Effectiveness of Mother as a Rehabilitative Aid (MARA) Program in the Recovery of Children with Cerebral Palsy-An Assessor blinded Randomized Controlled Trial

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Abstract

Background: Cerebral Palsy is a non-Progressive neuromotor disorder which leads to various impairments and disabilities. There are evidence based Paediatric Physiotherapy approaches for rehabilitating the same. In the recovery of the child literature suggests that home program plays a major role.

Objectives; Till date there is a dearth in the literature which quantifies the home program. To provide Mother as a Rehabilitative Aid Program (MARA) to parents of children with cerebral palsy. To compare the effectiveness of MARA with traditional home program.

Methodology: Mother as a Rehabilitative Aid (MARA) is a unique program which helps the mothers to be a part of rehabilitative team. It is a quantified tailor made treatment protocol to be effectively used by the mothers. The present study aims to see the effectiveness of MARA over traditional approaches for home program in children with spastic diplegic Cerebral palsy children of age 5 to 10 years. The study design is Assessor Blinded Randomized Controlled Trial. The study population divided into MARA group and Controlled group

Results: MARA proved to be effective than traditional home program. T test was used in the statistical analysis. GMFM-88, PBS, Gait parameters all were statistically significant in MARA group than Control group.

Discussion: This study is correlated with previous studies and found to give a clear explanation for parent oriented program with quantifiable outcome measures.

Conclusion: It can be incorporated in the treatment of cerebral palsy children. Students Communication skills improved, Their Practical skills and service oriented mindset generated. They will get good ideas and can able to feel different problems that parents are facing and they got chance to plan their treatment accordingly. For Parents it generates hope and Trust on our profession. Their involvement will be more when their suffering is shared. Parents came to know different other challenges faced by other parents and they Got to know various other methods to overcome. This study leaves a benchmark for more high quality studies on MARA.

Keywords: *Cerebral Palsy, Home Program, Spastic Diplegia, Parent involved treatment*

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Introduction

Physiotherapist will come across many children with disability and it's a daily routine that providing treatment and educating parents regarding the treatment and ask them to continue at home. Family centered home program for children with disability plays a

major role in their improvement.[1] Parents especially mother takes care of children most often in Indian scenario. We have noticed that Mothers were not able to give appropriate home program because of lack of quality in providing home program which gives them a clear idea of managing children at home. Mother's perceptions should be unique and focused for their child's improvement.[2,3]Thus we thought of conducting a program which empowers mothers and make them understand their abilities in providing appropriate home program for the early recovery of child suffering with cerebral palsy. Mother as a Rehabilitative Aid (MARA) Program idea was developed by Kovela Rakesh Krishna which gives tremendous insights into carryover and treatment follow up of children with disability.[4] Till date no high quality studies were done on MARA. If MARA is proved to be effective then it will help in setting a bench mark for home program for all the disabled children to have a faster recovery and thus reduces burden of parents. It will also help in maintaining continuity in the treatment as changes in the child will become quite evident. Objectives of the study are to provide Mother as a Rehabilitative Aid Program (MARA) to parents of children with cerebral palsy. To compare the effectiveness of MARA with traditional home program.

Methodology

Study setting was Paediatric Physiotherapy Unit of Vikas College of Physiotherapy. Mothers of Children with Spastic Cerebral Palsy were study population. Study Type was assessor blinded Randomized Controlled trial and Sample size was 30 (15 in each group)Study duration was 2 months, Sampling method was simple random sampling, Randomisation was computer generated random number table and allocation was sequentially numbered opaque sealed envelope. Inclusion Criteria was 1. Mothers of spastic cerebral palsy children of age 5-10 years either gender with GMFCS level I and II. 2. Mothers who are willing to spend time in giving home program and give a feedback every day and should maintain continuity coming to the department. 3. Mothers who can understand local language (Kannada, Tulu) Exclusion criteria: Mothers of Cerebral palsy children will be excluded if the children are suffering with fixed deformities, With recent surgeries involving spine and limbs, Under anti-epileptic medication.

Procedure: Institutional Ethical approval was received, children with spastic cerebral palsy visiting our department were screened for their GMFCS levels[5] and inclusion criteria. Once they met our inclusion criteria an informed consent and assent were taken from parents and children respectively. Parents of the included Cerebral palsy children were divided into two groups through computer generated random number table and allocation by sequentially numbered opaque sealed envelope (SNOSE) into Experimental and control groups. Experimental group received MARA program primarily aiming Gross motor function, balance and gait parameters and control group received traditional home program for one hour a week, for 8 weeks. On the first day of program and on the last day of program assessment was taken by blinded assessor experienced in taking outcome measures through GMFM-88, PBS, Cadence, Stride length and Gait Velocity.

