

Research Paper: Predictors of Interest in Performing Activities Among Iranian Adolescents With Cerebral Palsy



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Citation: Dehghanizadeh M, Akbarfahimi M, Zareyan A, Yazdani F, Khalafbeigi M, Soleimani F. Predictors of Interest in Performing Activities Among Iranian Adolescents with Cerebral Palsy. Iranian Rehabilitation Journal. 2020; 18(4):377-386. <http://dx.doi.org/10.32598/irj.18.4.422.5>

doi <http://dx.doi.org/10.32598/irj.18.4.422.5>



Article info:

Received: 5 Mar 2020

Accepted: 16 Jun 2020

Available Online: 01 Dec 2020

Keywords:

Interest, Volition, Participation, Motor activity, Adolescent, Cerebral palsy, Predictor

ABSTRACT

Objectives: Generally, adolescents who are interested in performing activities experience positive emotions and report high levels of well-being. However, adolescents with Cerebral Palsy (CP) encounter various issues affecting their interests. The present research was planned to investigate the predictor factors that affect the interest in performing activities in Iranian adolescents with CP.

Methods: In total, 312 adolescents with CP (10-19-year-olds, Mean±SD age: 14.08±2.34 y) participated in this cross-sectional study. Their gross motor function was assessed by the Gross Motor Function Classification System (GMFCS), and their manual ability was evaluated by the Manual Ability Classification System (MACS) in random order by an occupational therapist. All study participants also completed the Adolescent Interest Inventory-Cerebral Palsy (AII-CP). The predictive model was analyzed using a multiple linear regression model by the enter method.

Results: The multiple linear regression analysis data presented that the highest independence in motor performance, personal values, social environment support, and age appeared to be the strongest predictors of interest in performing activities in the explored adolescents with CP ($R^2: 0.475$).

Discussion: Interest as a significant factor for participation and motivation in conducting daily living activities is associated with the highest independence in motor performance, personal values, social environment support, and the age of adolescents with CP.

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Highlights

- The strongest and most significant factor affecting interest in adolescents with CP in performing activities relates to the highest independence in motor performance.
- The social environment was recognized as a predictor of interest in participating in tasks among adolescents with CP.
- Involving adolescents with CP in community activities and supporting them facilitates keeping them interested in performing activities.
- An essential factor affecting interest in adolescents with CP in performing activities is having greater values in their life.

Plain Language Summary

Cerebral Palsy (CP) is a permanent brain impairment that causes physical disability which affects movement and posture. CP could be associated with conflicts in behavior and communication. All adolescents who experience interest in doing activities feel positive and have a better outcome. But adolescents with CP face different factors affecting their interests. The present study tried to determine the factors involving the interest of doing an activity in adolescents with CP for helping the therapists in their planning. The collected results suggested that in 4 conditions, the studied adolescents with CP presented more interest in doing activities; less severity of their physical disorder; having greater values in life; having higher levels of social support, and being at younger ages. Based on these findings, providing physical rehabilitation and providing social support for adolescents with CP are recommended. Accordingly, it can improve these individuals' motivation in doing activities.

1. Introduction

Cerebral Palsy (CP), as an everlasting disorder of the development of posture and movement, imposes restrictions on the affected individuals' activities; accordingly, it is often associated with psycho-social problems [1]. The physical rehabilitation of adolescents with CP presents significant consequences in participation in other activities [2]. To achieve optimum physical rehabilitation benefits, the adolescent must be actively involved in the therapeutic process [3-5]. Adolescent's interest in participating in physical rehabilitation activities along with the quality of relationship with the therapist could influence the therapy outcomes [5, 6]. Interest, as a psychological term, epitomizes by an affective component of positive emotion as well as a cognitive component of concentration [7]. Socio-cultural, physical, and temporal environments where therapy occurs could enhance or diminish adolescent's motivation to engage in therapy [8, 9]. When individuals are interested in performing some activity, they have been intrinsically motivated for that activity [10].

