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Effects of educational material among children with clubfoot during bracing stage of treatment by Ponseti method

Ershad Ali, Md Monir Hossain, Marzana Mohoshina, Rafiqul Islam, Tuhin Ahammed, Wakil Ahad

ABSTRACT

Aims: To identify effects of educational material among children with clubfoot during bracing stage of treatment by Ponseti method.

Methods: This study was a quantitative type quasi-experimental research design. Actually, it was an experiment among specific groups and usual groups. Exercises applied with educational material to the material group or experiment group and only usual exercises applied to the non-material group or the control group. A pre-test (before exercises provided by educational material) and post-test (after exercises provided by educational material) was administered with each subject of both groups to compare the effects on children with clubfoot during bracing stage of treatment by Ponseti method.

Results: The mean Pirani score before providing exercises with educational material for right feet among the clubfoot babies were 0.56 ± 0.33 (material group) and after providing exercises with educational material for right feet among the clubfoot babies were 0.43 ± 0.41 (material group). Statistically it was found highly significant (t = 2.99, p < 0.0003). So, it was concluded that exercises with educational material had significant influence on Pirani score reduction for right feet among the clubfoot babies. The mean Pirani score before providing usual exercises for left feet among the clubfoot babies were 0.5 ± 0.15 (non-material group) and after providing usual exercises for left feet among the clubfoot babies were 0.53 ± 0.48 (non-material group). Statistically it was found significant (t = −0.059, p < 0.056). So, it was concluded that usual exercises without educational material had influence on Pirani score increased for left feet among the clubfoot babies.

Conclusion: The modern treatment of clubfoot is Ponseti method which is very effective, outcome oriented, and less invasive surgical procedure. This study was concluded that exercises with educational material had significant influence on Pirani score reduction among the children with clubfoot. So, there was significant importance of exercises with educational material rather than usual exercises by verbal instructions.

Keywords: Clubfoot, Pirani score, Ponseti method

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INTRODUCTION

Disability is a major public health problem worldwide, and physical disabilities are common, which can affect socioeconomic development [1]. The burden of disability is a significant health problem in developing countries which not relatively recognized [2]. It is estimated according to one study that 15% people are disabled in worldwide (World Bank disability facts and statistics, 2009). Disability is a significant developmental problem, and there is a link between poverty, disability, and equity [3].

Clubfoot is a physical type of disability. It can be detected in early life, and if left untreated, it leads more disabling with age [1]. The clubfoot that associated with social stigma which may lead psychological effect of children with clubfoot [1]. The Ponseti method for clubfoot treatment is effective, better outcome, and less complication than surgical procedure [4]. The clubfoot deformity is corrected by weekly manipulation, casting, a percutaneous Achilles tenotomy and maintain by brace as well as the success rate of Ponseti method is up to 98% [5]. According to the Pirani following principle: 0, no abnormality; 0.5, moderate abnormality; 1, severe abnormality. There are six different signs that are separated into three related to the hindfoot (posterior crease, empty heel, and rigid equinus) and three related to the midfoot (curve lateral border, medial crease, and lateral head of talus). Each foot hindfoot score between 0 and 3, a midfoot score between 0 and 3 as well as total score between 0 and 6. Here 0 means normal foot and 6 means severe deformity of the foot [6].

Rehabilitation is essential and well-known component in health care systems in worldwide [7]. The purpose of rehabilitation for children with clubfoot is to correct the impairment, to improve function, to prevent activity limitations, to prevent participation restrictions, and to improve the quality of life [8]. Physiotherapists are important persons of clubfoot treatment team not only in developed countries but also in developing countries [9]. There is a significant role of physiotherapists for treating children with clubfoot as well as educate the parents/caregivers about the condition, assessments, diagnosis, treatment procedure, and the treatment outcome [10].

Early detection of clubfoot, actual assessment, and early intervention are essential for achieving excellent treatment outcomes [9]. The birth of a baby is a major celebrated event for parents and the parents are initially shocked after first observing the baby's deformity and an experienced by emotional distress like anxiety, depression, and anger [11]. The process of treating child with clubfoot involves diagnosis, treatment, and follow-up which is very stressful for the parents [11].

