ORIGINAL PAPER

doi: 10.5455/medarh.2018.72.41-45
MED ARCH. 2018 FEB; 72(1): 41-45
RECEIVED: OCT 30, 2017 | ACCEPTED: JAN 11, 2017

Comparing Levels of Mastery Motivation in Children with Cerebral Palsy (CP) and Typically Developing Children

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ABSTRACT

Introduction: The present study aimed to compare motivation in school-age children with CP and typically developing children. **Material and Methods:** 229 parents of children with cerebral palsy and 212 parents of typically developing children participated in the present cross sectional study and completed demographic and DMQ18 forms. The rest of information was measured by an occupational therapist. Average age was equal to 127.12±24.56 months for children with cerebral palsy (CP) and 128.08±15.90 for typically developing children. Independent t-test used to compare two groups; and Pearson correlation coefficient by SPSS software applied to study correlation with other factors. **Results:** There were differences between DMQ subscales of CP and typically developing groups in terms of all subscales (P<0.05). The lowest motivation scores of subscales obtained in gross motor persistence (2.4870±.81047) and cognitive-oriented persistence (2.8529±.84223) in children with CP. Motivation was correlated with Gross Motor function Classification System (r= -0.831, P<0.001), Manual ability classification system (r=-0.782, P<0.001) and cognitive impairment (r=-0.161, P<0.05). **Conclusion:** Children with CP had lower mastery motivation than typically developing children. Rehabilitation efforts should take to enhance motivation, so that children felt empowered to do tasks or practices.

Keywords: motivation, cerebral palsy, child.

1. INTRODUCTION

Mastery motivation is an intrinsic force which enables individuals with incentive and encouragement to independently explore, act, persist and attempt in order to solve problems and challenging tasks(1).

It seems as the predictor of readiness to learning (2) and achievement of necessary skills for daily life activities and social skills (3, 4).

Autonomy, competence and relatedness are the keys to satisfaction with engagement or participation in particular activities according to the self-determination theory (5).

Autonomy refers to an intrinsic willing to choose meaningful and enjoyable activities and have a sense of ownership. Competency refers to the self-efficacy and confidence in success and relatedness such as feeling about other people involved in an activity for further support, greater participation, and well-being (6).

These three factors as the subsectors of the self-regulation and self-determination generally affect level of persistence in children with activity limitations to deal with challenges (5).

Children's motivation is the main determinant of rehabilitation efforts and contributes in other interventions (7, 8).

Bartlett and Palisano (2002) introduced a conceptual model under which the motivation is one of determinants of motor ability in children with Cerebral Palsy (CP) (9). Recent studies have emphasized the importance of motivation in rehabilitation interventions such as the virtual reality(10), constraint-induced movement therapy (CIMT)(6) and hybrid

CIMT combined with bimanual training (11).

According to parents of children with CP, they have lower levels of mastery motivation in some items than typically developing children despite the fact that many environmental and personal factors affect motivation such as parenting style and family structure, family expectations (family ecology)(4, 12, 13), level

of manual ability and level of gross motor function and relationship problems in children with CP (7, 9).

Mastery motivation has two elements; first, the instrumental aspect which refers to the amount of effort or persistence in a person (physical or psychological effort) to solve problems, and second, the expressive aspect regarding to the emotional behavior that are associated with attempt to do tasks (14). It seems that children with cerebral palsy have difficulty in one of these cases.

Therefore, it is essential to study a reduction of motivation for types of effort including motor, social, or cognitive activities as parts of rehabilitation intervention in order to optimize engagement and exercise of main skills for development.

Finally, loss of motivation can prevent children from perfect functional potential and influencing children's activity, leisure, and participation (15-17).

According to other studies, despite the fact that typically developing children have better abilities in playing than Cp children, the experience of pleasure is similar to their normal peers (18, 19).

The present study aimed to describe and compare motivation in school-age children with CP and typically developing children by a new version of Dimensions of Mastery Questionnaire (DMQ18), and identify relationships with motivation.

2. METHODS

Total amount of 229 parents of children with cerebral palsy and 212 parents of typically developing children participated in the present study. Parents voluntarily recruited. These parents filled demographic and DMQ18 forms. Other information such as Manual Ability Classification System (MACS) and Gross Motor Function System (GMFCS) assessed by an occupational therapist.

Descriptive statistics were used to characterize socio-demographic factors, children functioning and family environment in both groups, and examined in CP and typically developing children by independent sample t-test.

Correlation was assessed according to Pearson correlation coefficient between total score and some independent variables such as age, gender, MACS and GMFCS.

Research tools: Dimensions of Mastery Questionnaire (DMQ18), School-age Motivation Questionnaire (parent report).

School-age Motivation Questionnaire (parent report) contains 41 items on Five-point Likert scale (1-5) ranging from 1 "never like this child" to 5 "exactly like this child".