MARA Program: All the mothers of the Cerebral palsy children in the experimental group (15) were asked to assemble in a room. Primary investigator with the help of the guide elaborated the present condition of each child through PPT presentation. Co-investigator elaborated the changes and rationale behind changes. Balance, Gait parameters and Gross motor function were given priority throughout the program. Mothers were given chance to ask their queries regarding treatment. Once their queries are answered, the primary investigator demonstrated the home program through charts with exercises, video recordings and practical demonstrations. Home program which requires minimal handling from mothers were taught to maintain professional integrity. Mothers are made to perform the exercises minimum five times in front of the concerned physiotherapist. Exercises to be done at home were drawn and given to mothers through charts. Mothers were requested to take video recordings every day while giving home program. They are also instructed to maintain a diary. After 8th week comparison was shown to each parent individually about the development of the child and ease in functional activity performance of their child. Finally after 8 weeks, Gross motor function, balance and gait parameters were measured and post treatment outcome measures of Gross Motor function, Balance and gait parameters were taken.

Traditional Home Program, Control group: Mothers in the control group were given home program and asked to give all exercises which are taught to them without fail for 5 days a week, for 8 weeks.

Outcome measures: To measure balance, Paediatric balance scale (PBS)[6] is used. To measure Gait

parameters, Cadence (steps/min), Stride length (cm)and Gait velocity(m/min)[7] was used. To measure Gross motor function, Gross Motor Function Measure (GMFM-88)[8] was used. To measure Lower extremity function, Gross Motor Functional Classification System (GMFCS) was used.

Results

T test was used in Data analysis with SPSS 21 Software

T-Test

Paired Samples Statistics: Table 1

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	GMFM_D_PRE	29.5333	15	2.97289	.76760
	GMFM_D_POST	30.1333	15	2.89992	.74876
Pair 2	GMFM_E_PRE	43.8000	15	4.70865	1.21577
	GMFM_E_POST	44.3333	15	4.56175	1.17784
Pair 3	GMFM_PERCT_PRE	67.8080	15	7.59743	1.96165
	GMFM_PERCENT_POST	69.4040	15	6.65237	1.71763
Pair 4	PBS_PRE	40.2000	15	3.09839	.80000
	PBS_POST	40.7333	15	2.98727	.77131
Pair 5	WALKINGVELOCITY_PRE	59.8000	15	5.25357	1.35647
	WALKINGVELOCITY_POST	59.7333	15	4.97805	1.28533
Pair 6	CADENCE_PRE	78.5333	15	5.13902	1.32689
	CADENCE_POST	79.0000	15	4.91354	1.26867
Pair 7	STRIDELENGTH_PRE	.6207	15	.01907	.00492
	STRIDELENGTH_POST	.6260	15	.01765	.00456

Paired Samples Correlations: Table 2

		N	Correlation	Sig.
Pair 1	GMFM_D_PRE & GMFM_D_POST	15	.961	.000
Pair 2	GMFM_E_PRE & GMFM_E_POST	15	.994	.000
Pair 3	GMFM_PERCT_PRE & GMFM_PERCENT_POST	15	.955	.000
Pair 4	PBS_PRE & PBS_POST	15	.986	.000
Pair 5	WALKINGVELOCITY_PRE & WALKINGVELOCITY_POST	15	.992	.000
Pair 6	CADENCE_PRE & CADENCE_POST	15	.996	.000
Pair 7	STRIDELENGTH_PRE & STRIDELENGTH_POST	15	.963	.000

Paired Samples Test: Table 3

		Paired Differences			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence ... Lower
Pair 1	GMFM_D_PRE - GMFM_D_POST	-.60000	.82808	.21381	-1.05857
Pair 2	GMFM_E_PRE - GMFM_E_POST	-.53333	.51640	.13333	-.81930
Pair 3	GMFM_PERCT_PRE - GMFM_PERCENT_POST	-1.59600	2.33199	.60212	-2.88741
Pair 4	PBS_PRE - PBS_POST	-.53333	.51640	.13333	-.81930
Pair 5	WALKINGVELOCITY_PRE - WALKINGVELOCITY_POST	.06667	.70373	.18170	-.32305
Pair 6	CADENCE_PRE - CADENCE_POST	-.46667	.51640	.13333	-.75264
Pair 7	STRIDELENGTH_PRE - STRIDELENGTH_POST	-.00533	.00516	.00133	-.00819

Paired Samples Statistics Table 4

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	GMFM_D_PRE	25.1333	15	5.06905	1.30882
	GMFM_D_POST	29.0667	15	5.53517	1.42917
Pair 2	GMFM_E_PRE	37.0000	15	8.24621	2.12916
	GMFM_E_POST	40.9333	15	8.58126	2.21567
Pair 3	GMFM_PERCT_PRE	57.9067	15	12.11530	3.12816
	GMFM_PERCENT_POST	65.6840	15	12.96387	3.34726
Pair 4	PBS_PRE	39.8667	15	3.13657	.80986
	PBS_POST	43.7333	15	3.19523	.82501
Pair 5	WALKINGVELOCITY_PRE	61.2667	15	4.84719	1.25154
	WALKINGVELOCITY_POST	57.1333	15	4.54920	1.17460
Pair 6	CADENCE_PRE	80.0000	15	5.39841	1.39386
	CADENCE_POST	83.9333	15	5.04928	1.30372
Pair 7	STRIDELENGTH_PRE	.6387[a]	15	.00990	.00256
	STRIDELENGTH_POST	.7387[a]	15	.00990	.00256

a. The correlation and t cannot be computed because the standard error of the difference is 0.