MATERIALS AND METHODS

This study was a quantitative type quasi-experimental research design. Actually, it was an experiment among specific groups and usual groups. Exercises, along with educational material, are applied to the experimental group, while only usual exercises are applied to the control group. A pre-test (before providing educational material and exercises) and a post-test (after providing educational material and exercises) were administered to the experimental group, while a pre-test (before usual exercises based on verbal instructions) and a post-test (after usual exercises based on verbal instructions) were administered to the control group. This design was used to compare the effects of the interventions on children with clubfoot during the bracing stage of treatment using the Ponseti method.. The study was carried out at Walk for Life (The Bangladesh Clubfoot program) and Centre for the Rehabilitation of the Paralysed, Savar, Dhaka. The study was conducted among children with clubfoot and caregivers (father, mother, and other caregiver) who was attended at Walk for Life Ponseti clinic of Centre for the Rehabilitation of the Paralysed, Mirpur, *Bangabandhu Sheikh Mujib Medical University*, *Institute of Child and Mother Health*, Rajshahi Medical College Hospital, Barishal Medical College Hospital, Bhola Sadar Hospital, Patuakhali Sadar Hospital, Khulna Medical College Hospital, Bagerhat Sadar Hospital, Satkhira Sadar Hospital as well as Centre for the Rehabilitation of the Paralysed, Savar Ponseti Clinic. Both male and female caregivers (father, mother, and other caregiver) were recruited for interview in this study. Sample size was 360 for this study. Among them 175 participants were in experiment group or material group and 185 participants in control group or non-material group. Sampling technique was a convenient sampling technique. Data were collected by face-to-face interview and average 15–20 minutes were spent for each of the participants. A structured questionnaire (25 questions) in Bangla which related to socio-demographic information and children with clubfoot was used for data collection as well as Pirani scoring system where 6 components were used for detecting the severity of clubfoot. This study was included 360 data from different Ponseti clinics in Bangladesh where most of the Ponseti clinics included from Walk for Life and also one Ponseti clinic included from Centre for the Rehabilitation of the Paralysed, Savar, Dhaka. For material group included 175 data where Centre for the Rehabilitation of the Paralysed, Mirpur were 10, *Bangabandhu Sheikh Mujib Medical University* were 7, *Institute of Child and Mother Health* were 18, Rajshahi Medical College Hospital were 29, Barishal Medical College Hospital were 12, Bhola Sadar Hospital were 6, Patuakhali Sadar Hospital were 9, Khulna Medical College Hospital were 38, Bagerhat Sadar Hospital were 13, Satkhira Sadar Hospital were 18 as well as Centre for the Rehabilitation of the Paralysed,

Savar Ponseti Clinic were 15. On the other hand for non-material group included 185 data where Centre for the Rehabilitation of the Paralysed, Mirpur were 10, *Bangabandhu Sheikh Mujib Medical University* were 8, *Institute of Child and Mother Health* were 17, Rajshahi Medical College Hospital were 31, Barishal Medical College Hospital were 20, Bhola Sadar Hospital were 11, Patuakhali Sadar Hospital were 9, Khulna Medical College Hospital were 37, Bagerhat Sadar Hospital were 13, Satkhira Sadar Hospital were 9 as well as Centre for the Rehabilitation of the Paralysed, Savar Ponseti clinic were 20. Data were checked and rechecked thoroughly and meticulously. Missing data were checked from the data collection sheet and excluded from study. Collected data were entering into the computer. The analysis was done by using SPSS-20 software. Data were analyzed by using descriptive statistics (frequency, percentage, means, median, mode, and standard deviation), Compare *t*-test (paired sample *t*-test for test of significance) among children's Pirani score before providing educational material and children's Pirani score after providing educational material as well as children's Pirani score before providing no educational material and children's Pirani score after providing no educational material. The study was approved by the Institutional Review Board (IRB) of BHPI (CRP/BHPI/IRB/11/2018/1280), the academic Institute of Centre for the Rehabilitation of the Paralysed. Voluntary participation from the participant's was considered. Participants were provided with a written consent form. The Investigator was collected written permission to conduct the research from the participants. Participators were informed verbally about the aims and objectives of the study and investigators role as well. Participants also assured that the study would have no harm to the participants physically or mentally because it was a survey study and was not involve any experiments. Confidentiality was maintained by the investigator by keeping the name, address, and personal information of the client confidential and as data were not shared with others except the supervisor of the investigator. Participants were also being informed that they had full rights to withdraw themselves or refuse to answer any question any time during the study.

RESULT

This chapter represents the results of this study. The results include the socio-demographic characteristics of the parents, family history of clubfoot, sex of clubfoot baby, siblings, affected feet, duration of bracing time, problem during bracing Pirani score of children with clubfoot. So, the investigator had collected 360 respondents and collected data from them. The data were analyzed by descriptive statistics and calculated as percentages and presented by using pie charts, column, and tables.

