.1	10.8	0.9
83.0	8.5	9.2	10.9	0.9

This figure is showing Z score is varying on particular weight corresponding height. Like if someone's weight is 7.9kg and height 80cm means his/her Z score is -3 and suffering from severe malnutrition. Other values are provided here in the same manner.

Classification	Z-score Values
Normal	-2.0 < z-score
Moderately malnourished	-3.0 < z-score < -2.0
Severely malnourished	z-score < -3.0 or edema

When all of these measurements has completed, then the patient is divided in-group and doctor and dietitian prescribe them the required diet for that particular patient. In the meantime, doctors and dietitian took the history of patients last seven days their diet history.

If they found patients Z score is $-2 < Z$ means it normal then they suggest them normal diet with oral saline. If patients are under 6months then they suggest only breast milk and saline. If patient's age is more than 6months then they suggest normal diet with breast milk and saline. If patients Z score is, -2 to -3 means moderately malnourished and if patients Z score -3 or edema means they are severely malnourished.

10. Diet for the patients

For these patients dietitians provide therapeutic diet like,

- ❖ F-75,
- ❖ F-100,
- ❖ Modified infant formula (low-lactose)
- ❖ Milk suzi (low lactose)
- ❖ Milk suzi 100
- ❖ Special milk
- ❖ Khichuri (semi-solid)

Here is the recipe of these diets.

F-75		
	Ingredients	Amounts
If use powder milk	Powder milk	35g
	Sugar	100g
	Oil	20g
	Water	Upto 1000ml
If use fresh cow's milk	Milk	300ml
	Sugar	100g
	Oil	20g
	Water	Upto 1000ml

Now measure all the ingredients properly. Then take all ingredients in a bowl and stir this. Then take all ingredients into the blender. Add some lukewarm water into the blender. Then blend this for 2-3seconds. By this way, all the ingredients will come n homogeneous state. Then again, add lukewarm water and blend it again for few minutes. In this manner add water upto 1000ml and keep blending. Make sure that there is no lumps or foam during blending. After few minutes, F-75 is ready to serve.

From this F-75 able to get 75kcal and 0.9g protein.

F-100		
	Ingredients	Amounts
If use powder milk	Powder milk	110g
	Sugar	50g
	Oil	30g
	Water	Upto 1000ml
If use fresh cow's milk	Milk	880ml
	Sugar	75g
	Oil	20g
	Water	Upto 1000ml

Now measure all the ingredients properly. Then take all ingredients in a bowl and stir this. Then take all ingredients into the blender. Add some lukewarm water into the blender. Then blend this for 2-3seconds. By this way, all the ingredients will come n homogeneous state. Then again, add lukewarm water and blend it again for few minutes. In this manner add water upto 1000ml and keep blending. Make sure that there is no lumps or foam during blending. After few minutes, F-100 is ready to serve. From this F-100 able to get 100kcal and 2.4g protein.

Ingredients per liter	Modified infant formula (low-lactose)	Milk Suzi (low lactose)	Milk Suzi 100	Special milk
Whole milk powder	60g	40g	80g	100g
Rice powder	×	40g	50g	×
Sugar	50g	25g	50	70g
Oil	20g	25g	25g	30
Egg white	×	×	×	25g
Magnesium chloride	0.5g	0.5g	0.5g	0.5g
Potassium chloride	1g	1g	1g	1g
Calcium chloride	2g	2g	×	×
Energy-kcal/100ml	68	67	100	100
Protein-g/100ml	1.5	1.3	2.4	3
*PER (protein energy ratio)	9%	8%	10%	12%
**FER(fat energy ratio)	47%	48%	42%	47%

In ICCDR, B instead of F-75 they use modified infant formula (low-lactose) and milk suzi (low-lactose). Instead of F-100, they use milk suzi 100 and special milk. These are provided to the patients according to the age.

In these above recipes cooking is required in milk suzi (low lactose), milk suzi 100. Take all the ingredients in exact amount except water. Then add 200ml of water and stir it for homogenous mixture. Then add 1000ml of water. This extra water is added because while it takes for cooking after few moments it will start evaporating. That time reduce the nutrient loss here they use extra water. When it start boiling, increase the heat of fire. Then cook it for 15 to 20minutes. The product will become thicker.

In hospital, mothers are also stay with their babies. Among them maximum mothers are lactating women. To ensure their good health ICDDR, B also provide food for them that are nutritious and healthy for them.

Composition of khichuri	
Ingredients	Amount
Rice	135g
Lentil + Mung dal (18+18)	36g
Egg, whole	50g
Oil	30g
Potato chopped	40g
Onion chopped	40
Spices	As per taste
After cooked volume	1000g

Energy 100kcal/100g

Protein 2.57g/100g

All the diets are given to the patients according to their age and complications. When diet is start then doctors observe that patient with that particular food for 3days. Normally doctors started with ‘starter’ formula F-75. When patients are come into stable state then they suggest them ‘catch-up’ formula F-100. If in this 3days patient’s condition does not improve then doctors’ change their diet. They take time in this condition to observe in which diet patient’s condition improve. With this diet, they suggest to drink saline. They provide these with 2hours interval 12times in a day. However, in NRU they provide 11times in a day. They do not provide food at 4am.

