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Original Article

The Implication of Al Fatiha Intervention for Rehabilitating Cerebral Palsy Patients

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ABSTRACT

Al-Fatiha is the first surah of the Holy Quran and an integral part of the salah. The seven magnificent verses of Al-Fatiha contain the fundamental doctrines of Islam, such as aqida, dawa, Islamic legislation, prayer, and the afterlife. **Objective:** Allah's words can treat any disorder, and research has shown that listening to the Quran has therapeutic benefits for listeners. There have been few published research to support the idea that Al-Fatiha can help in rehabilitating cerebral palsy (CP) patients. The study aimed to investigate the therapeutic effects of listening to Al-Fatiha on behaviors during physiotherapy and spasticity in CP patients. **Methods:** Formal ethical approval for the study was granted by the Institutional Bioethics Committee of Karachi University as well as the rehabilitation center where the research was carried out between February and April 2021. Study participants were randomly allocated into two groups: control (n=12) and Al-Fatiha (n=16). Al-Fatiha sessions, totaling 31 structured group sessions, were administered over six weeks. The outcome measures were evaluated utilizing the Physiotherapist Reporting Questionnaire and the Modified Ashworth Scale. Statistical analysis, including the Wilcoxon signed rank test and descriptive statistics, was performed using SPSS version 28. **Results:** The findings of this study demonstrated a significant induction of calmness and a reduction in spasticity among participants in the Al-Fatiha group. It is hypothesized that several factors contributed to these improvements in both behavioral and physical outcomes, including the amplification of brain waves, the rebalancing of brain cells through the reduction of neural tension, and the stimulation of the auditory and motor cortex. Conclusion: Based on the preliminary findings, Al Fatiha is suggested as a promising, non-pharmacological, and cost-effective rehabilitation therapy for individuals with CP, subject to validation through second and third-phase clinical trials.

Keywords: Al-Fatiha, Brain waves, Cerebral Palsy, Physiotherapy, Spasticity

INTRODUCTION

The Quran's literary structure is comprehensive, including architecture, composition, clarity, diction, intertextuality, intratextual resonance, melodic tone, morphology, phonology, rhetoric, rhythm, style, syntax, and other literary features[1]. Al-Fatiha is the first surah of the Holy Quran and an integral part of the salah. The seven magnificent verses of Al-Fatiha contain the fundamental doctrines of Islam, such as aqida, dawa, Islamic legislation, prayer, and the afterlife. Allah's words can treat any disorder, and research has shown that listening to the Quran has a therapeutic effect on listeners. In recent years, numerous studies have confirmed the undeniable therapeutic benefits of listening to Quranic verses on blood parameters[2], cancer[3], cognitive functions[4,5], mental health[6,] and various physiological and physical variables[7].

All medical conditions, ranging from appendicitis, cancer, and diabetes to dementia, cardiac issues, CP, hypertension, kidney failures, liver disorders, respiratory distress, schizophrenia, and others, are typically managed through modern medical interventions and innovative treatments provided by physicians and medications. According to Islamic teachings, Quranic verses are believed to have the potential to heal illnesses, as all cures are ultimately granted by Allah. No ailment can be remedied without His will and permission. It is indicated in verse 82 of Surah Al-Isra: '*And We*

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send down from the verses of the Quran something that can be Shifa (cure) and a mercy to those who believe...'. This verse highlights the spiritual and healing power of the Quran for believers.

Cerebral palsy (CP) is a broad term encompassing a range of neurological disorders that impair an individual's ability to balance, maintain posture, stand, and walk[8]. It results from damage or malformations in the brain, typically occurring before, during, or shortly after birth. CP can affect a range of physiological and cognitive functions, including auditory perception, blood parameters, cognitive capabilities, metabolism, muscular coordination, motor skills, oral health, speech proficiency, vision, and more[8,9].

Key etiological factors associated with CP include birth asphyxia[10], consanguinity, genetic disorders, home labor, hypoxic encephalopathy, intrauterine growth restriction, infections, low gestational weight, maternal health issues, microcephaly, multiple pregnancies, reduced gestational age, traumatic head injuries, and more[8,11].

Moreover, the majority of reported risk factors for the development of CP are associated with the male gender and the prenatal developmental phase[11,12]. An estimated 17 million people globally are affected by CP[8]. However, the burden and underlying causes of CP in Pakistan have yet to be definitively determined[13,14].