- Age of children, mother, father, and other caregiver of the participants shown in Figure 1.
- The chart showed that 88.06% of caregivers were mother (n=317), 8.89% were father (n=32), 3.06% were other caregiver (n=11).
- Family history of the participants shown in Figure 2.
- The chart shows that among the participants 57.8% were of nuclear family.
- Living status of the participants shown in Figure 3.
- The chart showed that among 69.20% were living in rural area.
- Family history of clubfoot of the participants shown in Figure 4.
- The chart showed that family history of clubfoot baby where "Yes" was only 9.2%.

Gender of the Participants in Table 1.

Table 1 shows that among the participants 72.5% had male clubfoot baby.

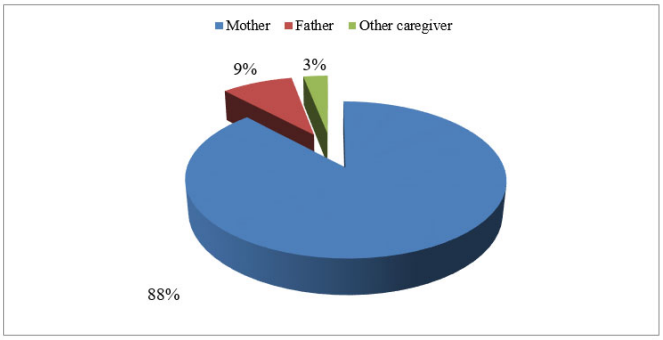

Figure 1: Age of children, mother, father, and other caregiver of clubfoot. The chart showed that 88.06% of caregivers were mother (n=317), 8.89% were father (n=32), 3.06% were other caregiver (n=11).

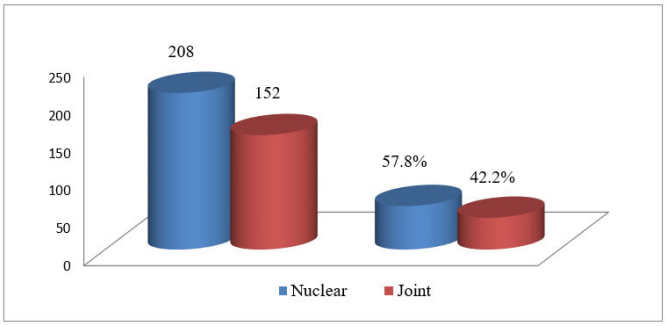

Figure 2: Family history of the participants. The chart shows that among the participants 57.8% were of nuclear family.

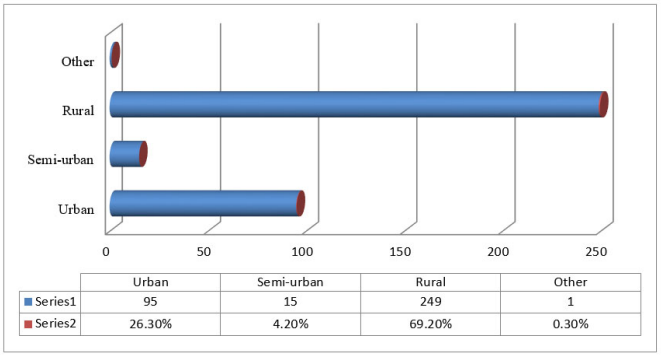

Figure 3: Living status of the participants. The chart showed that among 69.20% were living in rural area.

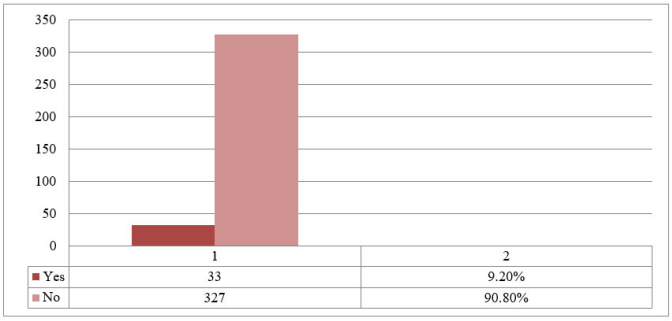

Figure 4: Family history of clubfoot of the participants. The chart showed that family history of clubfoot baby where, "Yes" was only 9.2%.

Age of children, mother, father, and other caregiver of clubfoot in Table 2.

Table 2 shows that mean ± SD of age of children with clubfoot, age of mother, age of father, and age of other caregiver.

Education level of mothers (n=360) in Table 3.