Questionnaire was divided into eight sections containing the Cognitive-Oriented Persistence which was obtained from calculation of (1+14+17+23+29+40)/6, Gross Motor Persistence obtained from calculation of (3+12+26+36+38)/5, Social Persistence with Adults (8+15+19+22+33+37)/6, Social Persistence with children which was obtained from calculation of (6+7+25+28+32+35)/6, Mastery Pleasure obtained from calculation of (2+11+18+21+30)/5, Negative Reactions- frustration/anger obtained from calculation of (9+13+16+41)/4, Negative Reactions-sadness/shame obtained from calculation of (5+24+34+39)/4, and General Competence obtained from calculation of (4+10+20+27+31)/5.

Negative reaction items can be combined together. This questionnaire was valid and reliable and investigated by authors in the present paper. In our opinion, there is approximately 10 to 15 minutes to complete the questionnaire(20).

Cognitive levels: Cognitive levels are categorized into three groups (>70, 50-70, and <50) and a form is developed by the SPARCLE project based on the parents' response. It is based on an algorithm depending on the assistance of children at schools and children ability to understand concepts and develop friendships compared to children at the same age or much younger children (21).

Gross Motor Function Classification System (GMFCS): The GMFCS classified into five levels. Children at

Variable	CP Group (N %)	Typically children Group
Children's age	127.12±24.56	128.08±15.90
Gender		
Male	140 (61.1)	152 (71.7)
Female	89 (38.9)	60 (28.3)
Total	229(100)	212(100)
Gross Motor Function Classification System (GMFCS)		
Level I: They walk and climb stairs without limitation	37(16.2)	
Level II: They walk with limitation	42(18.3)	
Level III: They walk with assistive devices	51(22.3)	
Level IV: They are unable to walk; limited self-mobility	38(16.6)	
Level V: They are unable to walk; severely limited self-mobility	61(26.6)	
Manual Ability Classification System (MACS)		
Level I: They easily handle objects	23(10.0)	
Level II. They handle objects with lower quality and speed	88(38.4)	
Level III: They handle objects s with difficulty and need help	58(25.3)	
Level IV; They handle a limited selection of easily managed objects in adapted situations	37 (16.2)	
Level V: They do not handle activities.	23(10.0)	
Cognitive Impairment		
IQ>70	115 (50.2)	
IQ: 50–70	47 (20.5)	
IQ< 50	67 (29.2)	
Parents		
Mother	154 (67.2)	153 (72.2)
Father	75 (32.2)	53 (25.0)
Grandmother	0(0)	6 (2.8)

Table 1. Socio-demographic characteristic of children with cerebral palsy and typically developing children and their parents

DMQ18 Sub scales	CP Group			Typically children Group	
	N	Mean/SD	p	N	Mean/SD
Cognitive-oriented Persistence	229	2.8529±.84223	P<0.001	212	3.6407±.84641
Gross Motor Persistence	229	2.4870±.81047	P<0.001	212	4.1509±.84216
Social Persistence with adults	229	3.3638±1.04196	P<0.001	212	4.0511±.73280
Social Persistence with children	229	2.9275±.99651	P<0.001	212	3.8357±.83554
Mastery Pleasure	229	4.2739±1.20564	P<0.001	212	5.5849±.80239
Negative Reaction	229	3.4397±1.05677	P<0.05	212	3.6698±.71909
Negative Reaction - frustration/anger	229	3.4870±1.28811	P=.735	212	3.4528±.79327
Negative Reaction - sadness/shame	229	3.3924±1.07908	P<0.001	212	3.8738±.95283
General Competence	229	3.3774±.94041	P<0.001	212	3.9198±1.02304
Total	229	3.1415±.84697	P<0.001	212	3.9321±.53628

Table 2. Comparison of mean scores in children with cerebral palsy and typically developing group

level I can walk without limitation; children at level II can walk indoor, but they have limitation outdoor; children at level III can walk with assistive devices; children at level IV have self-mobility by power mobility devices; and children in level V have severely limited self mobility (22) .

Manual Ability Classification System (MACS): The MACS classified into five levels. Children at level I easily handle objects. Children at level II handle objects with in lower quality and speed; children at level III handle objects with difficulty and need help. Children at level IV have a limited selection of easily managed objects in adapted situations; and children at level V do not handle objects (23).

3. RESULTS

Out of 154 (67.2%) of mothers of children with CP and 153 (72.2%) of mothers of typically developing children participated in the present study. 140 (61.1%) children with Cp and 152 (71.7%) of typically developing children were males. Mean age was 127.12±24.56 for Cp group and 128.08±15.90 for normal group.

GMFCS and MACS levels were classified as follows: level I: 37(16.2), 23(10.0); level II: 42(18.3), 88(38.4); level III: 51(22.3), 58(25.3); level IV: 38(16.6), 37 (16.2); and level V: 61(26.6), 23(10.0), respectively.

115 (50.2) children with cognitive impairment had of higher than 70; 47 (20.5) had IQ of from 50 to 70, and 67 (29.2) had IQ of lower than 50 as presented in Table 1.

There was not any significant difference between two groups of children in terms of age and gender.

According to Table 2 for comparison of CP and normal groups in terms of mean score in DMQ subscales, there was a difference between both groups in all subscales and p-value was (P<0.05) except for negative reaction - frustration/anger subscale. However, there was not any difference between mean scores in total negative reaction subscale that calculated negative reaction - frustration/anger and negative reaction sadness/shame (Table 2).

