

# **OUTCOME OF PONSETI METHOD FOR THE MANAGEMENT OF CLUBFOOT PATIENTS AT CRP.**

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Bachelor of Science in Physiotherapy (B.Sc. PT)

Session: 2006-2007

BHPI, CRP, Savar, Dhaka.



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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

**OUTCOME OF PONSETI METHOD FOR THE MANAGEMENT OF CLUBFOOT PATIENTS AT CRP.**

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# CONTENTS

	<b>Page No.</b>
Declaration	i
Acknowledgement	ii
Abbreviations	iii
List of Figures	iv
List of Tables	v
Abstract	vi
<b>CHAPTER: I INTRODUCTION</b>	<b>1-5</b>
1.1 Background	1-2
1.2 Rationale	3
1.3 Research Question	4
1.4 Aims	4
1.5 Objectives	4
1.5.1 General objective	4
1.5.2 Specific objective	4
1.6 Operational definition	5
<b>CHAPTER:II LITERATURE REVIEW</b>	<b>6-12</b>
<b>CHAPTER :III METHODOLOGY</b>	<b>13-15</b>
3.1 Study design	13
3.2 Sample selection	<b>13</b>
3.3 Study site	13
3.4 Study area	13
3.5 Data collection procedure	13
3.6 Inclusion criteria	14
3.7 Exclusion criteria	14
3.8 Materials and method	14
3.9 Ethical issues	14
3.10 Limitation of the study	14-15
3.11 Rigor	15

	<b>Page No.</b>
<b>CHAPTER: IV RESULTS</b>	<b>16-40</b>
4.1 Socio-demographic characteristics	16-27
4.2 Outcome of Ponseti method	28-40
<b>CHAPTER:V DISCUSSION</b>	<b>41-42</b>
<b>CHAPTER:VI CONCLUSION</b>	<b>43-44</b>
<b>REFERENCES</b>	<b>45-46</b>
<b>APPENDIX</b>	<b>47-50</b>
Questionnaire (English)	47-49
Permission letter	50

## **Declaration**

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study. I would be bound to take written consent from my supervisor.

**Signature:**

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## Abbreviations

<b>BHPI:</b>	Bangladesh Health Professions Institute
<b>CLB:</b>	Curved lateral border
<b>CRP:</b>	Centre for the Rehabilitation of the Paralyzed
<b>CTEV:</b>	Congenital talipes equinovarus
<b>HFCS:</b>	Hind foot contracture score
<b>MFCS:</b>	Mid foot contracture score
<b>PSS:</b>	Pirani severity score
<b>SPSS:</b>	Statistical Package for the Social Sciences
<b>WHO:</b>	World Health Organization

## List of Figures

	<b>Page No.</b>
<b>Figure -1:</b> Age group of the participant	17
<b>Figure -2:</b> Male-Female Ratio among the participant	18
<b>Figure -3:</b> Religion of the participant	19
<b>Figure -4:</b> Living area of the participant	20
<b>Figure -5:</b> Family type of the participant.	21
<b>Figure -6:</b> Birth history of the participants	22
<b>Figure -7:</b> Past medical history of the participant	23
<b>Figure -8:</b> Involvement of site of the participant	24
<b>Figure -9:</b> Types of clubfoot of the participant	25
<b>Figure -10:</b> Other congenital anomaly of the participant	26
<b>Figure -11:</b> Referral source of the participant	27
<b>Figure -12:</b> Past family history of the participant	28
<b>Figure -13:</b> Improvement of Postural Crease	30
<b>Figure -14:</b> Improvement of Empty Heel	32
<b>Figure -15:</b> Improvement of Rigid Equinus	34
<b>Figure -16:</b> Improvement Medial Crease	36
<b>Figure -17:</b> Improvement of Lateral Heel of Talus	38
<b>Figure -18:</b> Improvement of Curve Lateral Border	40



## List of Tables

	<b>Page No.</b>
<b>Table -1:</b> Improveent of all participants Posterior Crease ability	29
<b>Table -2:</b> Improvement of all participants Empty Heel ability	31
<b>Table -3:</b> Improvement of all participants Rigid Equinus ability	33
<b>Table -4:</b> Improvement of all participants Medial Crease ability	35
<b>Table -5:</b> Improvement of all participants Lateral Head of Talus ability	37
<b>Table -6:</b> Improvement of all participants Curve Lateral Border ability	39

## Abstract

*Purpose:* The purpose of group therapy was outcome of ponseti method for the management of clubfoot patients at CRP patient's outdoor department. *Objectives:* To compare the initial and discharge functional level of the clubfoot patients, to explore the outcome of ponseti management among the clubfoot patients, to find out the current clinical practice in Ponseti method for clubfoot patients, to identify the Sociodemographic information of the clubfoot patients. *Methodology:* The Study was done under retrospective design; retro-spective study design was selected for the study. Total 35 participants with clubfoot patients were selected through convenience sampling from Patients outdoor department at CRP, Savar, Dhaka. *Results:* After three to six session intervention significant changes found in functional improves severely to moderate 3%, severity to normal 83% and moderately to normal 14%. Ponseti method is effective for clubfoot patients. *Conclusion:* From the small project it can be suggested that, Ponseti method is effective for clubfoot patients. This study highlighted the significant improvement of the clubfoot patients after Ponseti management. Without proper Ponseti management the proper recovery of clubfoot patients cannot be achieve. As a whole the clubfoot patients getting functional improvement after Ponseti technique and the result were significant. Last of all this study will try to represent the strong evidence of the outcome of ponseti management among the clubfoot patients.

*Key words:* Outcome, Ponseti Method, Clubfoot.

**1.1 Background of the study**

It is estimated that more than 100,000 babies are born worldwide each year with congenital clubfoot. Eighty percent of the cases occur in developing nations. Most are untreated or poorly treated. Neglected clubfoot causes crushing physical, social, psychological and financial burdens on the patients, their families, and the society. Globally, neglected clubfoot is the most serious cause of physical disability among congenital musculoskeletal defects. In developed countries, many children with clubfoot undergo extensive corrective surgery, often with disturbing failures and complications. The need for one or more revision surgeries is common. Although the foot looks better after surgery, it is stiff, weak, and often painful (Ponseti, 2005).

The prevalence of clubfoot has been reported in the orthopedic literature to be two per 1000 births, with the definitive treatment being largely surgical. The majority of all clubfeet in reported series end in surgical release, primarily in patients between the ages of 3 months and 1 year, despite early serial casting (Lehman et al, 1980).

Non-operative treatment of idiopathic clubfoot has become increasingly accepted worldwide as the initial standard of care. The Ponseti method has become particularly popular as a result published short and long-term success rates in North America. The purpose of the current study was to examine the early rate of clubfoot recurrence following the use of the Ponseti treatment method in a New Zealand population and to analyze patient characteristics to identify factors predictive of recurrence (Geoffrey et al, 2007).

Malawi, in Southern Africa, is a country with 12 million people, 85% of whom live in remote rural areas with poor transportation and infrastructure. Congenital idiopathic talipes equinovarus is one of the most common and most disabling conditions affecting Malawians. The incidence of this condition in Malawi is twice that in Western Europe (Mkandawire, 2002). The Ponseti technique has been shown to be

highly successful in achieving correction of clubfoot deformity. In Ponseti's North American clinic, success rates for manipulation of 95% have been reported. The method has been suggested as being particularly suited to the developing world because of its inherent simplicity and conservative methodology (Ponseti, 1996).

The patients were followed for an average of 4.3 years. Both groups had similar severity scores before treatment. The initial correction rates were 94.4% for the Ponseti method and 95% for the French functional method. Relapses occurred in 37% of the feet that had initially been successfully treated with the Ponseti method. One third of the relapsed feet were salvaged with further non-operative treatment, but the remainder required operative intervention. Relapses occurred in 29% of the feet that had been successfully treated with the French functional method, and all required operative intervention. At the time of the latest follow-up, the outcomes for the feet treated with the Ponseti method were good for 72%, fair for 12% and poor for 16%. The outcome for the feet treated with the French functional method were good for 67%, fair for 17% and poor for 16% (Richard et al, 2008).

The Philippines has a congenital clubfoot incidence of 0.76 cases per 1,000 births. There is a high percentage of neglected clubfoot and unsuccessful subtalar releases for clubfoot in the Philippines (Julyn, 1995).

## **1.2 Rationale**

The Ponseti casting technique is reported to have a high success rate in the treatment of idiopathic clubfoot. Non-operative treatment of clubfoot provides a lower complication rate, less pain, and higher function as the patient ages than operative treatment. Patients complaint with the Ponseti technique and treated before the age of 7 months, had a 92% success rate at an early follow up after casting was completed. It is not the purpose of this article to analyze the long-term clubfoot treatment result but to establish tools which can be used to judge initial success with the Ponseti technique. Complications are few minor; limited to equipment used and cast technique (Lehman et al, 2003).

Clubfoot in an otherwise normal child can be corrected in 2 months or less with our method of manipulations and plaster cast applications, with minimal or no surgery. This method is particularly suited for developing countries where there are few orthopedic surgeons. The technique is easy to learn by allied health professionals, such as therapists and orthopedic assistants. A well-organized health system is needed to ensure that parents follow the instructions for the foot abduction brace to prevent relapses. The treatment is economical and easy on the babies. If well implemented, it will greatly decrease the number of clubfoot cripples. (Ponseti, 2003).

The outcome of Ponseti management can be compared with other countries .Other health professions may also understand about the standard of physiotherapy by knowing the outcome of my study .Consequently they also eager to refer physiotherapy related problem spatially club foot patients to the physiotherapist. It will assist the departmental annual survey to an instant.

Research makes the profession strongest. So there is no alternative to do research a professional in order to develop the profession. However, for fulfillment the 4th year of B.Sc in physiotherapy i have to carry out a research of my interest which accomplish the professional body of interest.