Table 3 shows that educations of the total mothers, most of 40% were primary level education. The mothers who participated in this study came from different educational backgrounds. 5% of mothers (n=18) had no institutional education; 33.1% of mothers (n=119) had secondary level education (VI to SSC), 10.8% of mothers (n=39) had higher secondary level (XI to HSC) education, 6.1% of mothers (n=22) had honors level education and 5% of mothers (n=18) had masters level education.

Education level of fathers (n=360) in Table 4.

Table 4 shows education among fathers, 33.1% had only primary level education. 14.7% of fathers (n=53) had no institutional education; 33.1% of fathers (n=119) had primary level (I–V) education; 22.5% of fathers (n=81) had secondary level education (VI to SSC), 13.3% of fathers (n=48) had higher secondary level (XI to HSC) education, 8.1% of fathers (n=29) had honors level education, and 8.3% of fathers (n=30) had masters level education.

Education level of other caregiver (n=11) in Table 5.

Table 5 shows education of the other caregiver, 18.2% had no institutional education, 36.4% had only primary level education.

Occupational status of mothers (n=360) in Table 6.

Table 6 shows that mostly 93% of mothers (n=334) were housewives as well as only 6.4% of mothers (n=23) were service holders, 0.3% of mothers (n=1) were day laborers, and 0.6% of mothers (n=2) had other occupations.

Occupational status of fathers (n=360) in Table 7.

Table 7 shows that about 30% of fathers (n=107) were service holders. Only 1.4% of fathers (n=5) were unemployed, 13.9% of fathers (n=50) were farmers, 18.3% of fathers (n=66) were businessmen, 21.1% of fathers (n=76) were day laborers, and 15.6% of fathers (n=56) were other different occupation.

Family income of the participants (n=360) in Table 8.

Table 8 shows that among the participants of the family income, 25% were below 10,000 BDT, 56.9% were 10,000–20,000 BDT, 8.3% were 20,001–30,000 BDT, 3.6% were 30,001–40,000 BDT, 4.7% were 40,001–50,000 BDT, and 1.4% were above 50,000 BDT.

Distribution of family history who had clubfoot (n=30) in Table 9.

Table 9 shows family history of clubfoot, where other relative had 30%.

Distribution of the clubfoot babies by siblings (n=360) in Table 10.

Table 10 shows that among the clubfoot babies, 52.2% were the firstborn.

Caregivers who were familiar with children with clubfoot (n= 360) in Table 11.

Table 11 shows that among caregivers, only 6.4% were familiar with clubfoot babies.

Distribution of the children by facing problem with wearing brace (n=360) in Table 12.

Table 12 shows that among participants, only 22.5% reported facing problems with brace wear for children with clubfoot.

Distribution of participants who encountered issues with brace wear during the bracing stage of clubfoot treatment, based on a sample of 81 individuals (n=81).

Table 13 shows that participants who faced problems with brace wears by children with clubfoot during bracing stage of clubfoot treatment, where unknown cause was 66.7%.

Distribution of clubfoot babies by affected feet (n=360) in Table 14.

Table 14 shows that among the clubfoot babies, 45% of clubfoot babies had unilateral.

Distribution of Pirani score among clubfoot babies for right feet (n=304) in Table 15(a).

Table 15(a) shows that 80.3% of children with clubfoot for right feet Pirani score were 0.5.

Distribution of Pirani score among clubfoot babies for left feet (n=256) in Table 15(b).

Table 15(b) shows that 79.3% of child with clubfoot for left feet Pirani score were 0.5.

Paired sample *t*-test in Table 16.

Paired samples statistics

Table 16 shows that pre-test Pirani mean score and post-test Pirani mean score among children with clubfoot in material as well as non-material group.

Paired samples correlations in Table 17.

Table 17 shows that correlation and significant level between pre-test Pirani score and post-test Pirani score among children with clubfoot in material as well as non-material group.

Paired samples test in Table 18.

The mean Pirani score before providing exercises with educational material for right feet among the clubfoot babies was 0.56 ± 0.33 (material group) and after providing exercises with educational material for right feet among the clubfoot babies was 0.43 ± 0.41 (material group). Statistically it was found highly significant ($t = 2.99$, $p < 0.0003$). So, it was concluded that exercises with educational material had significant influence on Pirani score reduction for right feet among the clubfoot babies. There was significant importance of exercises with educational material rather than usual exercises by verbal instructions.

Table 1: Gender of the participants

Variables	Frequency (N=360)	Percentage (%)
Male	261	72.5%
Female	99	27.5%
Total	360	100

Table 1 shows that among the participants 72.5% had male clubfoot baby.