Normally, CP patients are classified based on muscle tone, Gross Motor Function Classification System (GMFCS), severity, and topographical distribution[15]. Muscle tone is described as hypertonia or spastic CP and hypotonia or non-spastic CP. GMFCS is a 5-level classification system that was developed by Robert Palisano and coauthors which categorizes depending upon mobility into Levels I to V[16]. Severity is described as a mild case, moderate case, severe case, or no CP[15]. And topographically as monoplegia, diplegia, hemiplegia, triplegia, paraplegia, and quadriplegia.[15] Spastic muscle tone is dominant in CP patients[12,16] and hinders normal functions by causing joint pain, joint rigidity, and problems in performing activities of daily life. The extent or type of spasticity may have a different pattern on the right and left sides of the body in a CP-affected patient[17].

Many interventions including anticonvulsant medications, botulinum toxins, castings, occupational therapy, physiotherapy, and surgeries have exhibited a remarkable effect in modulating the behavior and spasticity of CP-affected individuals[18,19]. There have been few published research to support the idea that Al-Fatiha can help in rehabilitating CP patients. The study aimed to investigate the therapeutic effects of listening to Al-Fatiha on behaviors during physiotherapy and spasticity in CP patients.

MATERIAL AND METHODS

It was a first-phase clinical experiment hence; the sample size can be less than twenty[20]. Figure 1 illustrates the study protocol. Formal ethical approval for the study was granted by the Institutional Bioethics Committee of Karachi University (Ref IBC-2017) as well as the rehabilitation center where the research was carried out between February and April 2021. The officials at the rehabilitation center were briefed on the study design, study duration, and the criteria for inclusion and exclusion. The demographic data of all inducted participants were also recorded.

The rules of the Helsinki Declaration were taken into consideration.The inclusion criteria for this study required participants to have normal hearing and eyesight, the ability to follow the researcher's instructions, and the physical capability to grip a computer mouse with either their hands or feet. Participants were also screened to ensure they were not overly aggressive and did not have any medical conditions that could interfere with the intensity of the study's intervention. Individuals with photosensitive epilepsy were excluded from the study, as were those engaging in any other activities prohibited by the institute.

The intervention involved listening to the Al-Fatiha Chapter in the voice of Shaikh Mishary bin Rashid Alafasy. Al-Fatiha was played for 12 minutes over the loudspeaker, which was kept 6 feet away from every participant in the group. Before the administration of Al-Fatiha, all study participants in the Al-Fatiha group were requested to sit quietly and leave every activity for ten minutes so, they could relax. The audio was played in the presence of the class teachers/ attendants at the institute to keep them calm and comfortable throughout the session. Methodology is represented in scheamtic diagram in Figure 1. All sessions were conducted within the premises of the rehabilitation center.