### **1.3 Research Question**

- What is the outcome of Ponseti method for the management of clubfoot patients?

### **1.4 Aims**

- To explore the outcome of Ponseti method for the management of clubfoot patients attended at CRP.

### **1.5 Objectives**

#### **1.5.1 General objective**

- To evaluate the outcome of Ponseti method for the management of clubfoot patients attended at CRP.

#### **1.5.2 Specific objective**

- To evaluate the outcome of Ponseti method of clubfoot patients attended at CRP.
- To find out the sociodemographic information.
- To record an initial and discharge score of Posterior Crease, Empty Heel and Rigid Equinus.
- To record an initial and discharge score of Medial Crease, Lateral Head of Talus and Curved Lateral Border.

## **1.6 Operational definition**

### **Outcome**

A conclusion reached through a process of logical thinking.

### **Ponseti**

The Ponseti method is a complete treatment method that is 97% successful in correcting the clubfoot deformity without major surgery that was common practice.

### **Clubfoot**

A clubfoot, deformity or congenital talipes equinovarus (CTEV), is a congenital deformity involving one or both foot. The affected foot appears rotated internally at the ankle.

The Ponseti method is a manipulative technique that corrects congenital clubfoot without invasive surgery. It was developed by Dr. Ignacio V. Ponseti of the University of the Iowa, USA in the 1950s, and was repopularized in 2000 by Dr. John Herzenberz in the USA and in Africa by NHS surgeon Steve Mannion. It is a standard for the treatment of clubfoot. Congenital clubfoot or talipes equinovarus, (CTEV) is a fixed deformity that is present at birth. It is often bilateral and a hereditary factor is often present (Mercier 2000: 203). Clubfoot is more common in boys and more common on the right side (Loth, 1996).

Exact cause remain unknown there combination of genetic and environmental many factors are suspected. Palmer 1964 proved that clubfoot runs in families. If a family has one child with a club foot that risk in subsequent siblings is about 30 times higher than average. Most infant who have clubfoot have no identifiable genetic, Syndromal or extrinsic cause (Parker et al, 2009). There are some theories regarding causative factors of clubfoot include – extrinsic pressure of embryo in uteri ( Hippocrates 400 BC and Galen 200 AD) , Abnormal intrauterine force, Arrested fetal development ( Bohm, 1929), Nerve lesion, Abnormal muscle and tendon insertion , Imbalance between fast-twitch and slow-twitch muscle fiber group , Germ plasma defects, Bone anomalies tibial deficiency, Congenital dislocation of navicular talus, Circulatory – temporary or permanent breakdown of circulation, Breech presentation ( wynne-Davies 1972: 9-13 ). Pathologic condition associated with clubfoot include- Proximal femoral focal deficiency, Congenital bifurcation of the femur, Pierre Robin syndrome, Larsen’s syndrome, Amniotic band syndrome (Frymoyer 1993:627) Myelodysplasia, Arthrogryposis multiplex congenital, Diastrophic dwarfism (Bulstrode et al, 2002)

The true etiology of congenital clubfoot is unknown. Most infants who have clubfoot have no identifiable genetic, syndrome, or extrinsic cause. Extrinsic associations include teratogenic agents (e.g., sodium aminopterin), oligohydramnios, and



congenital constriction rings. Genetic associations include mendelian inheritance (e.g. diastrophic dwarfism, autosomal recessive pattern of clubfoot inheritance). Cytogenic abnormalities (e.g. congenital talipes equinovarus (CTEV) can be seen in syndromes involving chromosomal deletion. It has been proposed that idiopathic CTEV in otherwise healthy infants is the result of a multifactorial system of inheritance. Evidence for this is as follows: Incidence in the general population is 1 per 1000 live births. Incidence in first-degree relations are approximately 2%. Incidence in second-degree relations is approximately 0.6%. If one monozygotic twin has a CTEV; the second twin has only a 32% chance of having a CTEV.

The incidence of clubfoot is approximately 1 case per 1,000 live births in the United States. There is a 1 in 35 chance of a second child in the family having the same deformity. The male - to-female ratio is 1:2. Bilateral involvement is found in 30-50% of cases (Hilt & Cogburn, 1980).

Three classes of clubfoot can be determined at birth (1) Congenital idiopathic clubfoot- Is the typical clubfoot. No other major abnormalities are present (ie, corrects in five casts). (2) syndromic clubfoot - The clubfoot is part of a syndrome. Other congenital abnormalities are present. (I.e. corrects by Ponseti management). (3) positional clubfoot- It is not true clubfoot (i.e. corrects with one or two casts) (Ponseti 2009:8). Classification related to type of treatment expected (1) Non-rigid type (2) Fixed or rigid - Fixed or rigid club feet are either flexible (i.e. correctable without surgery) (3) Resistant rigid type-(ie, require surgical release, though that is not entirely true according to Ponseti experience (Scher, 2006).

The soft tissue at the medial side of the foot are under-developed and shorter than normal. (Gastrocnemius, soleus, plantaris) Tibialis posterior and toe flexor muscles. The foot is adducted and inverted at the subtalar, midtarsal and anterior tarsal joints, and is held in equinus (plantar flexion) at the ankle. In many cases the calf and peroneal muscles are under-developed. In the absence of early effective treatment

the developing tarsal bones become misshapen, perpetuating the deformity (Adams, 1976).

Congenital club foot is a complex deformity with four components-

Cavus: Increase in the height of the medial arch of the foot = break in the foot sole plan; the forefoot in relation to the mid foot is in pronation. Mid foot strong supination and forefoot less supination (Ponseti, 2003). Adductus: Medial deviation of the distal part of the foot (Ponseti, 2009). Varus: supination and adduction of the calcaneus. Calcaneus is locked under the talus (Ponseti, 2003). Equinus: Severe planter flexion in the ankle joint. Talus is severe flexion (Ponseti, 2003).

Dr. Pirani has developed a reliable and valid method of clinically assessing the amount of deformity present in an un-operated congenital clubfoot less than 2 years of age. It is useful because there is no science without reliable and valid measurement. Documenting the amount of deformity allows the treating practitioner (especially if inexperienced) to know where he or she is with respect to the roadmap of treatment, to know when tenotomy is indicated, and to reassure parents regarding progress. It allows meaningful comparison of results, extraction of subgroups etc.

Scores six clinical signs

0 Normal

0.5 Moderately abnormal

1 severely abnormal

Midfoot score Three signs comprise the Midfoot Score (MS), grading the amount of midfoot deformity between 0 and 3. Curved lateral border Medial crease Talar head coverage Hindfoot score three signs comprise the Hindfoot Score (HS), grading the amount of hindfoot deformity between 0 and 3. Posterior crease Rigid equines Empty heel Use of Pirani score Scoring Every clubfoot under Ponseti management is "scored" each week for HS, MS, and total score. Plotting scores on a graph shows where the foot is on the roadmap of treatment, visually and easily reassuring parents of satisfactory progress [An opposite page]. Tenotomy is indicated when  $HS > 1$ ,  $MS < 1$ , and the head of the talus is covered (Ponseti, 2003).

The aim of treatment is to produce and maintain plantigrade, supple feet that will function well. There are several methods of treatment but relapse is common, especially in babies with associated neuromuscular disorder. The treatment should begin shortly after birth. A sincere effort to correct the majority of deformity should be made during the first 3 months of age (Solomon et al, 2001).

The Ponseti method is a manipulative technique that corrects congenital clubfoot without invasive surgery. It was developed by Dr. Ignacio V. Ponseti of the University of Iowa, USA in the 1950s, and was repopularized in 2000 by Dr. John Herzenberg in the USA and Europe and in Africa by NHS surgeon Steve Mannion. It is a standard for the treatment of club foot. The challenge in achieving a successful outcome with this method lies not in correcting deformity but in preventing relapse (Zionts & Dietz, 2010).

The manipulation consists of abduction of the foot beneath the stabilized talar head. Locate the head of the talus. All components of clubfoot deformity, except for the ankle equines, are corrected simultaneously. To gain this correction, you must locate the head of the talus, which is the fulcrum for correction (Ponseti, 2009).

The method is Manipulation actively by the mother:

For children less than 2 months of age, the mother of the child is trained to carry out the passive manipulation of the foot everyday (Ebnezar, 2003). In children above 2 months of age, manipulation is carried out by the same technique and maintained by strapping, splintage or plaster of paris cast (Joshi & Kotwal, 1999).

The method and order of correction the mother has to follow. Forefoot adduction: An attempt is made to correct this deformity first by stabilizing the heel with one hand and the other hand thumb is placed on the talus, and using the talus as the fulcrum, the forefoot is slowly abducted and everted. Inversion: This is corrected next by the method mentioned above and by exerting pressure over the undersurface of the 4<sup>th</sup> and 5<sup>th</sup> metatarsal heads. Equines: This is the last to be corrected. The hand is placed beneath the foot and is raised into dorsiflexion (Ebnezar, 2003).

The cast is applied after the manipulation and immobilizes the foot in order to stretch the tight ligaments, joint capsules and tendon. Always use long leg casts up to the groin in order to keep the foot under the Talus in Abduction and prevent Rotation in the ankle mortise. In the “Younger child” (=not walked before treatment start) cast the knee in 90 flexion and change the cast every 5-7 days. In the “older child” (walked before treatment start) cast the knees in 70 flexion, so that they can stand up and change the casts every 7-10 (14) days. The last cast, if tenotomy of the Achilles tendon is done, will stay for 3 weeks in the “younger child” and 4 weeks in “older child”. The main focus in the first cast is the correction of the cavus by supinating the fore foot, but Mid foot inversion and Heel varus are addressed as well by gentle Abduction. When the cavus is eliminated, mid foot Inversion and Heel varus have to be corrected in the following casts. Aim to achieve the neutral heel for sure and in the “younger child” 50 (-60) Abduction, In the “older child” 30-50 Abduction. Finally (in most cases after tenotomy of the Achilles tendon) correct the Equines, but simultaneously improve mid foot Abduction and Heel Valgus. The last cast should have 60-70 Abduction + 15-30. Dorsiflexion is in the “younger child” and 30-60 Abduction and 10-20 Dorsiflexion in the “older child”. Never hold the heel when casting! Never cast the foot in a pronate position! Avoid External Rotation of the knee (Ponseti, 2003).