Table 2: Age of the participants

Age	Mean ± SD
Age of children with clubfoot (In months)	21.54 ± 17.374
Age of mother (In years)	25.03 ± 4.803
Age of father (In years)	31.89 ± 5.834
Age of other caregiver (In years)	44.09 ±15.195

Table 2 shows that Mean ± SD of age of children with clubfoot, age of mother, age of father and age of other caregiver.

Table 3: Education level of mothers

Variables	Frequency (N=360)	Percentage (%)
No institutional education	18	5%
Primary (I–V)	144	40%
Secondary (VI-SSC)	119	33.1%
Higher Secondary (XI-HSC)	39	10.8%
Honors	22	6.1%
Masters	18	5%
Total	360	100

Table 3 shows that education of the total mothers, most of 40% were primary level education.

Table 4: Education level of fathers

Variables	Frequency (N=360)	Percentage (%)
No institutional education	53	14.7%
Primary	119	33.1%
Secondary	81	22.5%
Higher Secondary	48	13.3%
Honors	29	8.1%
Masters	30	8.3%
Total	360	100

Table 4 shows that education among fathers most of 33.1% were primary level education.

Table 5: Education level of other caregiver

Variables	Frequency (N=11)	Percentage (%)
No institutional education	2	18.2%
Primary (I–V)	4	36.4%
Secondary (VI to SSC)	3	27.2%
Higher Secondary (XI to HSC)	1	9.1%
Honors	1	9.1%
Total	11	100

Table 5 shows that among the mothers 92.7% were housewife.

Table 6: Occupational status of mothers

Variables	Frequency (N=360)	Percentage (%)
Housewife	334	92.7%
Service holder	23	6.4%
Day labor	1	0.3%
Others	2	0.6%
Total	360	100

Table 6 shows that among the mothers 92.7% were housewives.

Table 7: Occupational status of fathers

Variables	Frequency (N=360)	Percentage (%)
Unemployed	5	1.4%
Farmer	50	13.9%
Service holder	107	29.7%
Business	66	18.3%
Day labor	76	21.1%
Other	56	15.6%
Total	360	100

Table 7 shows that among the fathers 29.7% were service holder.

Table 8: Family income of the participants

Variables	Frequency (N=360)	Percentage (%)
Below 10,000 BDT	90	25%
10,000–20,000 BDT	205	56.9%
20,001–30,000 BDT	30	8.3%
30,001–40,000 BDT	13	3.6%
40,001–50,000 BDT	17	4.7%
Above 50,000 BDT	5	1.4%
Total	360	100

Table 8 shows that among the participants 57.8% were of nuclear family.

Table 9: Distribution of family history who had clubfoot

Variables	Frequency (N=30)	Percentage (%)
Father	5	16.7%
Mother	6	20%
Brother	3	10%
Sister	4	13.3%
Grandfather	3	10%
Other	9	30%
Total	30	100

Table 9 shows family history that had clubfoot, where other relative had 30%.

Table 10: Distribution of the clubfoot babies by siblings

Siblings	Frequency (N=360)	Percent
First	188	52.2%
Second	117	32.5%
Third	47	13.1%
Fourth	7	1.9%
Fifth	1	0.3%
Total	360	100

Table 10 shows that the clubfoot babies by siblings where first babies were 52.2%.

Table 11: Caregivers who had familiar with children with clubfoot

Familiar	Frequency (N=360)	Percent
Yes	23	6.4%
No	337	93.6%
Total	360	100

Table 11 shows that among caregivers familiar with clubfoot baby where, yes was only 6.4%.

Table 12: Distribution of the children by facing problem with wearing brace

Problem	Frequency (N=360)	Percent
Yes	81	22.5%
No	279	77.5%
Total	360	100

Table 12 shows that participants who had problem face with brace wears by children with clubfoot, yes was only 22.5%.

Table 13: Distribution of participants' type of problem faced with brace wears by children with clubfoot during bracing stage of clubfoot treatment

Type of problem	Frequency (N=81)	Percent
Pain	5	6.2%
Swelling	5	6.2%
No cause	54	66.7%
Other	17	21%
Total	81	100

Table 13 shows that participants' type of problem faced with brace wears by children with clubfoot during bracing stage of clubfoot treatment, where unknown cause was 66.7%

Table 14: Distribution of clubfoot babies by affected feet

Affected feet	Frequency	Percent
Unilateral	162	45%
Bilateral	198	55%
Total	360	100

Table 14 shows that among the clubfoot babies, 45% of clubfoot babies had unilateral.