Adolescence is a rapid human developmental phase defined by various emotional and bio-social changes [11].

During this phase, personal interests are vital for the generation of self-development in adolescents [12], real-life choices, future orientation [13], as well as expertise [14]. Interest in adolescents proves high intrinsic motivation to learn [7, 15] and experience positive emotions; subsequently, it results in high wellbeing over time [16, 17]. Goals and values sustain when being congruent with an individual's interests [12]. Interests are raised through and embedded in interaction with social contexts; thus, it is a complex process to pursue interests in daily life [18].

Previous research on the predictors of interest has mainly focused on participation in leisure activities and the impact of the social environment on an individual's interest. Only a few numbers of studies addressed the effects of different factors on the interests of children with CP and reported different results. For example, Longo et al. [19] stated that children with CP presented low diversity and intensity of participation while there existed high levels of enjoyment. They also argued that participation in leisure activities outside the school was further affected by the children and environmental factors, compared to their families [19]. While in another study by Bergin [18], the social experience was investigated. He concluded that social experiences that teens have with classmates, families, schools, and culture

could be the primary influence of an individual's interest [18]. Oliveira et al. [20] also proposed a model based on cognitive and affective components. They suggested that interest presenting in adolescents with CP in conducting activities affects their hand coordination function. Furthermore, their study data revealed that a child's interests could be affected by the type of assistance, i.e. provided by the caregivers at home as well as the level of child's satisfaction during daily living activities [20].

Adolescents with CP also find a deep sense of fulfillment when conducting the activities of their interest [20]. Therefore, it is necessary to determine the factors intensifying the interest in performing activities among adolescents with CP. However, to the best of our knowledge, there is no research on the predictors of interest in performing activities among adolescents with CP in Iran. Therefore, this research was designed to determine the predictive factors of interest in performing activities among Iranian adolescents with CP.

2. Methods

A cross-sectional study was applied to detect the predictors of interest in performing activities among adolescents with CP.

In total, 312 adolescents with CP participated in this study. The research participants were recruited from the exceptional sensory-motor schools and private clinics by the multistage sampling method. First, Iran, with 31 provinces, was divided into 5 areas; north, north-west, west, center-south, and east. Then, one province was randomly selected from each region (Tehran, West-Azerbaijan, Hamadan, Isfahan, & Yazd). Next, the convenience sampling method was used for recruiting the study participants from the capital of each selected province. The inclusion criteria of the study included the following: receiving a diagnosis of CP by a paediatric neurologist, an age range of 10-19 years [21], a Gross Motor Function Classification System (GMFCS) level I-III [22, 23], the Intelligence Quotient (IQ) within the healthy range [24], and an ability to cooperate and respond the relevant inventories. The exclusion criteria of the study were visual impairments that limit the children's abilities to perform their everyday tasks; uncontrolled seizure disorder affecting motor skills, and history of orthopaedic or neurology surgery in the past 6 months. The following instruments were employed to collect the required data in the present study.

The Adolescent Interest Inventory-Cerebral Palsy (AII-CP): It is a 15-item self-report inventory, i.e. de-

veloped by the first author of this research [25]; the findings of a qualitative study using directed content analysis and a Nominal Group Technique (NGT) were used for this purpose [26]. The Model of Human Occupation (MOHO), as an occupational therapy framework, was used for developing the AII-CP. This inventory was developed to measure interest in adolescents with CP in participating in activities.