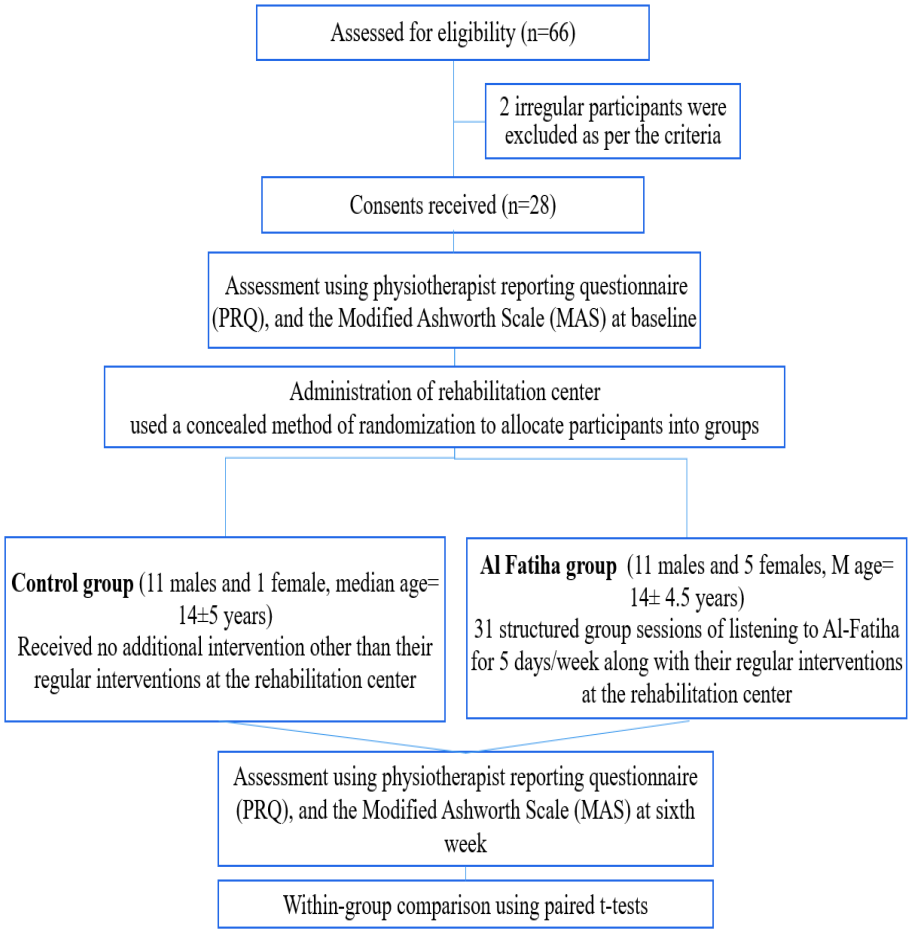

Figure 1. Schematic presentation of the protocol

For outcome measure, two scales were employed namely, 'Modified Ashworth Scale' (MAS) and 'Physiotherapist Reporting Questionnaire' (PRQ). The spasticity was measured using MAS which was originally designed by Bryan Ashworth and later modified by Bohannon and Smith[21]. It is a reliable tool for assessing poststroke spasticity[22]. The MAS scale assesses muscle tone, ranging from normal spastic tone at grade '0' to severe tone at grade '4'. Both left and right sides of the elbow, shoulder, and wrist in the upper extremity, whereas both left and abduction, adduction, ankle, hip, and knee in the lower extremity were examined for the study. If the pre-to-post MAS grading for a joint remained unchanged, it was categorized as 'Stable'; conversely, if the MAS grading for a joint decreased from a higher level to a lower level, it was categorized as 'alleviation of spasticity.'

The PRQ was a self-designed questionnaire that encompassed 10 variables and was structured using a seven-point Likert scale, where 'far below' corresponds to 1, 'moderately below' to 2, 'slightly below' to 3, 'met expectations' to 4, 'slightly above' to 5, 'moderately above' to 6, and 'far above' to 7. Physiotherapists at the rehabilitation center were already trained to efficiently rate the MAS scale and were requested to grade MAS and PRQ for all participants at baseline/pre-intervention and the 6th week. For physiotherapists, the study was classified as single-blind since they were not informed about the assigned groups of participants. All participants were assessed for both scales by the respective physiotherapists.

Statistical analysis

Statistical analysis, including the Wilcoxon signed rank test and descriptive statistics, was performed using SPSS version 28. Demographics data were measured in terms of frequency/percentages.

RESULTS

Demographic data showed that participants in both groups encompassed 4 GMFCS levels (GMFCS level

I, n=4; GMFCS level II, n=8; GMFCS level III, n=3; GMFCS level IV, n=11) but the Al-Fatiha group also presented GMFCS level V in 2 participants. In the Al-Fatiha group, hypotonic muscle tone (56.2%), diplegic presentation (56.2%), moderately severe (50%), wheelchair-bound (56.2%), and GMFCS level II (43.7%) were dominant characteristics. Whereas in the control group, spastic muscle tone (58.3%), diplegic (33.3%) and dystonia presentation (33.3%), mildly severe (66.6%), wheelchair-bound (41.6%), mobile (41.6%), and GMFCS level IV (50%) were dominant characteristics.Values were presented as mean ±std. and were compared using the Wilcoxon signed-rank test for both groups, with a significant difference indicated at $p<0.05$. The Wilcoxon signed-rank test revealed, in Table 1, that the post-test rank for calmness during physiotherapy was significantly higher than the pre-test rank in the Al-Fatiha group ($Z = -2.11$, $p<0.05$). In contrast, none of the post-test ranks in the control group exceeded the pre-test ranks.