Table 15: Pirani score of the participants

(a) Distribution of Pirani score among clubfoot babies for right feet (n=304)		
Pirani score	**Frequency**	**Percent**
0	26	8.6%
0.5	244	80.3%
0.10	32	10.5%
0.15	1	0.3%
0.25	1	0.3%
Total	304	100

(b) Distribution of Pirani score among clubfoot babies for left feet (n=256)		
Pirani score	**Frequency**	**Percent**
0	22	8.6
0.5	203	79.3
0.10	29	11.3
0.15	1	0.4
0.25	1	0.4
Total	256	100

Table 15(a) and (b) show that 79.3% of children with left foot clubfoot had a Pirani score of 0.5.

Table 16: Paired sample *t*-test:

Paired samples statistics			
Groups	**Mean**	**Std. Deviation**	**Std. Error Mean**
Pre-test Pirani score for right foot (Material group, n = 128)	0.56	0.33	0.0295
Post-test Pirani score for right foot (Material group, n = 128)	0.43	0.41	0.0363
Pre-test Pirani score for left foot (Material group, n = 111)	0.53	0.33	0.0309
Post-test Pirani score for left foot (Material group, n = 111)	0.44	0.64	0.0603

Table 16: *(Continued)*

Paired samples statistics			
Groups	**Mean**	**Std. Deviation**	**Std. Error Mean**
Pre-test Pirani score for right foot (Non-material group, n = 135)	0.496	0.13	0.0111
Post-test Pirani score for right foot (Non-material group, n = 135)	0.54	0.53	0.0454
Pre-test Pirani score for left foot (Non-material group, n = 118)	0.5	0.15	0.0135
Post-test Pirani score for left foot (Non-material group, n = 118)	0.53	0.48	0.0446

Table 16 shows that pre-test Pirani mean score and post-test Pirani mean score among children with clubfoot in material as well as non-material group.

Table 17: Paired samples correlations

Groups	**Correlation**	**Sig.**
Pre-test Pirani score for right foot (Material group, n = 128)		
Post-test Pirani score for right foot (Material group, n = 128)	0.02	0.0023
Pre-test Pirani score for left foot (Material group, n = 111)		
Post-test Pirani score for left foot (Material group, n = 111)	0.014	0.0140
Pre-test Pirani score for right foot (Non-material group, n = 135)		
Post-test Pirani score for right foot (Non-material group, n = 135)	0.011	0.0197
Pre-test Pirani score for left foot (Non-material group, n = 118)		
Post-test Pirani score for left foot (Non-material group, n = 118)	0.0272	0.0003

Table 17 shows that correlation and significant level between pre-test Pirani score and post-test Pirani score among children with clubfoot in material as well as non-material group.

Table 18: Paired samples test

Paired differences						
	Mean	**Std. dev.**	**95% Confidence interval of the difference**		**t**	**Sig. (2-tailed)**
			Lower	**Upper**		
Pre-test Pirani score for right foot (Material group)	0.125	0.47	0.0421	0.21	0.299	0.0003
Post-test Pirani score for right foot (Material group)						

Table 18: *(Continued)*

Paired differences						
	Mean	Std. dev.	95% Confidence interval of the difference		t	Sig. (2-tailed)
			Lower	Upper		
Pre-test Pirani score for left foot (Material group) Post-test Pirani score for left foot (Material group)	0.090	0.67	−0.0362	0.22	0.14	0.016
Pre-test Pirani score for right foot (Non-material group) Post-test Pirani score for right foot (Non-material group)	−0.048	0.53	−0.14	0.042	−0.11	0.029
Pre-test Pirani score for left foot (Non-material group) Post-test Pirani score for left foot (Non-material group)	−0.025	0.47	−0.11	0.059	−0.059	0.056

The mean Pirani score before providing exercises with educational material for right feet among the clubfoot babies was 0.56 ± 0.33 (material group) and after providing exercises with educational material for right feet among the clubfoot babies was 0.43 ± 0.41 (material group). Statistically, it was found highly significant (t = 2.99, p < 0.0003). So it was concluded that exercises with educational material had significant influence on Pirani score reduction for right feet among the clubfoot babies.

The mean Pirani score before providing exercises with educational material for left feet among the clubfoot babies was 0.53 ± 0.33 (material group) and after providing exercises with educational material for left feet among the clubfoot babies was 0.44 ± 0.64 (material group). Statistically, it was found highly significant (t = 0.14, p < 0.016). So it was concluded that exercises with educational material had significant influence on Pirani score reduction for left feet among the clubfoot babies.