According to a closer look at the mean score in Table 2, the lowest motivation was seen in gross motor persistence (2.4870±.81047) and cognitive-oriented persistence (2.8529±.84223) in children with CP were, and the greatest difference between children with CP (2.4870±.81047) and typically developing children (4.1509±.84216) in subscale scores was obtained for gross motor persistence.

Variable	P	r
Age	0.864	0.011
Gender	0.310	0.067
MACS	P<0.001	-0.782
GMFCS	P<0.001	-0.831
IQ	P<0.05	-0.161

Table 3. Coloration of total score with age, gender, MACS, GMFCS, and IQ in children with cerebral palsy

The lowest difference was obtained in mean score of subscale of negative reaction between CP (3.4397±1.05677) and typically developing children (3.6698±.71909) (Table 2)

Table 3 shows Pearson correlation coefficient for CP children's total scores in independent variables.

According to Table 3, the total score had negative significant correlation with GMFCS, MACS and cognitive impairment (P<0.05), but did not have any correlation with gender and age (P>0.05).

4. DISCUSSION

The present study indicated that there was a difference between CP and typically developing children on all subscales of DMQ18, but there was a correlation between motivation and GMFCS, MACS and cognitive impairment in children with CP.

There is not any study and literature on DMQ18 for comparison of normal and atypically developing children because the applied tool is new, and thus we can utilize the DMQ17 which is very similar to DMQ18 in scores and content (20).

Morgan et al. compared normal English children, who were rated by their parents, with atypically developing children, who were rated by their parents, and found that they were different on all six mastery motivation scales. Typically developing children had higher mastery pleasure and competence subscales than atypically developing children; and atypically developing children had higher competence and object/cognitive persistence, despite the fact that the typically developing children were older than normal children (24).

Morgan et al divided the atypically English children into four groups: cerebral palsy, autism spectrum, Down syndrome, and other developmental disorders.

Typically developing children had higher gross motor persistence, object/cognitive persistence, competence and social persistence than all four groups of children. Typically developing children had higher social persistence and mastery pleasure than children with autism and cerebral palsy, but in negative reaction subscale, typically developing children were put in lower ranks than children with autism spectrum disorder (24).

In the present study, there was not any significant difference between two groups in terms of negative reaction - frustration/anger subscale. Furthermore, CP and typically developing children had the lowest difference in mean score of negative reaction.

Parental rates of Chinese infants and toddlers with motor problems were compared to Typically developing children at the same age. Normal infants were significantly in higher rates on all scales except for the negative reaction (25, 26).

The present study indicated that parents of exceptional children perceived that their children had lower mastery motivation than normal children.

When parent ranked their disabled child, they probably compared them to typically developing children at a similar chronological age.

Results of our study also indicated that higher cognitive ability (IQ), lower gross motor function limitations (GMFCS), and better manual ability (MACS) were associated with a greater level of motivation.

It indicated that the lower and upper extremities reduce involvement of children with CP, and thus they would be able to perform better activities and thus more insist on doing tasks.

Majnemer et al. found that motivation might be associated with developmental impairment and activity limitation of personal and environmental factors such as motor ability, cognitive impairment, behavioral problems and family function (7).

Children with better gross motor function probably responded emotionally to failure, which could limit their desire to exclusively follow challenging tasks.

Children with better functional abilities in different domains are likely to perceive that they are able to do tasks successfully, and thus they are likely motivated in challenging tasks. Parents' perception of their children's motivation may be partially influenced by severity of their children's impairment.

It is found that children's motivation is affected by their environmental factor particularly by their family attitude (27). This variable was not measured in the present study, and thus it should be taken into account in further studies.

What children do in their actual life is influenced by interaction between impairment and functional limitation due to the personal and environmental factors such as obstacles.

Motivation is a main personal factor which can specify whether children prefer doing spatial tasks even if they are able to do it (28).

Therefore, consideration of motivation in rehabilitation intervention is important. Children should have the opportunity to select activities which are enjoyable and then find their capacity for challenging (7).

It should be noted that children's motivation can have important influence on motor ability and participation in leisure and other daily activities (15).

In the present study, we measured the parents' perception of their children's motivation, and we sought to be close to the reality. We suggested that children's perception should be considered in future studies.

5. CONCLUSION

Children with CP had lower mastery motivation than typically developing children. Our findings indicated that the mastery motivation might be as a risk for spectrum range of challenging tasks in children with CP. Furthermore, personal and environmental factors could influence mastery motivation. Rehabilitation effort should be utilized as a way to enhance motivation, so that children feel empowered to do tasks or practice. DMQ18 is a good questionnaire for measurement of mastery motivation at all aspects in children with CP.

- Conflict of interest: The authors have no conflict of interest to declare.
- Authors' contributions: Mahyar Salavati, Roshanak Vameghi, Seyed Ali Hosseini, Ahmad Saeedi and Masoud Gharib (authors) considered and aimed, the study and drafted the final manuscript and conceived of the study, participated in disseminating and, collecting the survey. All authors read, and approved of the final manuscript.

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