Age sex height weight these thing-varied patients to patients. Therefore, that suggesting diet is also varying. However, there is common formula for all that, dietitian suggest them 10ml/kg body weight. This is also different formula for kwashiorkor and marasmic-kwashiorkor patient. They will get 9ml/kg body weight.

If any, patient whose weight is 10kg then h/she needs $10 \times 8 = 80\text{ml}$ in every 2hours.

If the patient is suffering from kwashiorkor and body weight is 9 kg then h/she needs $9 \times 9 = 72\text{ml}$ in every 2hours.

11. Calorie calculation

Suppose patient name is X. 5months 4days age and weight is 5.8kg. Suggesting him/her milk suzi (lactose free). Now calculate his/her needed calorie. (Marasmus)

Solution:

As the patient is suffering from marasmus, so h/she needs 10ml/kg in every 2hours and for the body weight 5kg h/needs $5 \times 10 = 50\text{ml}$ in every 2hours.

2hours interval patient will get 12 times food in a day. So, $50 \times 12 = 600\text{ml/day}$

From 100ml of milk suzi (lactose free) patient is getting 67kcal

Therefore, from 1ml of milk suzi (lactose free) patient is getting 0.67kcal

Now in 600ml of milk suzi (lactose free) patient is getting $0.67 \times 600 = 402\text{kcal}$

Finally, $402/5.8 = 69\text{kcal/kg/day}$.

While dietitians provide protein in patient's food then they should provide or suggest that protein should come from animal. Because animal source protein is called 1st class protein and these are more beneficial than vegetable source protein. 1st protein are like lysine, arginine, histidine, tryptophan etc. Protein should be in specific amount because some animal source protein produce urea in our body, creatinine in our is very much harmful cause they may attack in our kidney, heart.

12. Persistence diarrhea

If diarrhea is for 14 days continuously then it is called 'persistent diarrhea'. If in this 14days diarrhea stop for 48 hours then it again start, this time that diarrhea will not consider as persistent diarrhea. If diarrhea stop for less than 48 hours in this 14days and again start then it is addressed as 'persistence diarrhea'.

For adult this 14 days diarrhea is called 'Chronic Diarrhea'.

For children this 14days diarrhea is called 'Persistence diarrhea'.

Causes of Persistence Diarrhea

Persistence diarrhea can occur sometimes for an operation on stomach. By this operation remove part of stomach, example is 'stomach cancer'.

- ❖ **Irritable Bowel Syndrome** a condition that has effect on normal function of bowel.
- ❖ **Inflammatory Bowel Disease** a condition that cause gut to inflamed.

Sign and Symptoms of Persistent Diarrhea

- ❖ Age below 4 months and not breast feed.
- ❖ Dehydration.
- ❖ Severe PEM
- ❖ Fever
- ❖ Presence of systemic infection

Patients with PD and malnutrition are highly prone to systemic infection. These are:

- Hypothermia
- Inability to drink
- Cold skin
- Lethargy and drowsiness
- Dyspnoea
- Abdominal distension

If one or more of these sign and symptoms are visible then patients are required to admit in hospital.

Final common pathway to persistence diarrhea is **prolonged small intestinal mucosal injury (PSIMI)**. More causes are leading to 'persistence diarrhea'. These are:

- ❖ Malnutrition
- ❖ Ineffective villous repair.
- ❖ Malabsorption of nutrients, especially carbohydrate (CHO) and fat.
- ❖ Increased absorption of foreign protein.
- ❖ Deficient enteric hormones.

All of these factors contribute to the vicious cycle of mucosal injury and malabsorption, which lead to **PD**.

13. Diet for Persistent Diarrhea Patient

When patient is suffering from persistent diarrhea they are suggest eating liquid based or semi solid diet. It helps in digestion.

From Dhaka Hospital of ICDDR, B they provide specific diet for PD patients. These diets are:

- ❖ Milk Based Diet (Low Lactose Formulae)
- ❖ Rice Based Diet (Lactose and Sucrose free Formulae)
- ❖ Chicken Based Diet (Lactose, Sucrose and Maltose free formulae)

These liquid formulae diets are given with ingredients and amount here:

MILK BASED DIET (Low-Lactose Formulae)

Modified Infant Formulae/litre

(<6 months age group)

Ingredients	Amount
Whole milk powder	60g
Sugar	50g
Oil	20g
Magnesium Chloride	0.5
Potassium Chloride	1g
Calcium carbonate	2g
Water	Upto 1000ml
Energy	68kcal/100ml
Protein	1.5g/100ml
Osmolality	369mosm/l
PER (Protein Energy Ratio)	9%
FER (Fat Energy Ratio)	47%

Milk-Suji/litre
(>6 months age group)

Ingredients	Amount
Whole milk powder	40g
Rice powder	40g
Sugar	25g
Oil edible	25g
Magnesium chloride	0.5g
Potassium chloride	1g
Calcium carbonate	2g
After cooked volume	1000ml
Energy	67kcal/1000ml
Protein	1.3g/100ml
Osmolality	246mosm/l
PER (Protein Energy Ratio)	8%
FER (Fat Energy Ratio)	48%

12% patients are cure by this diet.