Remove each cast in clinic just before a new cast is applied. Avoid cast removal before clinic because considerable correction can be lost from the time the cast is removed until the new one is placed. Although a cast saw can be used, use of a plaster cast knife is recommended because it is less frightening to the infant and family and also less likely to cause any accidental injury to the skin. Soak the cast in water for about 20 minutes, and then wrap the cast in wet cloths before removal. This can be done by the parents at home just before their visit. Use the plaster knife, and cut obliquely to avoid cutting the skin. Remove the above-knee portion of the cast first. Finally, remove the below-knee portion of the cast (Ponseti, 2003).

Using careful technique, as described, complication is uncommon:Rocker-bottom deformity: Is due to poor technique by dorsiflexing the foot too early against a very tight Achilles tendon,crowded toes: Are due to tight casting over the toes.Flat heel pad: Will occur if, while casting, pressure is applied to the heel rather than molding the cast above the ankle and Superficial sore: Are managed by applying a dressing and a new cast with additional padding.Pressure sore: Are due to poor technique. Common sites include the head of the talus, over the heel, under the first metatarsal head and popliteal and groin regions.Deep sores: Are dressed and left out of the cast for one week to allow healing. Casting is then resumed with special care to avoid relapse (Ponseti, 2009).

If at the end of three months the feet are not normal clinically and radio-logically operation is undertaken. All taut ligaments at the medial side of the ankle and foot are divided and any tendon that is too tight to allow full correction is lengthened-including the calcaneal tendon. Finally the tarsal bones, thus released, are restored to their normal relationships, particular attention being paid to the talus and the navicular bone. After operation a plaster is worn for two or three months (Adams, 1976).

In children of 2 to 12 years five operation are to be considered:1) Division of the short soft tissues at the medial side of the foot, the foot thereafter being forced into a plantigrade position and immobilized in plaster for three months; 2) Transfer of the tendon of the tibialis anterior lateral wards or (preferably) of the tibialis posterior through the interosseous membrane to the lateral side of the foot, to supplement the action of the evertor muscles; 3) lengthening of a short calcaneal tendon; 4) Arthrodesis of the calcaneo-cuboid joint, which excision of a wafer of bone to shorten the lateral border of the foot (Evans 1961); and 5) when inversion of the heel is a prominent feature, osteotomy of the calcaneus with insertion of a bone wedge in the medial side to correct the line of weight –bearing (Dwyer, 1963).

In children over the age of 12 resorts must be had to operation upon the bones: a wedge of bone of appropriate size is removed from the tarsus so that when the

resulting gap is closed the foot is planti grade. Operation is not recommended for children under 12 because it may impair the growth of the foot (Adams, 1976).

This is the recent concept in the management of CTEV and is reserved for difficult cases. There are two types of external fixation frames; one is designed by Ilizarov a Russian orthopedic surgeon. The second one is designed by an Indian orthopedic surgeon Dr.BB joshi this frame is known as joshi, external stabilization system popularly called as JESS (Ebnezar, 2003).

The purpose of the steenbeek foot abduction brace is to prevent relapse of deformity by holding the foot in the corrected position. It uses full time for 3 months and at night time. Until 4 years of age is critical for the success of the treatment program (Ponseti, 2009).

The prognosis depends largely upon the age at which primary treatment is begun, and upon the efficiency with which it carried out. The longer the delay before treatment, the smaller is the prospect of complete cure yet even with prompt treatment the outcome is uncertain. In a proportion of cases, despite the greatest care from the times of birth, there is a tendency to relapse when treatment is discontinued. These are usually the cases that present well marked hypo-plasia of the muscles of the lower leg, especially of the peroneal group (Adams, 1976). Studies of twins have shown that concordance is more common in homozygous than in heterozygous twins. Clubfoot is twice as common in boys as in girls and at least half the cases are bilateral. While there is clearly associated genetic factors, its exact nature is not understood (Shaw, 1977)

**3.1 Study design**

A quantitative research model was used in the form of retrospective type of descriptive survey in design. The meaning of retrospective study is to find out what is already happened (Hicks, 1999). Survey was use to gather information about a large number of populations in order to answer a set of hypothesis (Bailey, 1998). Descriptive survey design is chosen rather than any other design because the aim of the study was explore the “Outcome of Ponseti method for the management of clubfoot patients at CRP” a retrospective survey over last April 2011 to March 2012, at CRP patient’s outdoor department”. Therefore the study needs as much information as possible.

**3.2 Sample selection**

For the accomplish of the study, the documents (Assessment form, SOAP notes, Discharge summary) of those patients was selected, who had already been treated and discharged from patients outdoor department of CRP from April 2011 to March 2012 .

**3.3 Study site**

The study was conducted in Patients outdoor department of CRP where the service is offered for all outpatients who come from all over the country.

**3.4 Study area**

The study area is CRP, Savar which is 25 km away from Dhaka.

**3.5 Data collection procedure**

Researcher started the study and collected the relevant information from previous assessment, SOAP notes and discharge summary of each participant.

### **3.6 Inclusion criteria**

- Patients with club foot who had taken physiotherapy for consecutive at least three treatment session.
- Assessment execute by qualified physiotherapist.
- Both male and female was included

### **3.7 Exclusion criteria**

- Patients who discontinue their treatment from Outdoor Unit, CRP, Savar.
- Patients who are medically unstable.
- Patients who did not receive physiotherapy minimum three sessions in People outdoor unit of CRP.
- Patients who are not diagnosed club foot by physiotherapist.
- Recurrent clubfoot / Relaps after surgery.

### **3.8 Materials and method**

Materials of the research are paper, pen check list and medical records. The records of all patients with club foot who had taken treatment from people outdoor department at CRP from April 2011 to March 2012.

### **3.9 Ethical issue**

A research proposal was presented in front of the ethical committee of BHPI and they approved the proposal. The investigator was followed the guidelines given by local ethical review committee according to rules and guidelines of WHO and BMRC.

The questionnaire was developed and approved by supervisors of the researcher. Each copy was filled by researcher himself with respondents' signature willingly. All the data was reviewed in strict secure and maintained confidentiality.



### **3.10 Limitation of the study**

100% accuracy was not possible in any research so that some limitation may exist. Regarding this study, there were some limitations or barrier to consider the result of the study as below:

- The first limitation of this study was sample size. It was taken only 35 samples.
- A very few researches have been done on a few of research among outcome of Ponseti management of clubfoot patients. So there was little evidence to support the result of this project study in the context of Bangladesh.
- Another major limitation was time. The period was very limited to conduct the research project on this topic. As the study period short so the adequate number of sample could not arrange for the study.
- AS the study was conducted at Centre for the Rehabilitation of the paralyzed (CRP) which may not represent the whole country.

### **3.11 Rigor**

This study was conducted in systemic way. All the steps of research were followed by the researcher sequent. During data collection and analysis the researcher avoided influencing the whole process by own perspectives values and biases. When conducting the study the researcher took help from the supervisors and physiotherapists. The researcher never influenced the participants by her own perception during data collection. A trustful relationship with participants was always maintained and the documents were kept confidential. Biasness was avoided during data analysis.

The data that the researcher collected was descriptive data. Generally descriptive statistics are used in conjunction with survey methods (Hicks, 1999) and it provides picture of the group under investigation. These pictures may be in the form of charts, tables, percentages, averages and so on (Goulding, 1992). By this survey a lot of information was collected. The three most commonly used forms of descriptive data are: graphs, measure of central tendency and measure of description.

The researcher used the graph technique for analyzing data, calculated as percentages and presented this using bar, and pie charts. All these results gave a basic idea about the outcome of ponseti management for clubfoot patients. This was used because it is easy and simple method, so that the readers understand the findings easily (Hicks, 1999).

### Age range

The mean age of the participants was 1.26 month, n= 28 (80%) participants in between 1-10 months of age, n=5 (14%) in between 11-20 months of age and n=2 (6%) in between 21-30 month. Result shows that 1-10 months are more common age those who had taken ponseti method from patient's outdoor department at CRP. The percentage of age group is shown below as a bar graph.

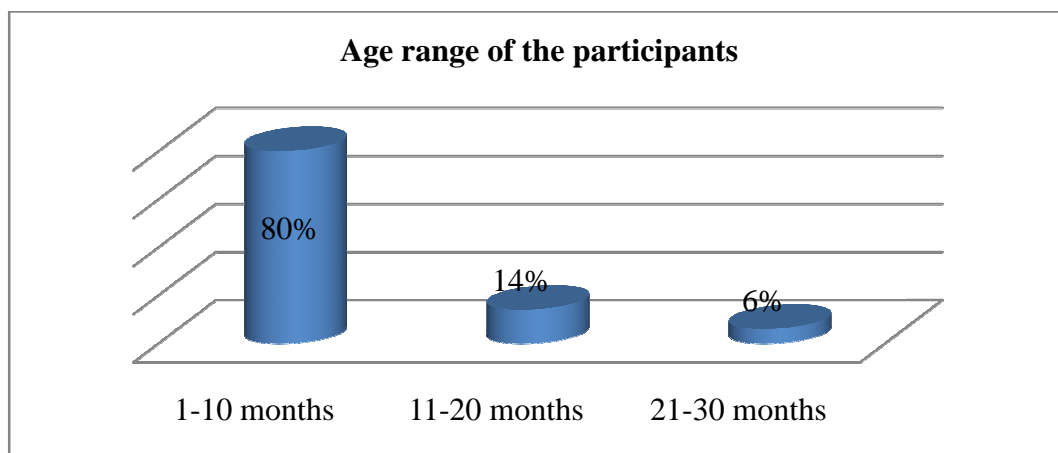


Figure-1: Age range of the participants

## Gender

Among all the participants  $n=21$ (60%) were male and approximately 40% (14 of 35) was female. Result shows that male was more affected than female.