Response choices contain a 5-point Likert-type setup, ranging from one (strongly agree) to 5 (strongly disagree), with a neither agree nor disagree midpoint. It takes about 8 minutes to complete this scale. The AII-CP was constructed in 5 domains; personal values (3 items), the perception of ability (3 items), interest in performing an activity (3 items), physical environment features (3 items), and social environment support (3 items). Concerning the quantitative face validity of the AII-CP, the item impact technique with scoring ≥ 1.5 [27] was conducted on 10 adolescents with CP and a healthy IQ approved by the Study of Participation of Children with Cerebral Palsy Living in Europe (SPARCLE) [24]. Intelligence testing was performed by an occupational therapist with 5 years of clinical experience. Respecting the quantitative content validity of the inventory, Item-level Content Validity Index (I-CVI) and Content Validity Ratio (CVR) were evaluated for the items. According to Lawshe [28], while the number of experts is 20, the minimum acceptable CVR is equivalent to 0.42. In this study, the CVR was assessed by 20 experts who had clinical experiences with children and adolescents with CP for >10 years (13-PhD graduates in occupational therapy, 5-MSc graduates in occupational therapy, 2-PhD graduates in clinical psychology). To assess the I-CVI, another 20 experts (17-PhD graduates in occupational therapy & 3-MSc graduates in occupational therapy) with a 10-year clinical experience with adolescents with CP were requested to rate the relevance of the AII-CP items [29]. Then, the modified kappa was calculated. Its minimum value for maintaining an item is considered to be >0.74 [30]. Finally, the AII-CP was composed of items with the I-CVIs of 0.78 or higher [30].

The Gross Motor Function Classification System (GMFCS): This scale was used as a standard observational clinical classification system to describe the gross motor function of individuals with CP concerning self-initiated movement abilities [22]. This five-level classification system is developed based on the movement ability and the need for assistive devices. In the first level of the scale, there is the highest independence in motor performance; on the other side of the scale, level V presents the least independence in motor performance [22]. The validity

Table 1. Frequency distribution of characteristics of the study participants (N=312)

Characteristics		No. (%)
Gender	Male	195 (62.5)
	Female	117 (37.5)
GMFCS	I	65 (20.8)
	II	139 (44.6)
	III	108 (34.6)
MACS	I	115 (36.9)
	II	126 (40.4)
	III	55 (17.6)
	IV	10 (3.2)
	V	6 (1.9)

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GMFCS: Gross Motor Function Classification System; MACS: Manual Ability Classification System.

and reliability of this scale for adolescents with CP have been proven by a previous study in Iran [23].

Evidence about the manual capability of adolescents with CP was gathered by the Manual Ability Classification System (MACS) considering the limitations of manual skills, as well as the need for assistive tools [31]. Based on this classification, adolescents categorize into 5 levels. The first level reflects the highest independence, while level V signifies the least independence in manual skills [31]. The reliability and validity of this classification system for adolescents with CP have previously been established [32].

Information about the age and gender of the adolescents with CP was collected using a demographic data form. After the approval of this research by the relevant Ethics Committee, the Education Organization of Tehran, West-Azarbayjan, Hamedan, Esfahan, and Yazd provinces provided a brief introduction to obtain permission from the samples of exceptional sensory-motor schools. Subsequently, after obtaining permission from the ministers of exceptional sensory-motor schools, the process of sampling started. Next, the parents of adolescents with CP signed the written informed consent forms. Subsequently, the study participants were elaborated on the research objectives and got acquainted with the procedure of completing the inventory. The healthy IQ range of the research participants was approved by the SPARCLE study [24]. Intelligence testing was per-

formed by an occupational therapist with 5 years of clinical experience. Next, with composure in a quiet school environment from 8:00 am to 12:00 am at break times, the selected adolescents with CP completed the AII-CP. At the time of completing the questionnaire, none of the study participants reported feelings of being stressed or tired. Then, the gross motor function and the manual ability were assessed by GMFCS and MACS in random order by an expert occupational therapist with 5 years of clinical experience blinded to the study purposes.

The gender, GMFCS, and MACS were considered as the categorical variables. The personal values, perception of ability, physical environment features, social environment support, interest in conducting an activity, and age were considered as continuous variables in the data analyses.