Table 1. Wilcoxon signed-rank test for PRQ

Variables	Groups	Evaluation		Wilcoxon signed-rank	
		Pre	Post		
		Mean±SD	Mean±SD	z value	p-value
Calmness during physiotherapy	Control	4.08±1.97	3.91±2.02	-.37	0.70
	Al-Fatiha	3.25±1.48	3.81*±1.68	-2.11	0.03
Communication	Control	4.75±1.60	5.00±1.65	-1.08	0.27
	Al-Fatiha	3.81±1.64	4.12±1.74	-.914	0.36
Cooperation	Control	4.66±1.92	4.58±2.02	-1.00	0.31
	Al-Fatiha	4.00±1.63	4.31±1.81	-1.89	0.05
Fine motor abilities	Control	4.25±1.42	4.00±1.65	-1.34	0.18
	Al-Fatiha	2.87±0.95	2.93±0.99	-.577	0.56
Gross motor abilities	Control	4.33±1.96	4.41±1.97	-.447	0.65
	Al-Fatiha	3.12±1.31	3.12±1.20	.000	1
Involuntary movement	Control	3.00±1.95	3.25±1.91	-1.73	0.08
	Al-Fatiha	2.43±1.41	2.43±1.63	.000	1
Overall progress	Control	4.08±1.50	4.33±1.30	-1.34	0.18
	Al-Fatiha	3.81±1.60	4.18±1.83	-1.16	0.24
Reduction in spasticity	Control	2.58±1.62	2.75±1.81	-.447	0.65
	Al-Fatiha	3.12±1.85	3.87±1.85	-1.62	0.10
Weeping	Control	1.58±1.24	1.50±1.00	-.447	0.65
	Al-Fatiha	2.75±2.04	2.62±2.09	-.108	0.91
Willingness	Control	4.58±1.62	4.58±1.56	.000	1
	Al-Fatiha	4.75±1.52	5.06±2.08	-1.16	0.24

In the MAS scale assessment, an alleviation in spasticity was observed in 3 participants from the Al-Fatiha group and 4 participants from the control group. The observed spasticity alleviation noted in the control group was likely a result of the physiotherapy provided at the rehabilitation center. Table 2 presented the descriptive statistics of the MAS changes, while Table 3 presents the alleviation of spasticity among participants concerning both upper and lower extremities.

Table 2. Pre-to-post MAS changes in participants

Joint	Groups	Stable n (%)	Alleviation of spasticity n (%)
Rightside abduction	Control	9(75)	3(25)
	Al-Fatiha	13(81.2)	3(18.7)
Left side abduction	Control	9(75)	3(25)
	Al-Fatiha	13(81.2)	3(18.7)
Right side adduction	Control	10(83.3)	2(16.6)
	Al-Fatiha	14(87.5)	2(12.5)
Left side adduction	Control	9(75)	3(25)
	Al-Fatiha	14(87.5)	2(12.5)
Right ankle	Control	10(83.3)	2(16.6)
	Al-Fatiha	14(87.5)	2(12.5)
Left ankle	Control	10(83.3)	2(16.6)
	Al-Fatiha	15(93.7)	1(6.25)
Right elbow	Control	12(100)	0
	Al-Fatiha	15(93.7)	1(6.25)
Left elbow	Control	11(91.6)	1(8.33)
	Al-Fatiha	15(93.7)	1(6.25)
Right hip	Control	11(91.6)	1(8.33)
	Al-Fatiha	15(93.7)	1(6.25)
Left hip	Control	11(91.6)	1(8.33)
	Al-Fatiha	15(93.7)	1(6.25)
Right knee	Control	11(91.6)	1(8.33)
	Al-Fatiha	15(93.7)	1(6.25)
Left knee	Control	11(91.6)	1(8.33)
	Al-Fatiha	15(93.7)	1(6.25)
Right shoulder	Control	12(100)	0
	Al-Fatiha	15(93.7)	1(6.25)
Left shoulder	Control	12(100)	0
	Al-Fatiha	15(93.7)	1(6.25)
Right wrist	Control	12(100)	0
	Al-Fatiha	15(93.7)	1(6.25)
Left wrist	Control	12(100)	0
	Al-Fatiha	15(93.7)	1(6.25)

Table 3. Alleviation of spasticity in the upper and lower extremities

Groups	No. of participants	Extremity	Alleviation of spasticity
Control	4	Upper	1
		Lower	4
Al-Fatiha	3	Upper	1
		Lower	3

DISCUSSION

As discussed earlier, studies have asserted an undeniable therapeutic effect of listening to Quranic verses on blood parameters[2], cancer[3], cognitive functions[4,5], mental health[6,] and various physiological and physical variables[7]. The purpose behind the Al-Fatiha intervention was to help normalize behaviors and alleviate spasticity in the participants with CP participants based on the belief that the words of Allah have the power to heal all ailments.