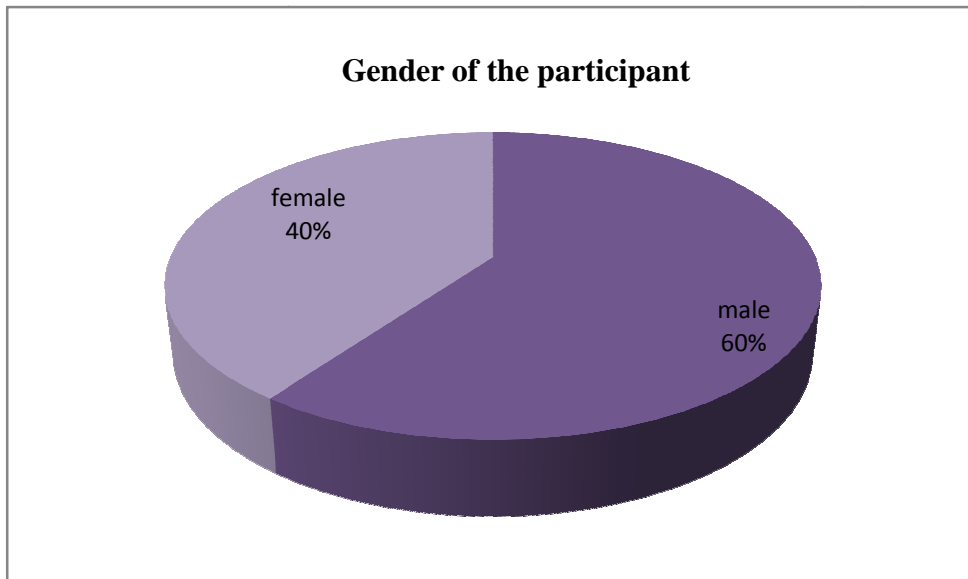


Figure-2: Gender of the participants

## Religion

Analysis showed that among all the participants 94% (33 of 35) participants were muslim and 6% (2 of 35) participant were Hindu.

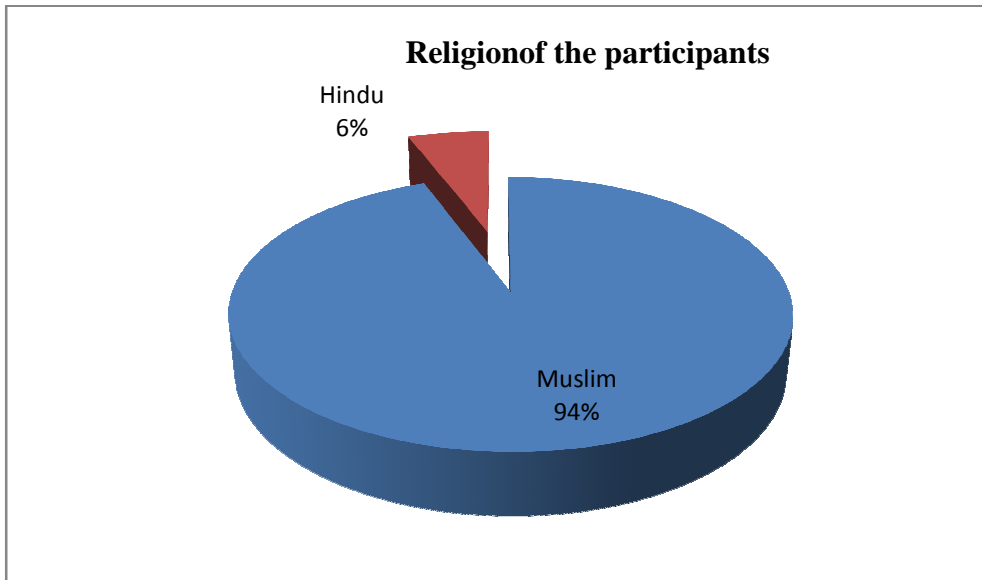


Figure-3: Participants of the religion

### **Living area of the participants**

Among all the participants researcher found that n=12(34%) were urban and n=23 (66%) participants were rural.

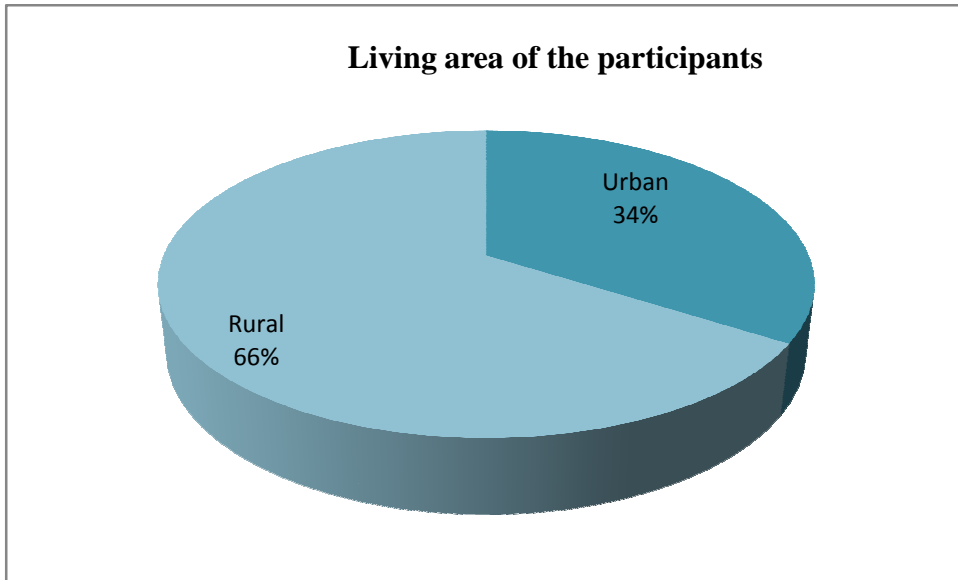


Figure-4: Living area of the participants

### Family type of the participants

Result shows that among 35 of the participants n=24(69%) were from extended family and n=11(31%) participants were from nuclear family.

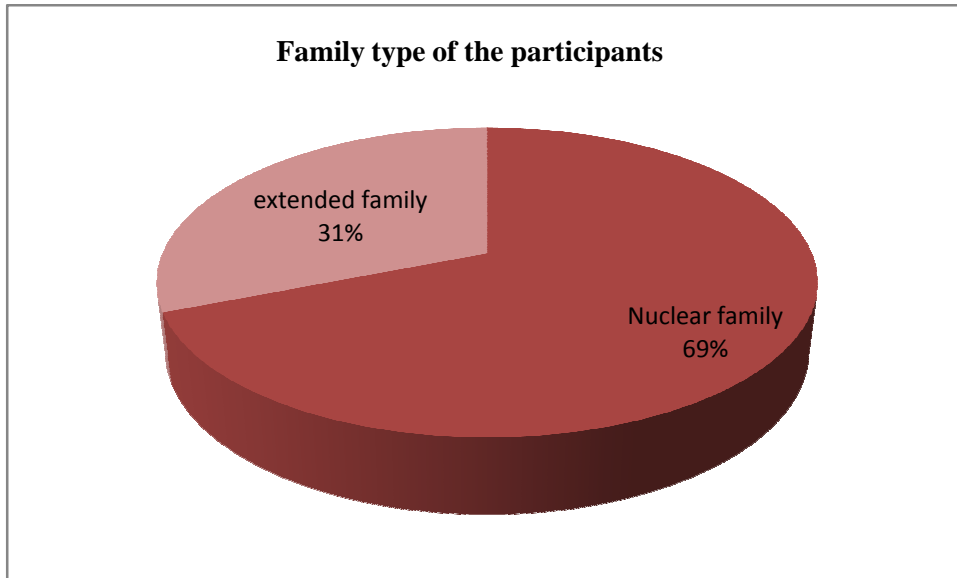


Figure-5: Family type of the participants

### Birth history of the participants

Result shows that among all the participants approximately n=2(6%) Were pre-term, n=7(20 %) were term, n=1(3%) were post term and no complain were n=25(71%) of the participants.