For the statistical analysis of this study, SPSS was used. To measure correlations among the variables, appropriate statistical tests were applied. Initially, the correlation coefficient was run to screen a significant correlation between independent variables (gender, age, GMFCS, MACS, personal values, the perception of ability, physical environment features, & social environment support) and dependent variable (interest in performing an activity). Categorical variables (GMFCS and MACS) cannot directly be entered into a regression model and significantly interpreted. In general, a k level categorical variable is converted into k-1 variables, each with two

levels. As in dummy coding, categorical variables are just recoded into K binary 0-1 variables [33]. Precisely, the variables that suggested a significant correlation with the dependent variable were employed into the multiple linear regression model with the enter method. Besides, $P \leq 0.05$ was considered statistically significant. Durbin-Watson value in the range of 1.5 to 2.5 was considered to be relatively normal [34].

3. Results

In total, 312 adolescents with CP with GMFCS level I-III participated in the present study. The Mean age of participants was 14.08 ± 2.34 years old (Table 1). Correlations revealed that only personal values, the perception of ability, social environment support, age, and GMFCS were related to interest in performing an activity in the study participants. Thus, only these variables were entered in the regression analysis model. Based on correlations analysis, MACS and physical environment features were not significantly correlated with interest in conducting an activity. As a result, these variables were excluded from the model.

Then, multiple linear regression was calculated to predict interest in performing an activity based on personal values, social environment support, GMFCS level I, and age. A significant regression equation was found ($F_{6,305} = 46.083$, $P < 0.001$), with an R^2 of 0.475. The research participants' predicted interest in performing an activity equaled $7.947 + 0.621$ (GMFCS level I) + 0.308 (personal values) + 0.195 (social environment support) - 0.08 (age). The prediction model for interest in conduct-

ing activities in adolescents with CP is presented in Table 2. GMFCS level I, personal values, social environment support, and age were significant predictors of interest in performing an activity. However, GMFCS Level II-III and the perception of ability were not significant predictors in this respect.

4. Discussion

Identifying the influential and predictive factors of interest in performing activities by adolescents with CP was the main purpose of the present study. The outcomes of the initial analysis discovered that maximum independence in motor performance (GMFCS level I), personal values, social environment support, and age had exerted more influence on interest in performing activities among the studied adolescents with CP.

Based on the obtained results, the most important factor affecting adolescent's interest in performing activities was the highest independence in motor performance. Considering these results, GMFCS level I was associated with a higher level of interest in performing activities. These outcomes appeared to be consistent with the study conducted by Longo et al. [19]; they argued that lower GMFCS levels in adolescents with CP are associated with a higher level of participation in leisure activities. Furthermore, they revealed that a higher level of motivation could be observed in adolescents with fewer activity limitations [35].

The achieved findings also revealed that personal values significantly impact interest in performing activities

Table 2. Multiple linear regression analysis with enter method data

Model 1	b	SE b	β
Constant	7.947	0.638	-
Personal values	0.308	0.039	0.365*
Social environment support	0.195	0.028	0.322*
The perception of ability	0.026	0.022	0.051
GMFCS level I	0.621	0.147	0.201*
GMFCS level II	-0.086	0.119	-0.034
Age	-0.080	0.022	-0.149*
R^2	-	0.475	-
F for change in R^2	-	46.083	-

* $P \leq 0.001$; Durbin-Watson value: 2.150.

by adolescents with CP. These results appeared to be consistent with those of Hofer's and Krapp's studies [12, 36], stating that perusing goals and values are associated with interests. Such goal pursuit intensifies the enjoyment of the positive activity [37]. Furthermore, Oliveira et al. [20] explored task values and interest in engaging in activities in children. They proposed a model highlighting that subjective task value was a character influencing children's interest in activities. Personal values seem to be the second influential factor affecting interest in performing activities among adolescents with CP despite their movement limitations.

The present research results suggested that the higher levels of social environment support were related to the greater interest in performing activity among adolescents with CP. Based on these findings, and considering that the personal values, age, and GMFCS level are fixed factors, rehabilitation therapists should focus on improving the social environment support to increase interest in performing activities among adolescents with CP. Other studies also emphasized the social-environmental support influencing social participation among adolescents with CP [38, 39]. Research on the interest in different contexts discovered that parents, as the most influential implementers of developing and experiencing interest, need to provide their children with the resources (e.g. taking them to music lessons, sports events, & different museums) [18].