Paired Samples Correlations Table 5

		N	Correlation	Sig.
Pair 1	GMFM_D_PRE & GMFM_D_POST	15	.993	.000
Pair 2	GMFM_E_PRE & GMFM_E_POST	15	.990	.000
Pair 3	GMFM_PERCT_PRE & GMFM_PERCENT_POST	15	.994	.000
Pair 4	PBS_PRE & PBS_POST	15	.973	.000
Pair 5	WALKINGVELOCITY_PRE & WALKINGVELOCITY_POST	15	.986	.000
Pair 6	CADENCE_PRE & CADENCE_POST	15	.991	.000

Paired Samples Test: Table 6

		Paired ...			
		95% Confidence ...			
		Upper	t	df	Sig. (2-tailed)
Pair 1	GMFM_D_PRE - GMFM_D_POST	-3.49097	-19.071	14	.000
Pair 2	GMFM_E_PRE - GMFM_E_POST	-3.25617	-12.458	14	.000
Pair 3	GMFM_PERCT_PRE - GMFM_PERCENT_POST	-6.87572	-18.501	14	.000
Pair 4	PBS_PRE - PBS_POST	-3.45508	-20.149	14	.000
Pair 5	WALKINGVELOCITY_PRE - WALKINGVELOCITY_POST	4.59508	19.199	14	.000
Pair 6	CADENCE_PRE - CADENCE_POST	-3.49097	-19.071	14	.000

Discussion

Results were analyzed using T tests and SPSS 21 Software. Boys were more in number than girls. Mean age group was 7. Results of control group are shown in tables 1-3. Results of Experimental group shown in tables 4-6. GMFM 88 D&E, Goal % were significantly improved in MARA Group than Traditional group. PBS and gait parameters were also significant in MARA than traditional group. This is the first study in MARA program with outcome measures.

Previous study by Racic M related to home program were shown that it is cost effective and easy to deliver.[9]

Previous study by Arthasarathy states that children with special needs have intimate relationship with parents with higher levels of motivation and protection, in which mothers have more role than fathers.[10] The results of the present study also proves the same that mothers have strong belief and can work harder to gain benefit in their children.

A study by Domenech Et al states that mother caregivers have a positive perception of the physical therapy treatment. They value and recognize the benefits of the treatment, by emphasizing that it provides for the physical, psychological and social recovery of their children.[11] the present study has proved that the mothers have positive perception and positive inclination to home program.

Conflict of Interest: None

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References

1. King S, Teplicky R, King G, Rosenbaum P. Family – Centered Service for Children with Cerebral Palsy and Their Families: A Review of the Literature. Seminars in Paediatric Neurology. 2004;11(1):78-86.
2. Hinojosa J, Anderson J. Mothers Perceptions of Home Treatment Programs for Their Preschool Children with Cerebral Palsy. American Journal of Occupational Therapy.1991;45:273-79.
3. Piggot J, Pterson J, Hocking C. Participation in home therapy programs for children with Cerebral Palsy: a compelling challenge. Qual Health Res.2002;12(8):1112-29
4. Krishna KR, Kumar DKU, Baliga MN. Mother as a Rehabilitative Aid (MARA) A Unique Program for Mothers of Disabled Children. International Journal of Creative research and thoughts.2018;6(1): 772-775.
5. Bodkin A, Robinson C, Perales F. Reliability and Validity of the Gross Motor Function Classification System for Cerebral Palsy. Pediatric Physical Therapy 2003;15(4): 247-252.
6. Franjoine MR, Gunther JS, Taylor MJ. Paediatric balance scale: A modified version of berg balance scale for the school-age child with mild to moderate motor impairment. Paediatr Phys Ther. 2003;15(2):114–28.
7. Kumar C, Ostwal P. Comparison between Task Oriented Training and Proprioceptive Neuromuscular Facilitation Exercises on lower extremity function in Cerebral Palsy-A Randomized Clinical Trial. J Nov Physiother 2016;6(2):1-9.
8. Ko J. Kim M. Reliability and Responsiveness of the Gross Motor Function Measure-88 in Children With Cerebral Palsy. Physical Therapy 2012;93(3):393-400.
9. Racic M, Kusmuk S, Krstovic-Spremo V. Effectiveness of the Home-based Habilitation Programme for Children with Cerebral Palsy. Indian Journal of Physical Medicine and Rehabilitation. 2014;25(1):6-12.
10. Dr. K. Arthasarathy D. Parent-Child Relationship: Perception of Differently Abled Children. International Journal of Scientific Research. 2012;2(4):360-361.
11. Domenech A, Tavares K, Ruedell A, Nobre J. Cerebral palsy: the meaning of physical therapy for mother caregivers. Fisioterapia em Movimento. 2016;29(4):757-766.