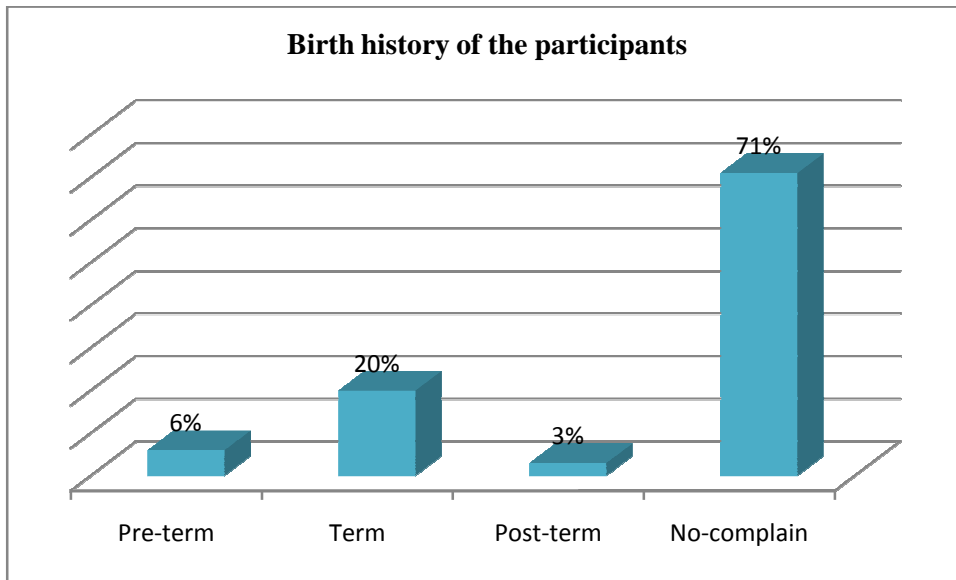


Figure-6: Birth history of the participants

### **Past medical history of the participants**

Analysis showed that among all the participants 3% (1 of 35) were new patients, 3-6 times casting were given 40%(14 of 35) and 3-6 times casting with tenotomy were given 57% (20 of 35) of the participants.

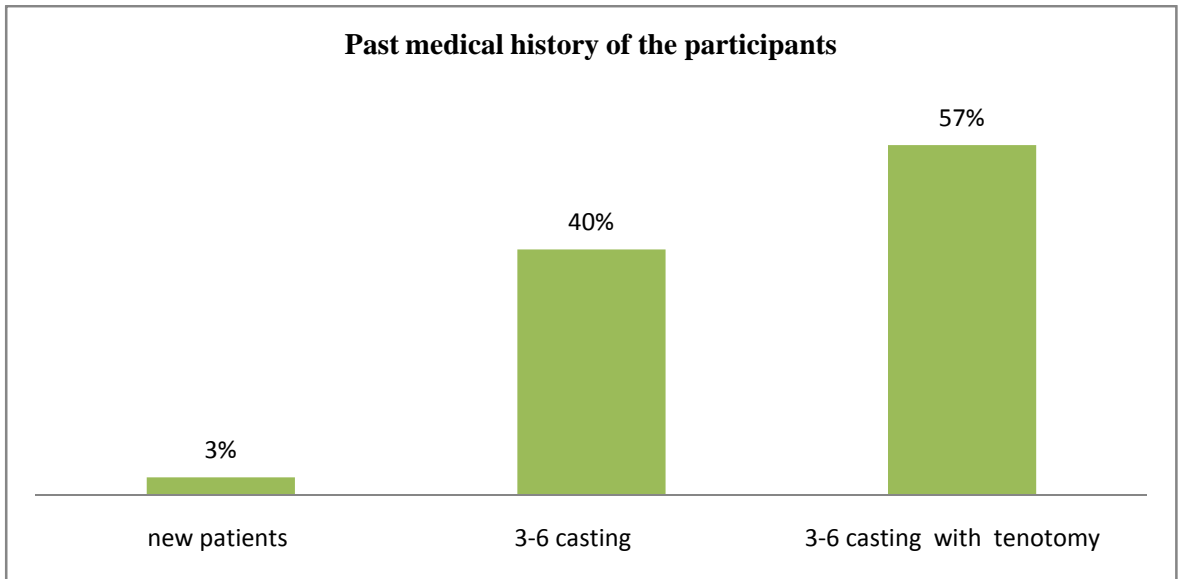


Figure-7: Past medical history of the participants



### **Involvement of site of the participants**

Result shows that among all the participants approximately n=21(60%) were unilateral, n=14(40 %) were bilateral.

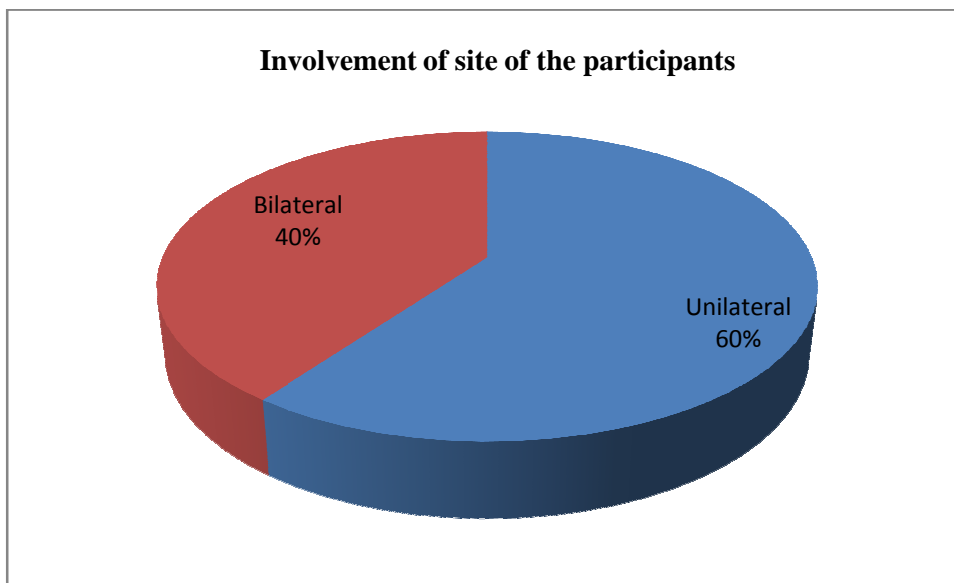


Figure- 8: Involvement of site of the participants

### Types of clubfoot of the participants

Result shows that among all the participants approximately 43% (15 of 35) were rigid, 48 % (17 of 35) were non rigid and few number of the participants were 3% (3 of 35) were resistance rigid.

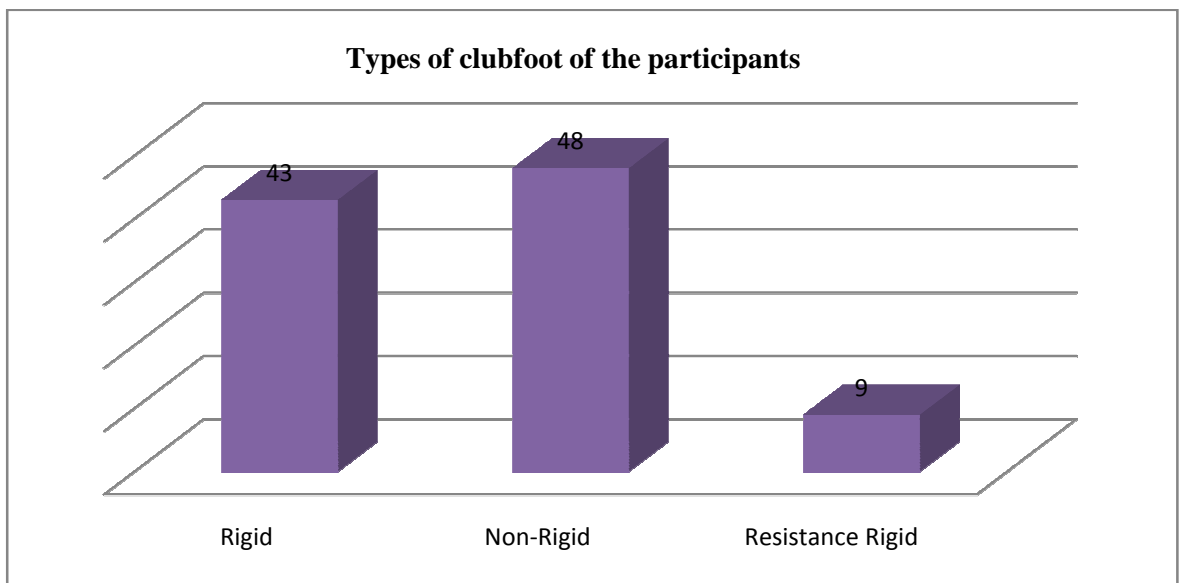


Figure 9: Types of clubfoot of the participants

### **Other congenital anomaly of the participants**

Result shows that among all the participants approximately n=2(6%) had other congenital anomaly of the participants and n=32(94%) had no other congenital anomaly of the participants.

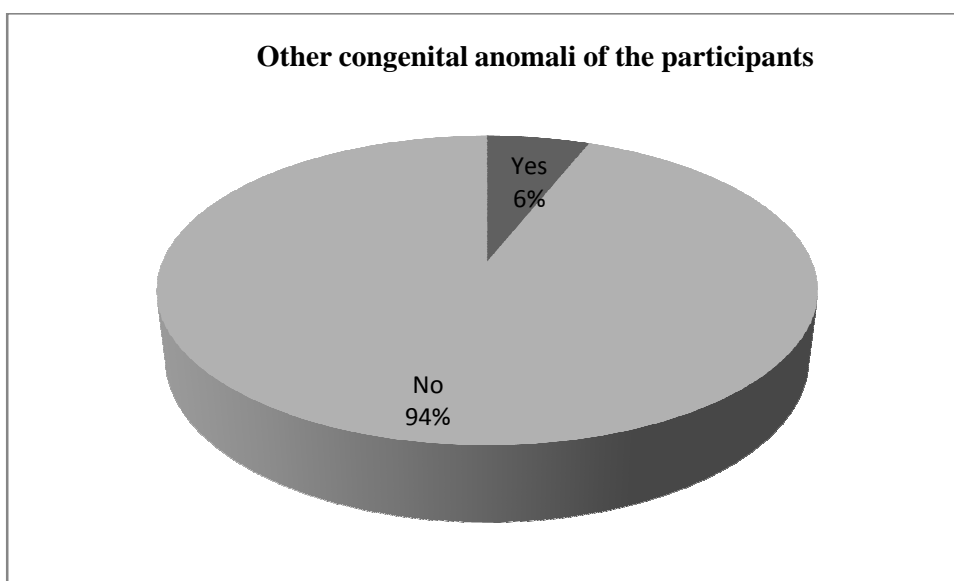


Figure - 10: Other congenital anomaly of the participants

### Referral sources of the participants

Result shows that among all the referral approximately n=1(3% ) were publicity=21(60%) were doctors n=2(6%) were previous patients and n=11(31%) were others.