RICE BASED DIET (Lactose and Sucrose free Formulae)

$\frac{3}{4}$ Strength Rice Suji/litre

Ingredients	Amounts
Rice powder	40g
Egg white	100g
Oil	25g
Glucose	30g
Salt	1g
Potassium chloride	1g
Magnesium chloride	0.5g
Calcium carbonate	2g
After cooked volume	1000ml
Energy	57kcal/100ml
Protein	1.9g/100ml
Osmolality	296mosm/l
PER (Protein Energy Ratio)	13%
FER (Fat Energy Ratio)	40%

RICE BASED DIET (Lactose and Sucrose free Formulae)

Full Strength Rice Suji/Litre

Ingredients	Amount
Rice powder	60g
Egg white	100g (three)
Oil	30ml
Glucose	35g
Salt	1g
Potassium chloride	1g
Magnesium chloride	0.5g
Calcium carbonate	2g
After cooked volume	1000ml
Energy	70kcal/100ml
Protein	2.1g/100ml
Osmolality	315mosm/l
PER (Protein Energy Ratio)	12%
FER (Fat Energy Ratio)	39%

It has had been examined that 85% to 87% patients are cure by this **Rice Based Diet** (Lactose and Sucrose free Formulae).

Chicken-Based Diet (Lactose, Sucrose and Maltose free Formulae)

$\frac{3}{4}$ Strength Comminuted Chicken

Ingredients	amount
Chicken, minced	150g
Oil	20g
Glucose	30g
Onion	10g
Salt	1g
Potassium chloride	1g
Magnesium chloride	0.5g
Calcium carbonate	2g
After-cooked volume	1000ml
Energy	46kcal/100ml
Protein	3.8g/100ml
Osmolality	267mosm/l
PER (Protein Energy Ratio)	34%
FER (Fat Energy Ratio)	39%

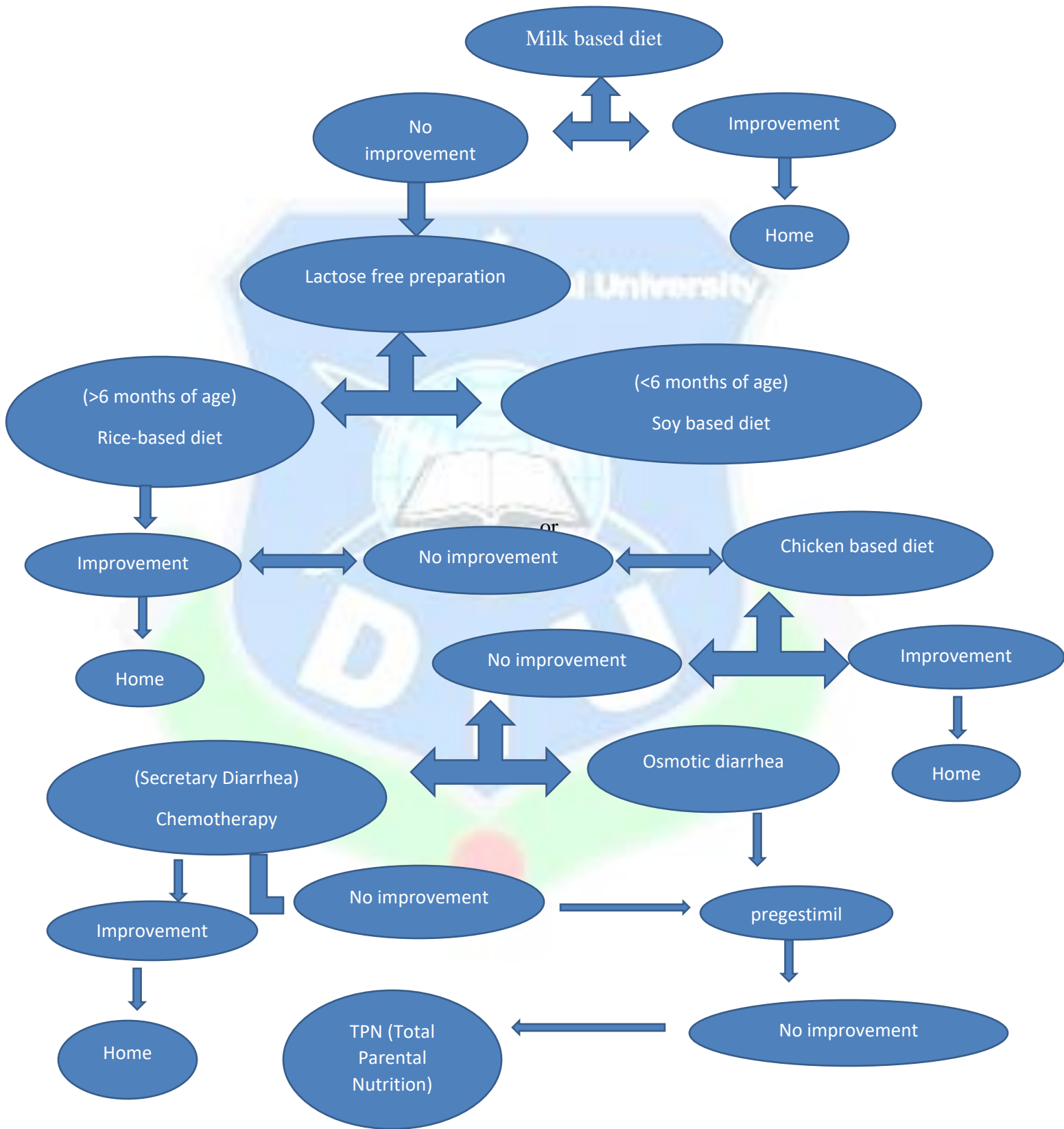
Chicken-Based Diet (Lactose, Sucrose and Maltose free Formulae)