Listening to Quranic verses can evoke a sense of calm in listeners, as evidenced by our findings from the PRQ. This tranquility, particularly from Al-Fatiha, may aid in the healing process for patients with CP. In our study, participants in the intervention group listened to Al-Fatiha; however, we believe that reciting the verses themselves could lead to even more positive results. In the light of the Quran, a better physical function can be linked to a healthy attachment to listening to the Quran. As stated, "And whosoever puts his trust in Allah, then He will suffice him" (Surah At-Talaq, verse 3), and "the ones who believe and whose hearts feel tranquil through remembering Allah surely hearts feel tranquil whenever Allah is mentioned" (Surah Ar-Ra'd, verse 28). Additionally, research suggests that spiritual well-being is positively correlated with improved physical health outcomes, likely due to reduced levels of stress and enhanced coping mechanisms[23].

Relaxation techniques, including listening to music, practicing yoga, and engaging in meditation, have been shown to enhance alpha wave activity in the brain, typically measured between 8 and 12 Hz[24]. Research indicates that listening to Quran recitation, particularly, generates brain waves of higher alpha magnitudes, promoting calmness, relaxation, and reducing anxiety[25,26]. Hence, based on studies it was anticipated that there must be an amplification of alpha waves in the brain while listening to Al-Fatiha which significantly induced calmness in the participants of the Al-Fatiha group as indicated in PRQ ($p<0.05$).

In the present study, the evaluation of the Modified Ashworth Scale (MAS) revealed a significant reduction in spasticity in both extremities of three participants who received the intervention. This finding aligns with existing literature suggesting that listening to the Holy Quran facilitates a rebalancing of brain activity, which in turn enhances the brain's capabilities, promotes relaxation, and improves overall functioning by alleviating neural tensions[27]. The cerebellum is crucial for regulating emotions and coordinating motor movements, as highlighted by studies indicating its role in motor control and emotional regulation[28]. The auditory cortex, responsible for processing pitch and complex rhythm patterns, may also be engaged during Quranic recitation, leading to further neural benefits[29]. Additionally, the motor cortex plays a vital role in sending signals throughout the body to activate skeletal muscles for movement[30]. Given these functions, it was anticipated that listening to Quranic recitation might stimulate the auditory cortex, cerebellum, and motor cortex, potentially contributing to improvements in physical outcomes for participants. This multidimensional engagement of brain regions could explain the observed alleviation of spasticity and points to the potential of Quranic recitation as a therapeutic intervention in rehabilitation settings.

The limited alleviation in spasticity can be attributed to the fact that physical dysfunction depends on the severity and pattern of brain lesions in individuals affected by CP. The extent of physical impairment also varies based on the timing, location, and severity of the brain injury. Since each case of CP is unique, the physical outcomes of the intervention are unlikely to be the same for all participants affected by CP[17], as demonstrated in the present study. It is predicted that the longer duration of the Al-Fatiha may be more effective for the alleviation of spasticity. There is no standardized method for rehabilitating CP-inflicted patients, as it often requires a combination of different methods including peripheral nerve blocks, intrathecal medications, castings, physiotherapy, training, surgical procedures, and many others[8]. Every CP case is different from others[17] so, provided interventions must be adaptable and evidence-based for everyone. Currently, physiotherapy has shifted from a traditional method to a goal-oriented method, but the multimodal treatment plan for CP patients seems more promising.

The present study had several limitations that warrant consideration. Firstly, it was conducted as a first-phase clinical trial at a single rehabilitation center. While this design facilitated the control of environmental variables, it also restricted the generalizability of the findings. The choice of a single facility was deliberate, aiming to maintain consistent environmental conditions for all participants, thereby minimizing external influences that could

affect the outcomes. Moreover, the duration of Al-Fatiha administration was relatively brief, and a larger sample size is necessary to validate our findings more robustly. Future research should consider an extended intervention period to assess the long-term effects of Al-Fatiha as a therapeutic modality. Based on the preliminary findings, Al-Fatiha is recommended as a promising, non-pharmacological, and cost-effective rehabilitation therapy for individuals with CP. However, further second and third-phase clinical trials are necessary to confirm its efficacy and safety before broad clinical adoption.

CONCLUSION

The findings of this study demonstrated a significant induction of calmness and a reduction in spasticity among participants in the Al-Fatiha group. It is hypothesized that several factors contributed to these improvements in both behavioral and physical outcomes, including the amplification of brain waves, the rebalancing of brain cells through the reduction of neural tension, and the stimulation of the auditory and motor cortex. Based on the preliminary findings, Al-Fatiha is suggested as a promising, non-pharmacological, and cost-effective rehabilitation therapy for individuals with CP, subject to validation through second and third-phase clinical trials.

DECLARATIONS

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Authors' Contribution: AR: Concept & design, acquisition, analysis, interpretation of data for the work, drafting of the manuscript, reviewing critically, final approval of the version to be published.

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