The mean Pirani score before providing usual exercises for right feet among the clubfoot babies was 0.496 ± 0.13 (non-material group) and after providing usual exercises for right feet among the clubfoot babies were 0.54 ± 0.53 (non-material group)). Statistically, it was found significant (t = – 0.11, p < 0.029). So it was concluded that usual exercises without educational material had influence on Pirani score increased for right feet among the clubfoot babies.

The mean Pirani score before providing usual exercises for left feet among the clubfoot babies were 0.5 ± 0.15 (non-material group) and after providing usual exercises for left feet among the clubfoot babies were 0.53 ± 0.48 (non-material group). Statistically, it was found significant (t = – 0.059, p < 0.056). So it was concluded that usual exercises without educational material had influence on Pirani score increased for left feet among the clubfoot babies.

DISCUSSION

This study focused on exercises during bracing stage of clubfoot treatment by Ponseti method with educational material for preventing recurrence of children with clubfoot. This study was a quasi-experimental study due to lack of randomization to see the effects of educational material among children with clubfoot during bracing stage of clubfoot treatment by Ponseti method. This study also described about a snapshot of socio-demographic information of caregivers of children with clubfoot who attended at different Ponseti clinics in Bangladesh. The socio-demographic information exposed that age, education, occupation, income of caregivers as well as sex, family history, affected feet, starting age of treatment, Pirani score, and problem during wear brace of children with clubfoot. In Bangladesh, physiotherapists are heavily involved for clubfoot treatment in clubfoot clinics. There are 32 Ponseti clubfoot clinics at Walk for Life is a project of the Glencoe Foundation as The National Clubfoot Program of Bangladesh in whole country except Chattogram division. Chattogram division is covered clubfoot treatment by Zero clubfoot mostly as well as CRP also providing clubfoot treatment in Bangladesh. All the Ponseti clubfoot clinics in Bangladesh like Walk for Life, Zero clubfoot, and CRP Ponseti clubfoot clinic are conducted by Physiotherapists as a Ponseti practitioner under the supervision of orthopedic surgeons where physiotherapists provide assessment, diagnosis, manipulation, and casting as well as maintain follow up. One of the studies conducted in Harare that established clubfoot clinics are run mainly by physiotherapists as well as combined with occupational therapists and rehabilitation technicians [12]. Orthopedic clinical officers are mainly involved in Malawi for conducting clubfoot clinics [13] as well as physiotherapists are also mostly involved in South Africa for clubfoot treatments [14]. Physiotherapists, occupational therapists and rehabilitation technicians working combined in clubfoot clinics [12].

One study reported that 20 years of practice, relapses occurred in estimated half of the children with clubfoot from ten months to five years, averaging two-and-one-half years; basically, relapses were observed on 2–4 months after discarded brace [15]. In Bangladesh, there are different levels of education. Most of the mothers who participated in this study came from different educational background specially 40% of mothers (n=144) had primary level (I–V) of education as well as 33.1% of mothers had secondary level of education (VI to SSC). The fathers who participated in this study came from also different educational backgrounds such as 14.7% of fathers had no institutional education, 33.1% of fathers (n=119) had primary level (I–V) education, 22.5% of fathers had secondary level education (VI to SSC), 13.3% of fathers had higher secondary level (XI to HSC) education, 8.1% of fathers had honors level education, and 8.3% of fathers had masters level education. On the other hand, education of the other caregivers (18.2%) were no institutional education and 36.4% of them were primary. A total 360 children with clubfoot were recruited in this study. The children's ages ranged from 2 months to 84 months. The mean age of clubfoot children was 21.54 months as well as standard deviation (SD) was 17.374. The mothers' ages ranged from 16 years to 45 years. The mean age of mothers was 25.03 years and SD was 4.803. The fathers' ages ranged from 18 years to 52 years. The mean age of fathers was 31.89 years and SD was 5.834 years. There were other caregivers 11 out of 360. The other caregivers' ages ranged from 18 years to 66 years. The mean age of other caregivers was 44.09 years and SD was 15.195 years. The previous study reported that the mean age of the caregivers was 31.10 years and SD was 6.22 years, where 62.1% were between 26 and 35 years of age [11]. In our study, male to female ratio was 1.5:1 which compared to other similar studies ranges from 2.33:1 to 2.5:1 in the world [16]. Some of Indian studies showed that the ratio ranges from 2:1 to as 4:1 [17]. Prevalence of affected feet which included 44% bilaterally, 24% for right feet, and 32% for left feet [18].