Full Strength Comminuted Chicken

Ingredients	Amount
Chicken, minced	180g
Oil	30g
Glucose	35g
Onion	10g
Salt	1g
Potassium chloride	1
Magnesium chloride	0.5g
Calcium carbonate	2g
After-cooked volume	1000ml
Energy	60kcal/100ml
Protein	4.7g/100ml
Osmolality	272mom/l
PER (Protein Energy Ratio)	31%
FER (Fat Energy Ratio)	45%

14.

Dietary Manipulation



This is the figure of dietary manipulation. Dietitian suggest a patient one specific diet, which is required according to patient condition. They take time for 3 to 4 days to see that patient's health condition is improving or not. If improving then doctors release them and suggest taking that for 7 days more. If doctors found that patient's health condition is not improving in these 3days then they change the diet.

This dietary manipulation is actually describing this. Here, patient start with milk based diet. Then observe for 3 to 4days. If patient's health condition improve then doctor, suggest them to go home and continue that diet for 7 days more.

If there is no improvement in-patient then doctors suggest him or her for lactose free diet, means rice based diet. In this rice-based diet normally 85%, patients are recovered from diarrhea in 3to 4 days. If improved then suggest to go home.

If no improvement then dietitian suggest them for chicken-based diet, which is protein rich diet. If again no improvement then provide them pregestimil means some food that are rich in macronutrients and these are in half digest condition. It means carbohydrates are in glucose form, proteins are in amino acid form, and fat in fatty acid.

After all of this treatment if patient does not recover then the final step is Total Parental Nutrition (TPN). In this method, all the macro and micronutrients are injected to the patient's vein through IV. They can also provide nutrients rich fluid through NG.

As it was said, persistent diarrhea is only coined for children. So before, provide the diet dietitians are frequently ask some question to attendant of patient. In addition, go for some physical examination. These things are:

- ❖ Name
- ❖ Age
- ❖ Date of birth
- ❖ Height
- ❖ Weight
- ❖ Duration of diarrhea
- ❖ WAZ (weight for age, z score)
- ❖ HAZ (height for age)
- ❖ Patients diet history before diarrhea
- ❖ Patients diet history during diarrhea
- ❖ Lactating mothers diet history before diarrhea
- ❖ Lactating mothers diet history during diarrhea
- ❖ Family economic status

After doing all of these then dietitian will suggest them the diet what patient actually need. Doctors may prescribe some medicines as well as also.

Instruction for attendants of patients to prepare the diet

When doctors are suggest patient to leave hospital and go to home and health workers bring them in diet department. Here dietitian guide them, ‘how attendants of patients will prepare the diet when they at home?’

Health workers will provide a plastic transparent beaker or mug to the attendants where dietitian will take all the ingredients by measuring. After measuring of one material then they mark that point. This process is doing because at home people may do not have measuring scale by which they will able to this materials in lo amount.

It is already said that in Persistence diarrhea children may not breastfed. This can be happened by mother or by any family member or children may not able to suck the breastmilk. For them ICDDR, B has a unit which is known as ‘BREASTMILK Counseling Unit’.

When patients are suffering from diarrhea or persistence diarrhea doctors and dietitians, they both suggest patient to take “ORAL REHYDRATION SALINE (ORS)”. From the hospital, they prepare this ORS and provide it to the patients. WHO and UNICEF recommend this ORS.

Preparation of Oral Rehydration Solution

❖ Glucose ORS (Reduced Osmolarity)/litre

Glucose	13.5g
Sodium chloride	2.6g
Trisodium citrate	2.9g
Potassium chloride	1.5g
Total osmolality	245 mosm/litre

❖ Rice ORS (Reduced Osmolarity)/litre

Rice powder	30g
Sodium chloride	2.6g
Trisodium citrate	2.9g
Potassium chloride	1.5g
Total osmolality	170mosm/litre

Method of Preparation

- ❖ First, take one litre water in a clean saucepan.
- ❖ Then take 50ml more water for cooking loss or evaporation.
- ❖ Pour all the ingredients into the saucepan.
- ❖ Then mix thoroughly and cook to make it even solution.
- ❖ It needs one minutes boiling without bubbles come out.
- ❖ Continuous stirring is needed when cooking.
- ❖ Now the solution is ready to serve.

- ❖ Solution can be kept 6 hours in room temperature during and summer season and 8 hours in winter in Bangladesh.

PACKAGING

- ❖ Electrolytes are in one chamber.
- ❖ Rice powder in another packet.

Shelf life

- ❖ Two months in rainy season.
- ❖ Three months in dry season.

15. BREASTMILK COUNSELING Department

BREASTMILK

Breastmilk is the milk that produced from the breast of human female to feed her child. First six months age of a baby can get proper nutrition from breastmilk. This period is called exclusive breastfeeding. So mothers are suggested to not feed any other things beside breastmilk.