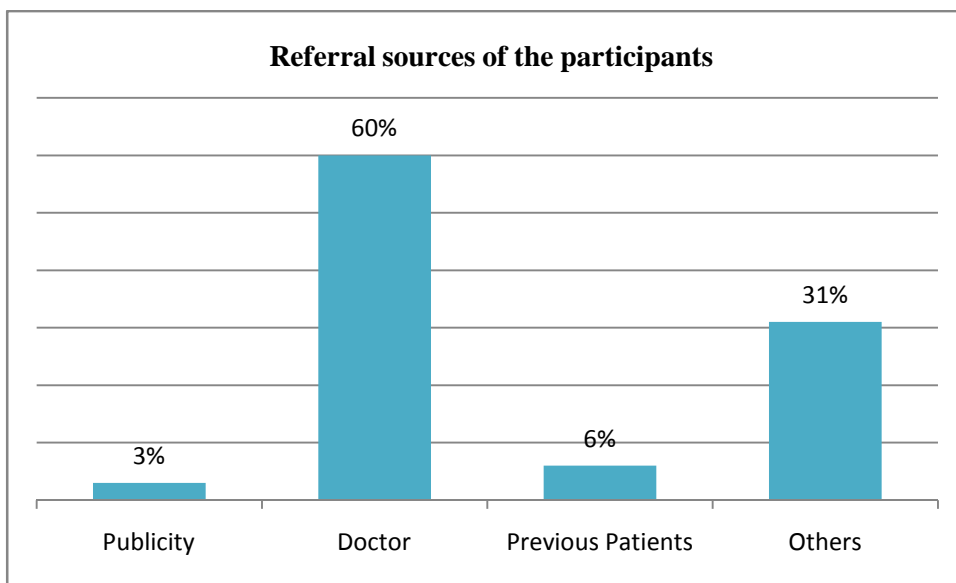


Figure 11: Referral sources of the participants

### **Past family history of clubfoot**

Result shows that among all the participants approximately 3% (1 of 35) had past family history of clubfoot and 97% (34 of 35) had no past family history of club foot.

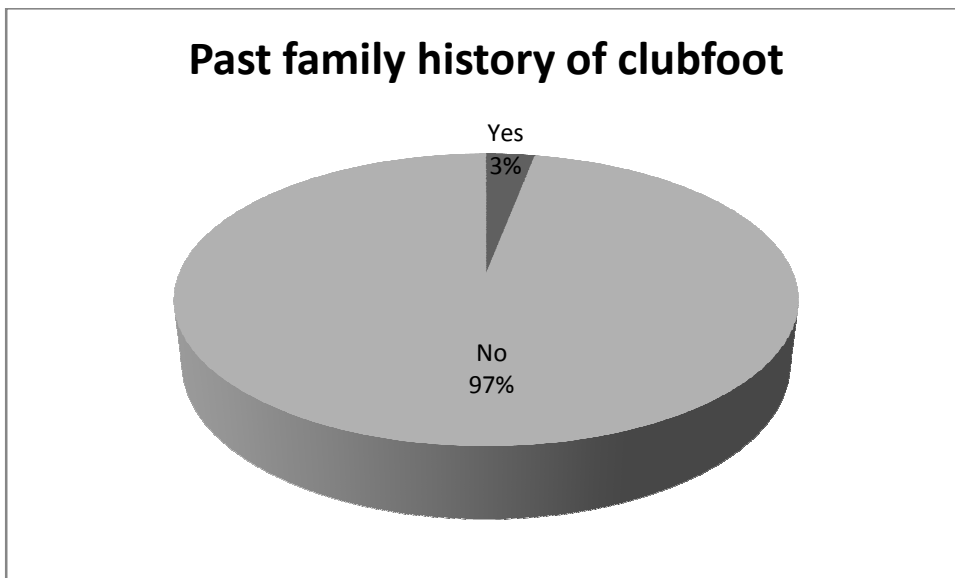


Figure 12: Past family history of clubfoot

## **Outcome of ponseti measurement by Pirani Severity Scale**

According to Pirani severity scale 70% children out of 35 children are observed in level-1 or severely abnormal in pre-test score, but during post-test score those who have level-1. Functional ability have been improved to 17% children in level-2 or moderately abnormal, functional ability have been improved 25% children level-3 or normal (in pre-test score) from level-2 or moderately abnormal (in post test score) and 53% are observed in pre-test score, children are improved their functional position grade-3 or normal from level-1 or severely abnormal (after the measurement of post test score).

Pre-test & post-test score are showing that Ponseti method is effective to improve functional ability for the children with club foot.

	<b>Scale Ranking</b>			<b>Total Number of participants</b>
<b>Pirani severity scale</b>	<b>Level-1</b> Severely abnormal	<b>Level-2</b> Moderately abnormal	<b>Level-3</b> Normal	<b>35</b>
<b>Posterior Crease</b>				
<b>Pre-test score</b>	30 person (86%)	5person (14%)	person (%)	
<b>Post-test score</b>	0 person	1person (3%)	34person (97%)	

**Table-1:** Improvement of all participants Posterior Crease ability according to Pirani severity scale.

#### 4.1 Interpreting the result

According to pirani severity scale (Posterior Crease) function improves severely to moderate 3%, severity to normal 83% and moderately to normal 14%.

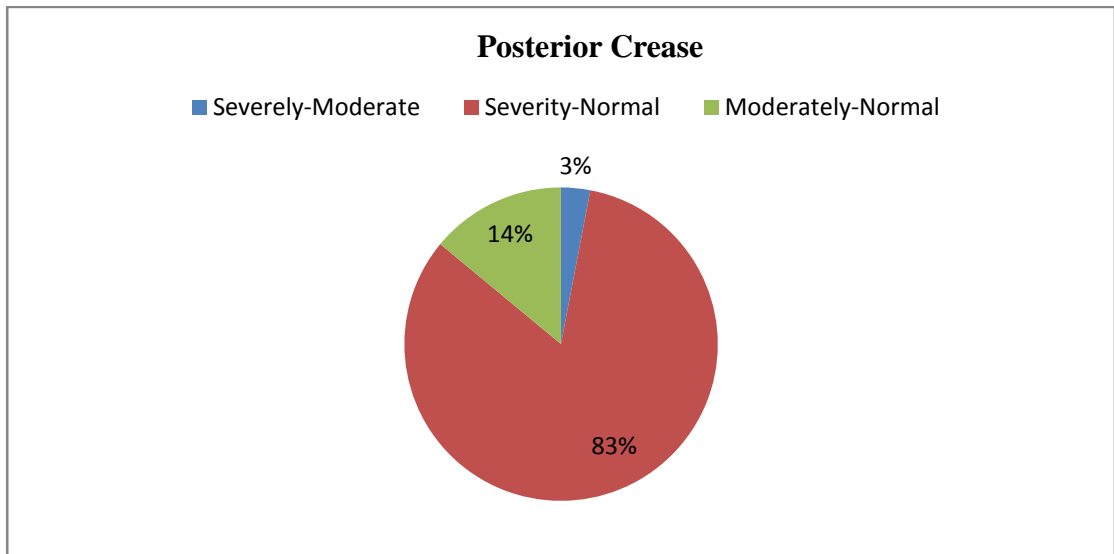


Figure-13: Posterior Crease



	<b>Scale Ranking</b>			<b>Total Number of participants</b>
<b>Pirani severity scale</b>	<b>Level-1</b> Severely abnormal	<b>Level-2</b> Moderately abnormal	<b>Level-3</b> Normal	<b>35</b>
<b>Empty Heel</b>				
<b>Pre-test score</b>	32 person (91%)	3person (9%)	0 person (%)	
<b>Post-test score</b>	0 person	30person (86%)	5person (14%)	

**Table-2:** Improvement of all participants Empty Heel ability according to Pirani severity scale

## 4.2 Interpreting the Result

According to pirani severity scale (Empty heel) function improves severely to moderate 86%, severity to normal 6% and moderately to normal 8%.