This study reported that the mean Pirani score before providing exercises with educational material for right feet among the clubfoot babies was 0.56 ± 0.33 (material group) and after providing exercises with educational material for right feet among the clubfoot babies was 0.43 ± 0.41 (material group)). Statistically, it was found highly significant ($t = 2.99$, $p < 0.0003$). So, it was concluded that exercises with educational material had significant influence on Pirani score reduction for right feet among the clubfoot babies. The mean Pirani score before providing exercises with educational material for left feet among the clubfoot babies was 0.53 ± 0.33 (material group) and after providing exercises with educational material for left feet among the clubfoot babies was 0.44 ± 0.64 (material group)). Statistically, it was found highly significant ($t = 0.14$, $p < 0.016$). So, it was concluded that exercises with educational material had significant influence on Pirani score reduction for left feet among the clubfoot babies [19–66].

This study presented that the mean Pirani score before providing usual exercises for right feet among the clubfoot babies was 0.496 ± 0.13 (non-material group) and after providing usual exercises for right feet among the clubfoot babies was 0.54 ± 0.53 (non-material group)). Statistically, it was found significant ($p < 0.029$). So, it was concluded that usual exercises without educational material had influence on Pirani score increased for right feet among the clubfoot babies. The mean Pirani score before providing usual exercises for left feet among the clubfoot babies was 0.5 ± 0.15 (non-material group) and after providing usual exercises for left feet among the clubfoot babies was 0.53 ± 0.48 (non-material group)). Statistically, it was found significant ($t = – 0.059$, $p < 0.056$). So, it was concluded that usual exercises without educational material had influence on Pirani score increased for left feet among the clubfoot babies. There was a very important role of exercises with educational material rather than usual exercises by verbal instructions.

CONCLUSION

Clubfoot is most common musculoskeletal deformity at birth and early detection of clubfoot, actual assessment, and early intervention are essential for achieving excellent treatment outcomes. The modern treatment of clubfoot is Ponseti method, which is very effective. This study was concluded that exercises with educational material had significant influence on Pirani score reduction among the children with clubfoot. So, there was significant importance of exercises with educational material rather than usual exercises by verbal instructions.

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Authors declare no conflict of interest.

Data Availability
All relevant data are within the paper and its Supporting Information files.

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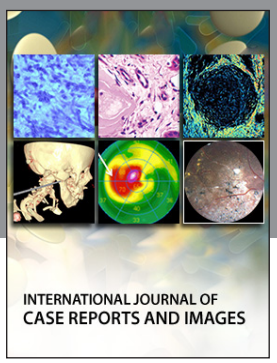

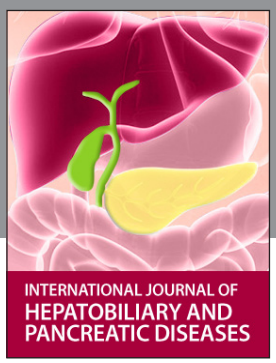

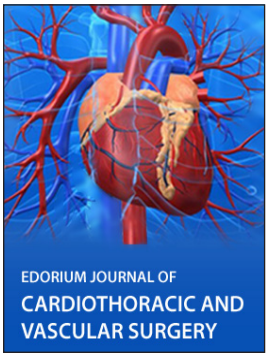

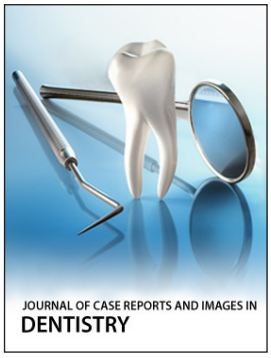

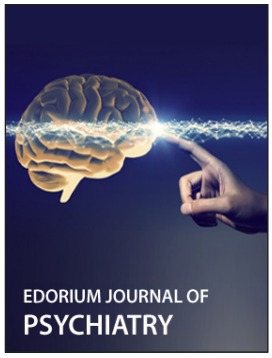

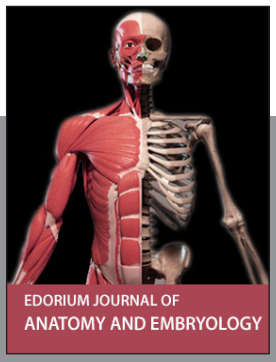

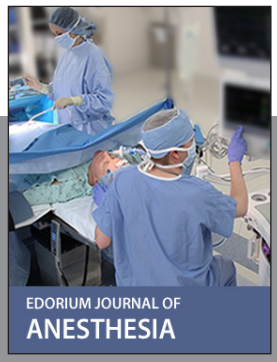

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