Types of breastmilk

Three types of breastmilk. These are:

- ❖ **Colostrum** is the yellowish breastmilk that is produced for first 3 to 4 days after baby's birth after this normal lactation is begun. This milk is especially rich in nutrients and antibodies. Antibody helps body to protect from disease and pathogen. Therefore, it is highly recommended that to introduce and feed breastmilk with newborn baby as much as possible.
- ❖ **Foremilk** is the milk that is first drawn during a feeding. Normally it is thin and lower in fat. It helps a baby to satisfy thirst and liquid needs.
- ❖ **Hindmilk** is the milk, which follows **foremilk** during a feeding. This milk provides high calorie and is rich in fat. This fat and calorie are helpful for health growth and development.

Different types of infant feeding

- ❖ **Exclusive breastfeeding** first six months age of baby will consume, eat, or drink only breastmilk. This type of feeding is called exclusive breastfeeding. Mothers are suggested not to provide any food except breastmilk. If doctors suggested any medicine in this period then this medicine can provide.
- ❖ **Predominant feeding** means babies will get some water based food beside breast milk. These foods are like water, juice, honey and some liquid stuffs.
- ❖ **Partial feeding** means babies will eat other food with breastmilk. Normally after six months of age of a baby h/she will start to have this feeding. Normally semisolid foods are given to them.

- ❖ **Bottle-feeding**, spoon-feeding, or feeder this types of feeding can change the baby’s eating style. They may quit suck breast milk after introducing this feeding style. Because they will easily have the food without giving any pressure to suck breast milk or chew the food.

IMPRTANCE of BREASTMILK



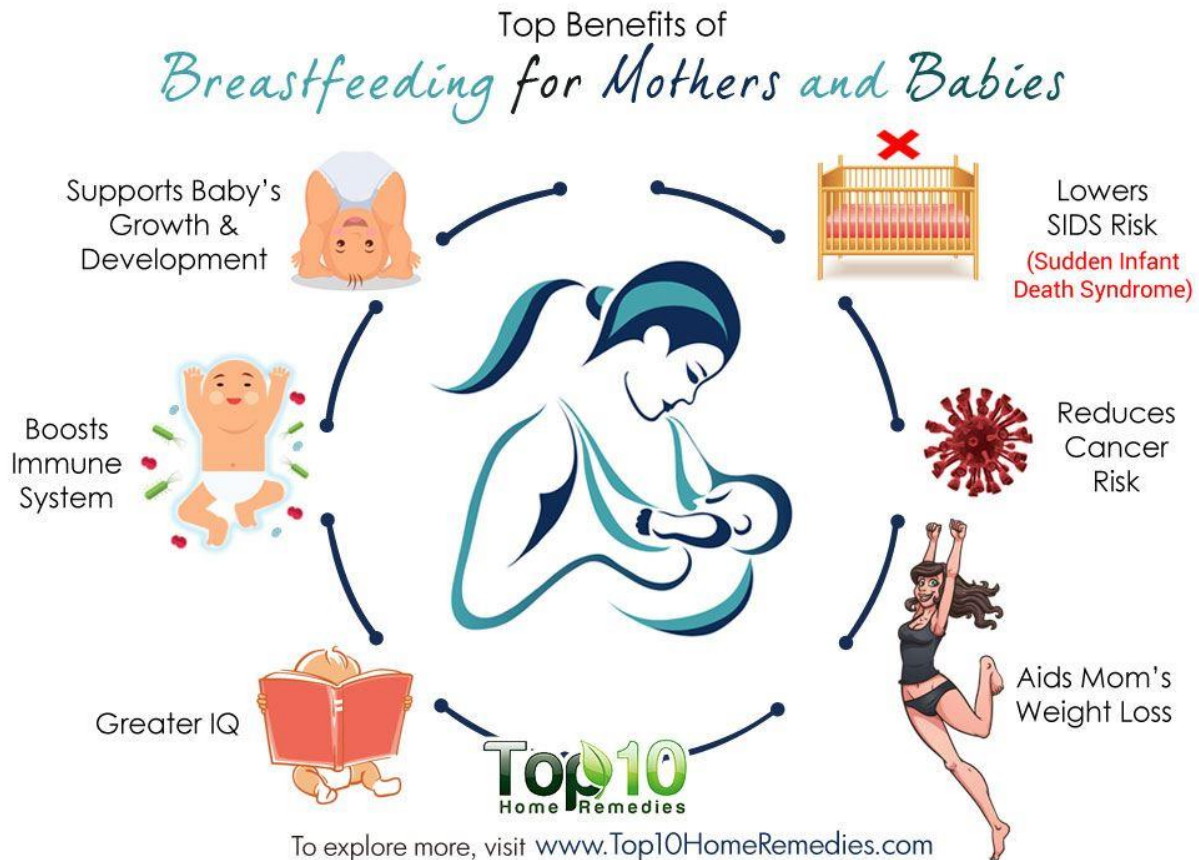
 World Health Organization

10 good things you need to know about exclusive* breastfeeding

- 1**  **saves life**
and protects baby against disease with antibacterial agents.
- 2**  **provides**
all nutrients baby needs for the first 6 months.
- 3**  **ensures**
clean and safe source of food, especially in emergencies.
- 4**  **makes**
child grow strong and intelligent.
- 5**  **breaks**
the cycle of diarrhea and malnutrition.
- 6**  **bonds**
mother and child.
- 7**  **reduces**
the mother's risk of ovarian and breast cancer.
- 8**  **helps**
space pregnancies, a natural method of birth control.
- 9**  **saves money**
by not having to buy infant formula and feeding equipment.
- 10**  **protects**
the environment with no need for packaging and disposal.