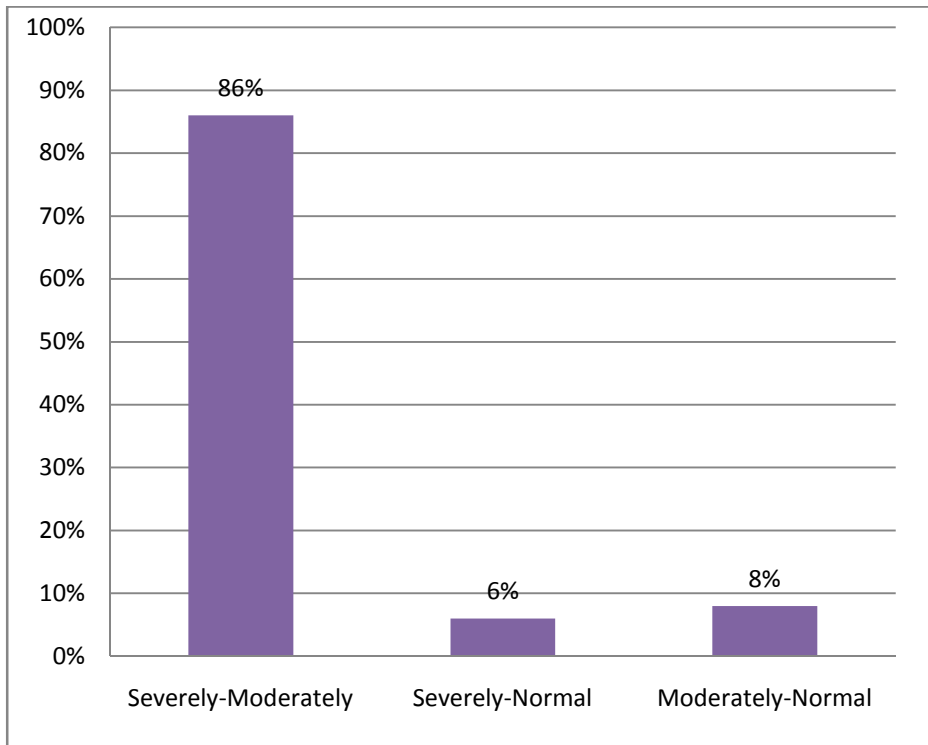


Figure-14: Empty Heel

<b>Pirani severity scale</b>	<b>Level-1</b> Severely abnormal	<b>Level-2</b> Moderately abnormal	<b>Level-3</b> Normal	<b>Total number of participants</b>
<b>Empty Heel</b>				<b>35</b>
<b>Pre-test score</b>	32 person (91%)	3person (9%)	0 person (%)	
<b>Post-test score</b>	0 person	30person (86%)	5person (14%)	

**Table-3:** Improvement of all participants' rigid equinus ability according to Pirani severity scale.

### 4.3 Interpreting the result

According to pirani severity scale (Rigid Equinus) function improves severely to moderate 3%, severity to normal 77% and moderately to normal 20%.

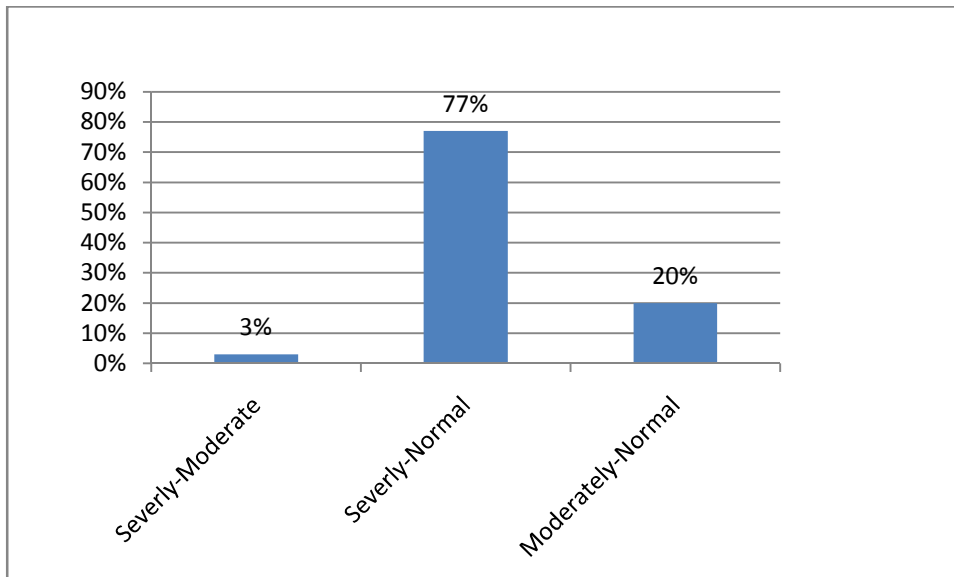


Figure 15: Rigid Equinus

<b>Pirani severity scale</b>	<b>Level-1</b> Severely abnormal	<b>Level-2</b> Moderately abnormal	<b>Level-3</b> Normal	<b>Total number of participants</b>          <b>35</b>
<b>Medial Crease</b>				
<b>Pre-test score</b>	30 person (86%)	5person (14%)	person (%)	
<b>Post-test score</b>	0 person	1person (3%)	34person (97%)	

**Table-4:** Improvement of all participants Medial Crease ability according to Pirani severity scale.

#### 4.4 Interpreting the result

According to pirani severity scale (Medial Crease) function improves severely to moderate 11%, severity to normal 69% and moderately to normal 20%.

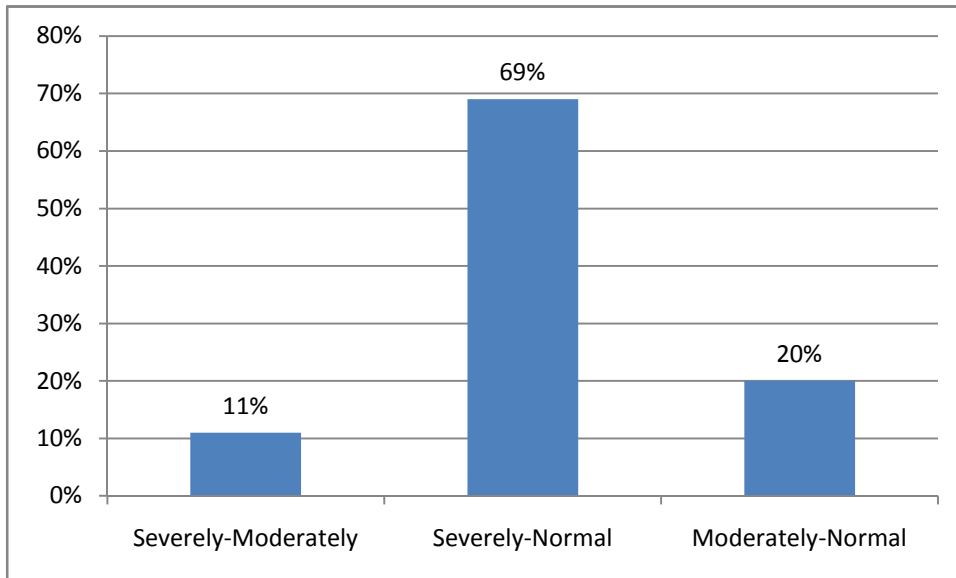


Figure-16: Medial Crease

<b>Pirani severity scale</b>	<b>Level-1</b> Severely abnormal	<b>Level-2</b> Moderately abnormal	<b>Level-3</b> Normal	<b>Total number of participants</b>     <b>35</b>
<b>Lateral Head of talus</b>				
<b>Pre-test score</b>	19 person (54%)	16person (16%)	0person (%)	
<b>Post-test score</b>	0 person	0person (%)	35person (100%)	

**Table-5:** Improvement of all participants Lateral Head of Talus ability according to Pirani severity scale

#### 4.5 Interpreting the result

According to pirani severity scale (Lateral Head of Talus) function improves severely to moderate 0%, severity to normal 54% and moderately to normal 20%.

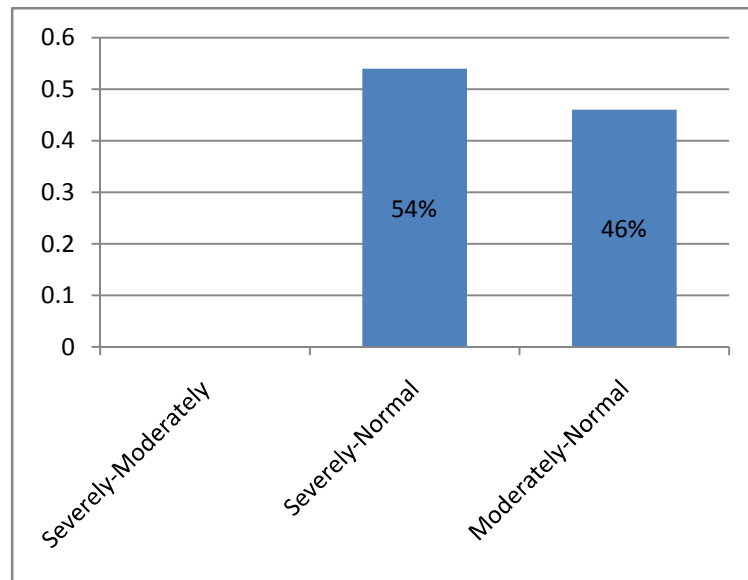


Figure-17: Lateral Head of talus



<b>Pirani severity scale</b>	<b>Level-1</b> Severely abnormal	<b>Level-2</b> Moderately abnormal	<b>Level-3</b> Normal	<b>Total number of participants</b>
<b>Curve Lateral Border</b>				<b>35</b>
<b>Pre-test score</b>	21 person (60%)	14person (40%)	0person (%)	
<b>Post-test score</b>	0 person	0person (%)	35person (100%)	

**Table-6:** Improvement of all participants Curve Lateral Border ability according to Pirani severity scale.

#### 4.6 Interpreting the result

According to pirani severity scale (Curve Lateral Border) function improves severity to normal 60% and moderately to normal 40%.

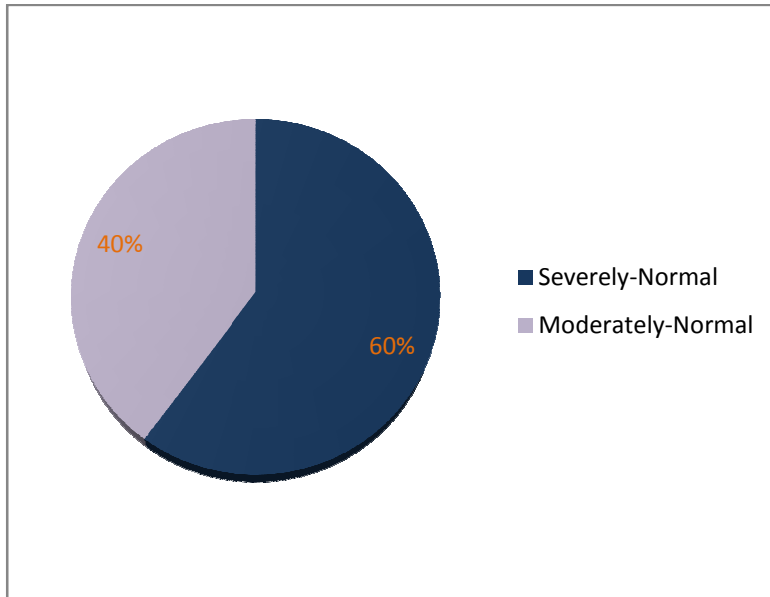


Figure-18: Curve Lateral Border

The study was indicated a process that could be continuing to establish the result. The purpose of this study is to evaluate the effect of Ponseti method to improve functional ability among clubfoot children. To determine this, the researcher observed pre-test & post-test score in Pirani severity Scale among those children who had taken Ponseti method.