Based on the current study findings, the younger adolescents with CP are more interested in engaging in performing activities, duties, and roles. This result appeared to be inconsistent with those of Hoff et al.'s study [40]; they reported that mean-level interest scores broadly increase with age. However, further investigating the data revealed that during young adulthood, interest in performing the activities that involve working with hands, tools, and materials, as well as scientific and research activities, remained constant [40]. However, by increasing age, adolescents with CP generate more movement limitations and are progressively frustrated by the limitations of conducting their activities of interest. Thus, it seems that their interest in performing activities decreases with age.

Interestingly, the physical environment features, which could be among the factors that affect the interest of adolescents with CP, were not significant in this area. These findings were inconsistent with those of Majnemer and associates [41]. They revealed that accessibility is a hindrance to participation in leisure activities for individuals with physical disabilities. Accessibility problems did not

seem to affect their interest in performing activities owing to their parents' support in daily movements.

The present study sample was selected from adolescents with CP (GMFCS level I-III); therefore, it is recommended that future studies investigate characteristics affecting interest in adolescents with CP (GMFCS level IV-V) using a parent-report inventory. The strength of the present study was conducting research based on the MOHO context in adolescents with CP for the first time. Moreover, sampling was performed in a large statistical population in this study. The present study had some limitations. Since most adolescents with CP (GMFCS level IV-V) are at greater risks to present IQ scores in the severity levels [42], they could not complete the self-report inventory. As a result, we had restrictions in sampling in this group. Furthermore, an individual's interests are related to their values and environmental features [25]. The values of these individuals also could depend on their family and friends. Thus, it can affect their interests. Since motivation and participation of individuals in performing their activities help reduce the burden on caregivers [43], it is suggested the relationship between the motivation of adolescents with cerebral palsy and the burden of caregivers will be studied in future study.

5. Conclusion

Based on this research data, interest in performing activities was associated with maximum independence in motor performance, personal values, social environment support, and the age of adolescents with CP. Consequently, identifying the factors that predict and affect the interest of adolescents with CP can facilitate rehabilitation in promoting their motivation and participation in performing daily living activities. Furthermore, adolescents with the highest independence in motor activity are further interested in conducting activities. Thus, physical rehabilitation for adolescents with CP is recommended, as it can improve their motivation. The adolescents' engagements in different activities could increase their participation. Furthermore, by getting involved with community activities and social support of adolescents with CP, it is more likely to keep them interested in performing activities.

Ethical Considerations

Compliance with ethical guidelines

This research was approved by the Iran University of Medical Sciences Ethics Committee on 24 June 2018, (Code: IR.IUMS.REC.1397.048). Informed consent

forms were obtained from all study participants and their parents prior to gathering information.

Funding

This study was endorsed by the Iran University of Medical Sciences (Grant number: 97-3-6-12888).

Authors' contributions

Methodology: Moslem Dehghanizadeh, Malahat Akbarfahimi, Armin Zareiyan, Farzaneh Yazdani, Mitra Khalafbeigi, Software: Moslem Dehghanizadeh, Armin Zareiyan; Validation and formal analysis: Moslem Dehghanizadeh, Malahat Akbarfahimi, Armin Zareiyan; Investigation: Moslem Dehghanizadeh; Resources, data curation: Moslem Dehghanizadeh; Writing – original draft: Moslem Dehghanizadeh, Malahat Akbarfahimi, Armin Zareiyan, Farzaneh Yazdani, Mitra Khalafbeigi; Preparation, writing – review & editing, visualization, supervision: All authors; Project administration and funding acquisition: Malahat Akbarfahimi.

Conflict of interest

The authors stated no conflicts of interest.

Acknowledgments

This study was impossible to be conducted without the contribution of the parents and adolescents with CP. Furthermore, the authors would like to express their gratitude to these subjects as well as the colleagues at the Iran University of Medical Sciences. In addition, the authors appreciated the occupational therapists helping the researchers in completing the study tools.

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