***exclusive** means 100% breastmilk, no water, no solid food, nothing else.

Advantage of breastfeeding



Besides these, there are some more advantages like:

- ❖ Mother and child relation bonding.
- ❖ Prevention of Chest infection
- ❖ Prevention of Diarrhea
- ❖ Antibody producing
- ❖ Asthma
- ❖ Mouth formation
- ❖ Diabetes.

Disadvantages of artificial feeding

- ❖ Malnutrition
- ❖ Obesity
- ❖ Diarrhea
- ❖ Persistence diarrhea
- ❖ Breast cancer
- ❖ Lack of bonding
- ❖ Low IQ
- ❖ Low immune system
- ❖ Low growth
- ❖ Difficult to digest cow's milk

Daffodil International University

Disadvantages of Artificial Feeding

Baby

- More diarrhoea, ARI and other infections
- Requires preparation
- Not easy to digest
- Lacks balance of nutrients
- More likely to die from infection & malnutrition



Mother

- May become pregnant sooner

- Interferes with bonding
- More allergy and milk intolerance
- Increased risk of some chronic diseases
- Overweight babies

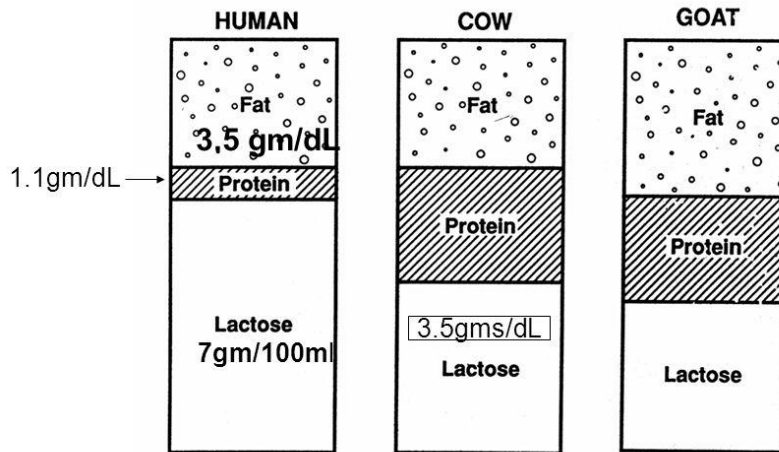
- Increased risk of anemia, osteoporosis, ovarian and breast cancer

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Differences between cow's milk, human and goat milk

Nutrients in Human & Animal Milk

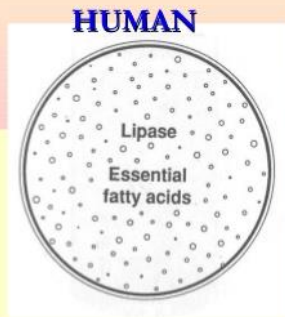
What are the differences between these milks?



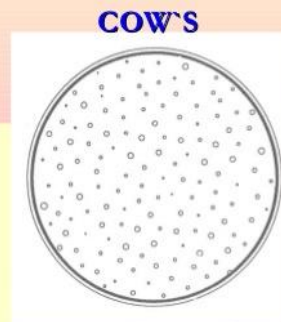
Lower protein content puts lower solute load on kidney

18

Differences in the Fats of Different Milks



Contains
Essential Fatty Acids,
Enzyme Lipase



Contains
No Essential Fatty Acids
No Enzyme Lipase

Due to some reasons children, mothers or family member of a family is responsible for to not breastfeed. To change this condition mothers, parents and others family members need counseling. Tell them why breast milk is important for child and mother. Counselor describe with them on importance of breast milk and they have motivate parents on not to stop breastfeeding.

16. Breast feeding Counseling

Counseling is a method, where professional person will advise to someone on specific topic to resolve the problem. Before giving any solution counselor must listen or know the problem properly. Then counselor will give their feedback.

When counselor will talk with parents or patients that time patients are tends to hide the actual information. Their information may average or below average. Sometimes parents or patients will give wrong information. This time counselor has to more friendly with them. Make patients understood that only h/she can give them actual solution of that problem.