The researcher found a statistical significant improvement in ability for the children with congenital clubfoot. The researcher observed 35 children's functional ability level by following Pirani severity scale before and after given plaster cast. Their age range is 1-30 months. They have impaired functional ability.

According to Pirani severity scale 28 children or 80% children out of 35 children are observed in level-1 or severely abnormal in pre-test score, but during post-test score those who have level-1, functional ability have been improved to 1 children or 60% children to level-2, 91% to level-3.

Midfoot score Three signs comprise the Midfoot Score (MS), grading the amount of midfoot deformity between 0 and 3. Curved lateral border Medial crease Talar head coverage Hindfoot score three signs comprise the Hindfoot Score (HS), grading the amount of hindfoot deformity between 0 and 3. Posterior crease Rigid equines Empty heel Use of Pirani score Scoring Every clubfoot under Ponseti management is "scored" each week for HS, MS, and total score. Plotting scores on a graph shows where the foot is on the roadmap of treatment, visually and easily reassuring parents of satisfactory progress [An opposite page]. Tenotomy is indicated when  $HS > 1$ ,  $MS < 1$ , and the head of the talus is covered (Ponseti, 2003).

The aim of treatment is to produce and maintain plantigrade, supple feet that will function well. There are several methods of treatment but relapse is common, especially in babies with associated neuromuscular disorder. The treatment should

begin shortly after birth. A sincere effort to correct the majority of deformity should be made during the first 3 month of age (Solomon et al, 2001).

The authors retrospectively reviewed 230 patients (319 clubfeet). One hundred sixty-five patients (72%) had undergone previous nonsurgical treatment elsewhere. Patients were assigned to 5 or 7 days based solely on geography. Ninety percent of patients required five or fewer casts for correction, and there was no difference between groups ( $P = 0.85$ ). Average time from first cast to Achilles tenotomy was 16 days for the 5-day group and 24 days for the 7-day group ( $P = 0.001$ ). Three patients (1.3%) required corrective surgery and there were 36 relapses ( $P = 0.4$ ). In conclusion, the Ponseti method is very effective and the deformity can be corrected in a relatively short time (Morcuende et al, 2005).

The median Pirani score at the start of treatment was 5.5 (mean; 2 to 6). A Pirani score of  $> 5$  predicted the need for tenotomy ( $p < 0.01$ ). The 400 feet studied, 39 (97.5 %) achieved correction of deformity. (Shack N and Eastwood DM, 2006).

The Ponseti method provides excellent results with an initial correction rate of around 90% in idiopathic feet. Non compliance with a bracing is the most common cause of relapse. The current best practice for the treatment of CTEV is the original Ponseti method, with minimal adjustments being hyper adduction of the foot in the final cast and the need for longer –term bracing up to four years (Jowett CR et al, 2011).

From over all discussion researcher can be said that ponseti management is effective for clubfoot patients. Alternative hypothesis of this study is group therapy with conventional therapy is not effective for cerebral palsy child. But in this study it is proved that group therapy with conventional therapy is significantly effective for stroke patient. So null hypothesis is rejected in this study.

Bangladesh is a very poor country in the world. Education, economy and other social aspects are very low level. People are not fully concerned about basic health care. Health services in Government and Non Government sector are not sufficient, for that most of the people in our country not get proper treatment facilities. Some private clinic and hospitals are now trying to provide latest medical services, but nothing to be mentioned is about ponseti method. People in our country think that ponseti method is some form of plaster. But it plays great rules in medical sector and many children become disable due to lack of awareness of ponseti method. Ponseti method is considered as an important treatment process in the develop countries. Clubfoot is the less major cause of disability, and there is need to identify the effective Ponseti caster interventions that will increase the functional activities of patients. Some Physiotherapy clinic and hospital provide ponseti method for the treatment of clubfoot patients. Here is an important term that is Ponseti method. Besides the casting with tenotomy is very effective. It encourage the patients to willing participate in the treatment session and dramatically outcome can be observed. So the study was aiming to “Outcome of Ponseti management for club foot patients at CRP.” For the fulfillment of the study a retrospective method was designed and collected 35 clubfoot patients as sample. Than an initial score and discharge score was done and score measured. This study highlighted the significant improvement of the clubfoot patients after ponseti management. Without proper ponseti method the proper recovery of clubfoot patients cannot be achieve.

As a whole the clubfoot patients getting functional improvement after ponseti method casting with tenotomy and the result were significant. Last of all this study will try to represent the strong evidence of the “Outcome of Ponseti method for the management of children with clubfoot patients at CRP. By conducting the study the researcher found effectiveness of Outcome of Ponseti management for club foot patients at CRP at patient’s outdoor department at CRP. But it is not always possible to gain complete achievement from every work.

Same things happened in the study, what the researcher wanted to gain from the study not achieved fully. So, some further steps that might be taken for better accomplishment for further research. The researcher recommended the following things –The next generation of physiotherapy members continues regarding this area which may involve outcome of Ponseti method followed by clubfoot patients.

Should take more samples for generalizing the result and make the research more valid and reliable. Sample should collect from different hospital, clinic, institute and organization in different area of Bangladesh to generate the result. This is an undergraduate study, and suggests to do the same study at graduate education level will give more precise output.

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## APPENDIX

### Appendix-1

#### Questionnaire

#### Title: Outcome of Ponseti Management at CRP

Code no:	Date:
Patient's Name:	
Fathers name:	
Mother's name:	Contact no:
Address:	

#### Part-A: Socio-demographic information

Ques. No.	Questions	Response
01.	Age	
02.	Gender	1. Male 2. Female
03.	Religion	1. Muslim 2. Hindu 3. Buddha 4. Christian
04.	Living area	1. Urban 2. Rural
05.	Family type	1. Nuclear family 2. Extended family

#### Part-B: Diseases condition

Ques. No.	Questions	Response
01.	Birth History	1. Pre-term 2. Term

		3. Post-term 4. No Complain
02.	Past Medical History	1. New patients 2. -----Casting 3. -----Casting with tenotomy 4. Relaps
03.	Involvement of site	1. Unilateral 2. Bilateral
04.	Types	1. Rigid 2. Non-rigid 3. Resistance Rigid
05.	Other Congenital Anomaly	1. Yes 2. No
06.	Referral Source	1. Publicity 2. Doctor 3. Previous Patients 4. Others
07.	Past Family History of clubfoot	1. Yes 2. No

**Part-C: This part is designed to measurement the Outcome of Ponseti Management at CRP.**

**Pirani severity Scoring**

0	normal
0.5	moderately abnormal
1	severely abnormal

	Starting position	Pirani Severity Scoring	
1.	Score of Posterior Crease	Initial Score    Discharge score	
		1                    0.5	

		0.5	0	
		1	0	
2.	Score of Empty Heel	Initial Score	Discharge score	
		1	0.5	
		0.5	0	
		1	0	
3.	Score of Rigid Equinus	Initial Score	Discharge score	
		1	0.5	
		0.5	0	
		1	0	
4.	<b>Hind Foot Contracture Score</b>			
5.	Score of Medial Crease	Initial Score	Discharge score	
		1	0.5	
		0.5	0	
		1	0	
6.	Score of Lateral Head of Talus	Initial Score	Discharge score	
		1	0.5	
		0.5	0	
		1	0	
7	Score of CLB (Curved Lateral Border)	Initial Score	Discharge score	
		1	0.5	
		0.5	0	
		1	0	
8	<b>Mid foot contracture score</b>			
9	Total Score			

**“Thank you for your participation”**

## Appendix-2 Permission Letter

Date: 25/10/2012

To

Head of the Department

Department of Physiotherapy

Centre for the Rehabilitation of Paralyzed (CRP),

Savar, Dhaka-1343.

**Subject:** Application to review Pirani Severity Score and to record different scores mentioned there in order to complete a retrospective study on "Outcome of Ponseti Management at CRP".

Dear Sir,

I beg most respectfully to state that, I am a student of 4<sup>th</sup> year B. Sc in physiotherapy at Bangladesh Health Professions Institute (BHPI) under the University of Dhaka. I am conducting research on "Outcome of Ponseti Management at CRP" as a part of our course curriculum, under supervision of Mohammad Anwar Hossain, Associate Professor, BHPI. For your kind information the research methodology & questionnaire are submitted with this application. So I need to review Pirani Severity Score and record score mentioned there .

I therefore, pray and hope that you would be kind enough to grant me and thus oblige thereby.

Sincerely yours,

*M Rashid*  
25.10.12

Mohammad Mamunur Rashid

B.Sc in physiotherapy

4th year, Roll-12,

Session: 2006-2007

BHPI, CRP, Savar, Dhaka.

*Could be allowed for conducting the study for academic purpose. Recommended & forwarded to Head of MCV for consideration.*  
*Head, PT*

*"Allowed to do collect the mentioned as part of this academic for" 25/10/12*

*Dr. Md. Anwar Hossain*  
Associate Professor  
Department of Physiotherapy, Dhaka  
Centre for the Rehabilitation of Paralyzed (CRP)