Criteria of Listening

- ❖ Ask open question
- ❖ Remove all the barrier
- ❖ Should pay attention
- ❖ Touch patient if needed
- ❖ Make them understand that counselor also feeling their pain.
- ❖ Reflect what patients say
- ❖ Avoid judging word
- ❖ Keep eye level in equal position



Building confidence and provide support

- ❖ Use simple word
- ❖ Avoid judging or hard word
- ❖ Provide practical demonstration
- ❖ Feel their feelings
- ❖ Praise them
- ❖ Make them understood that you can give proper solution to them

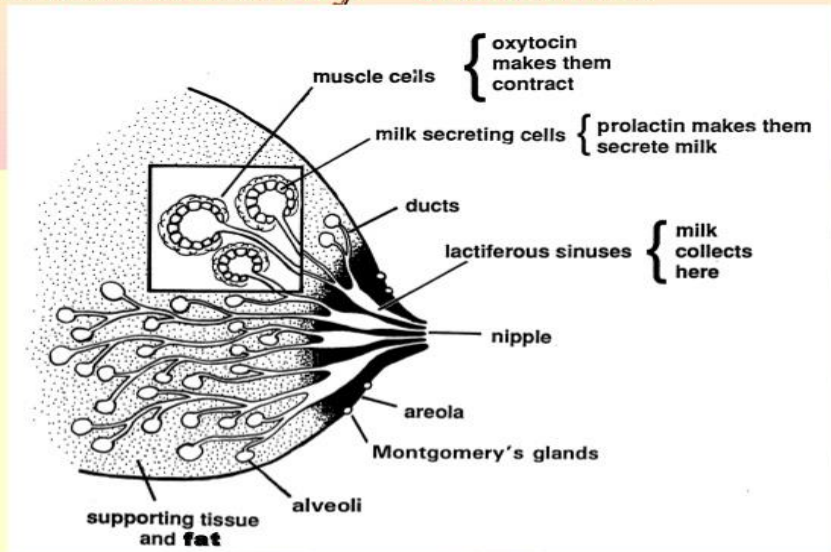
Bangladesh Demographic and Health Survey (BDHS) data of 2014

Exclusive breastfeeding	55%
Breastfeed within one hour after birth	51%
Breastfeeding for one year	96%
Breastfeeding for 2years	87%
Colostrum feeding within 6 to 23 months	23%
PRBF (predominant breastfeeding) of Bangladeshi children receive a pre-lacteal feed	27%

Anatomy of Breastmilk



Breast Anatomy - Structure



Positioning for breastfeeding

The important thing in breastfeed to a child is position. When mother properly hold her child then the child will able to suck properly and able to digest.



Some key points on positioning

- ❖ Baby should hold closer to mother during breastfeed.
- ❖ Baby's head and body should be in straight line.
- ❖ For few months mother will support her baby from bottom.
- ❖ The child will facing to his/her mother and nose opposite of mother's nipple.

Hospitals support in breastfeeding

The TEN STEPS to Successful Breastfeeding

1 HOSPITAL POLICIES
Hospitals support mothers to breastfeed by...

- Establishing policies or laws
- Making breastfeeding a core business priority
- Creating a bank of staff for breastfeeding

2 STAFF COMPETENCY
Hospitals support mothers to breastfeed by...

- Training staff on breastfeeding practices
- Assessing health workers' knowledge and skills

3 ANTENATAL CARE
Hospitals support mothers to breastfeed by...

- Encouraging the importance of breast-feeding at antenatal visits
- Preparing women to take their babies home

4 CARE RIGHT AFTER BIRTH
Hospitals support mothers to breastfeed by...

- Encouraging immediate skin-to-skin contact and baby suckling on demand
- Helping women to be prepared to do breast-feeding

5 SUPPORT MOTHERS WITH BREASTFEEDING
Hospitals support mothers to breastfeed by...

- Checking and solving breastfeeding-related issues
- Providing practical breastfeeding support
- Helping mothers with breastfeeding problems

6 SUPPLEMENTING
Hospitals support mothers to breastfeed by...

- Using only breast milk, expressed or machine-released
- Providing clear or written instructions if supplement is needed
- Helping mothers to only start to supplement if they need to do so safely

7 ROOMING-IN
Hospitals support mothers to breastfeed by...

- Putting mothers and babies close together day and night
- Helping staff to assist with breastfeeding

8 RESPONSIVE FEEDING
Hospitals support mothers to breastfeed by...

- Helping mothers to follow their baby's hunger cues
- Helping mothers to follow their baby's fullness cues

9 BOTTLES, TEATS AND PACIFIERS
Hospitals support mothers to breastfeed by...

- Ensuring that mothers are not given bottles or teats unless they really need them

10 DISCHARGE
Hospitals support mothers to breastfeed by...

- Referring mothers to community resources for breastfeeding support
- Working with community to improve breastfeeding support services

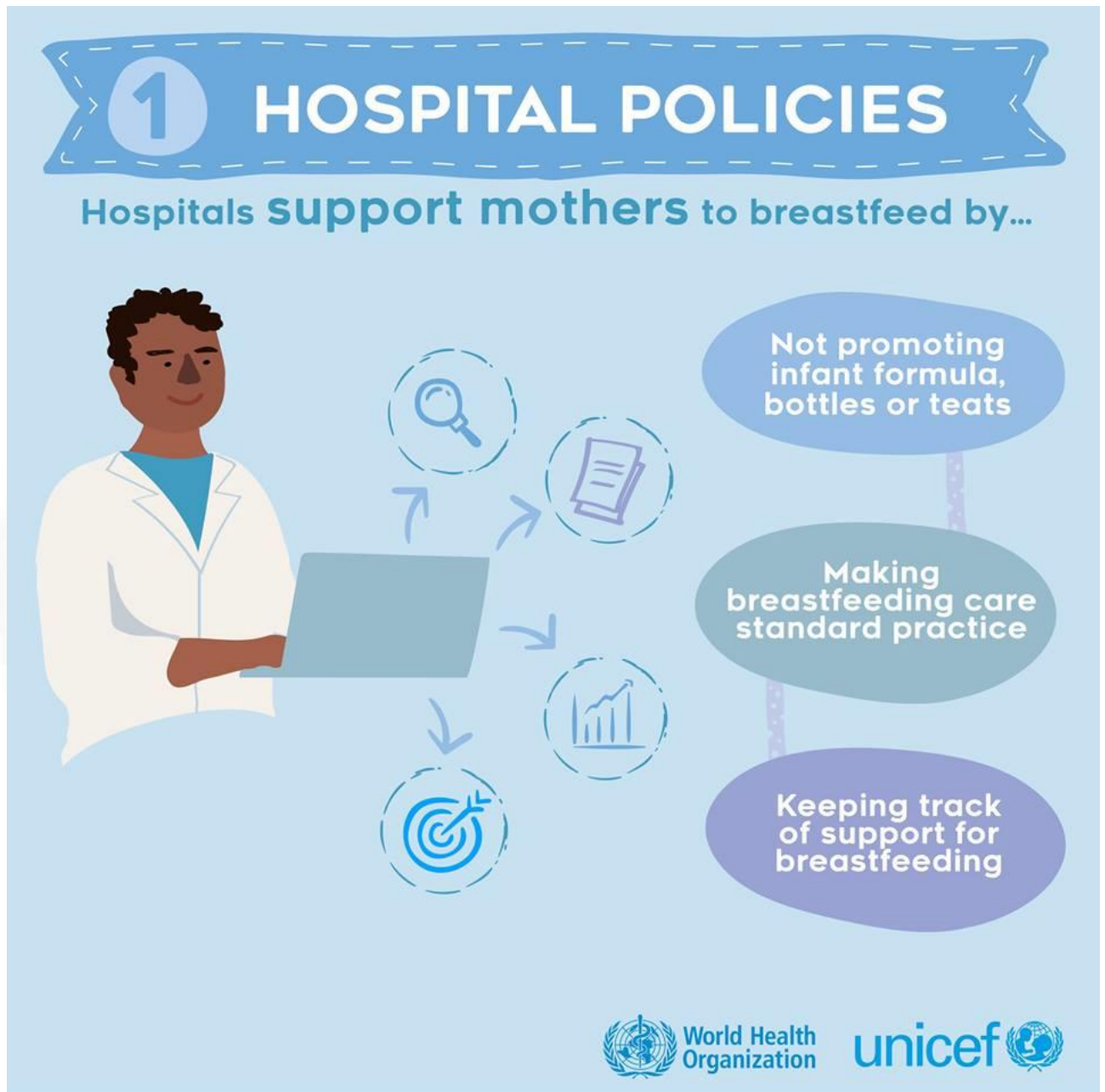


World Health Organization



This steps are shortly describe here

- I. Every health care center should make policy that they will routinely check their patients whether they are breastfeed their child or not.



II. Health workers must be well trained as they as execute the policy



- III. Before the delivery mother will visit the doctors or counselor then they will describe about the importance of breastfeeding.



IV. Health workers will help mothers to feed her child

4 CARE RIGHT AFTER BIRTH

Hospitals support mothers to breastfeed by...

Encouraging skin-to-skin contact between mother and baby soon after birth

Helping mothers to put their baby to the breast right away

World Health Organization unicef

- V. Health workers help both child and mother during breastfeeding when they both are separated from each other after delivery.



- VI. Breastmilk should give to the newborn baby, if any complications present then if doctor prescribe medicine that time mother can give it to them.



VII. Rooming in means, allow mother and child stay together for longer time.



VIII. Milking time of baby

8 RESPONSIVE FEEDING

Hospitals support mothers to breastfeed by...

Helping mothers know when their baby is hungry

Not limiting breastfeeding times

World Health Organization unicef

IX. Not to provide any other food except breastmilk in first 6months.



X. Establish the support in community for breastfeeding



17. Re-lactation

Mother stopped breastfeed her child and later she wants to start breastfeed her child this thing is called re-lactation. This type of situation can occurred by mother's wish or by the pressure of any family member.

To bring back a mother for again start breastfeed is very difficult task. Very well trained and expert counselor needs to do this job. Because they have to motivate them on the importance of breastfeed for both mother and child. When mother or family member will feel that they should again start breastfeed then they will breastfeed their child.



Re-lactation rate at Dhaka Hospital 2016 & 2017

Breastfeeding status	2016				2017			
	Admission	Discharge			Admission	Discharge		
		PTBF	EBF	NBF		PTBF	EBF	NBF
NBF	110	95	04	11	81	65	01	16

18. Conclusion

Both diarrhea and malnutrition are major cause for the mortality and morbidity. Most of the children are from rural area are suffering for malnutrition and diarrhea. There complications may arise from their economic condition, unhygienic drinking water and lack of sanitation. ICDDR, B is trying to reduce this mortality and morbidity rate in Bangladesh by providing them free treatment and proper guideline for future after discharge from the hospital. By doing all of this ICDDR, B trying to improve nutritional status in them.

