Musculoskeletal Disorders among Mothers of Children with Cerebral Palsy in Pediatric Rehabilitation Center in Khartoum – Sudan 2022

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Research Article

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Abstract

**Background:** Cerebral palsy (CP) is characterized by impaired motor development, cognitive, sensory and communicative deficits. The disorder develops when the immature brain responds for a variety of reasons. Long-term care and support is especially important, for the mother of a child with cerebral palsy, as well as the family as a whole.

**Objectives:** The aim of the study is to recognize Prevalence of musculoskeletal disorders among a mothers of a child with cerebral palsy.

**Material and Methods:**

A hospital-based descriptive cross-sectional study conducted in three centers in Khartoum, Sudan (Shaheen pediatric rehabilitation center, Youmna care center and Roya physiotherapy clinic in Khartoum, Sudan).

51 Sudanese patients 51mothers aged between 16 to 50 years, were involved in the study. Data analyzed using Statistical Package of Social Sciences (SPSS) version 19.

**Result:** The most common musculoskeletal disorders in mother who have cerebral palsy children is low back pain but researchers found the neck pain is the most common, neck pain 20% > low back pain 19%

**Conclusion:**

- The common age of mother for musculoskeletal disorders ranging between (27-33) years.
- The most Musculoskeletal disorders of mother is neck pain.
- Children with CP who depend on their mother full or partial have the same effect of musculoskeletal disorders.

**Background**

Cerebral palsy (CP) is characterized by impaired motor development, cognitive, sensory and communicative deficits. The disorder develops when the immature brain responds for a variety of reasons. Long-term care and support is especially important, for the mother of a child with cerebral palsy, as well as the family as a whole. Having a child with a disability is about some specific culture. Personal care, transportation, daily activities and treatment during which they may be exposed to physical trauma and heavy loads. Chronic physical loading can lead to musculoskeletal problems, and there are a limited number of studies in the literature evaluating musculoskeletal pain and associated factors observed in children. The musculoskeletal system of these mothers is an important component that is provided support and technique by these mothers. Important for the quality of care and rehabilitation support provided to healthy mothers. (1)
The mothers who have children with CP provide active support to their children in terms of personal care, transfer, daily life activities and treatment during which they may be exposed to physical trauma and heavy loads. It is known that chronic physical loading could produce problems in the musculoskeletal system. There are a limited number of studies in the literature evaluating musculoskeletal system pain and the related factors that are observed in the mothers of the children with cerebral palsy. Knowing the extent and the risk factors of the problems in the musculoskeletal system of these mothers is of importance to determine the support and the approach to be provided to this group. It is also important for the quality of the care and the rehabilitation support that is provided to the healthy children of these mothers. The aim of the current study to determine musculoskeletal system pain and the related factors observed in the mothers of children diagnosed with cerebral palsy. (1)

A large number of mothers who have children with cerebral palsy suffer from Musculoskeletal Disorders and low back pain as a result of carrying their children, therefore, our study determine the frequency of mothers.

Cerebral palsy (CP)

A persistent, non-progressive disorder resulting from brain insult or injury in the antenatal, perinatal, and postnatal period, is the major developmental disability affecting function in children. It is characterized by an inability to naturally control motor functions, and it has the ability to influence a child's general development by affecting a child's ability to explore, speak, learn and be independent. Effective management can improve the quality of life of the child and family. (2)

A drop in muscle size associated with cerebral palsy, but previous research describes a deficit only in a few muscles. It is unknown how much muscle volume is lost in the extremities. (3)

Cerebral palsy is caused by abnormal brain development or damage to the developing brain. This usually happens before a child is born, but it can occur at birth or in early infancy. In many cases, the cause isn't known. Many factors can lead to problems with brain development, Some include:

Gene mutations that result in genetic disorders or differences in brain development Maternal infections that affect the developing fetus Fetal stroke, a disruption of blood supply to the developing brain Bleeding into the brain in the womb or as a newborn,

Infant infections that cause inflammation in or around the brain Traumatic head injury to an infant, such as from a motor vehicle accident, fall or physical abuse Lack of oxygen to the brain related to difficult labor or delivery, although birth-related asphyxia is much less commonly a cause than historically thought,

Signs and symptoms of cerebral palsy can vary greatly from person to person. Cerebral palsy can affect the whole body, or it might be limited primarily to one or two limbs, or one side of the body.

Signs and symptoms include:
• Problems with movement and coordination
• Speech and eating problems
• Stiff muscles and exaggerated reflexes (spasticity), the most common movement disorder.
• Variations in muscle tone, such as being either too stiff or too floppy.
• Stiff muscles with normal reflexes (rigidity).
• Lack of balance and muscle coordination (ataxia).
• Tremors or jerky involuntary movements.
• Slow, writhing movements.
• Favoring one side of the body, such as only reaching with one hand or dragging a leg while crawling.
• Difficulty walking, such as walking on toes, a crouched gait, a scissors-like gait with knees crossing, a wide gait or an asymmetrical gait.
• Difficulty with fine motor skills, such as buttoning clothes or picking up utensils.
• Speech and eating.
• Delays in speech development.
• Difficulty speaking.
• Difficulty with sucking, chewing or eating.
• Excessive drooling or problems with swallowing.
• Development Delays in reaching motor skills milestones, such as sitting up or crawling.
• Learning difficulties.
• Intellectual disabilities.
• Delayed growth, resulting in smaller size than would be expected.
• Other problems.
• Damage to the brain can contribute to other neurological problems such as:
• Seizures (epilepsy).
• Difficulty hearing.
• Problems with vision and abnormal eye movements.
• Abnormal touch or pain sensations.
• Bladder and bowel problems, including constipation and urinary incontinence.
• Mental health conditions, such as emotional disorders and behavioral problems.

The brain disorder causing cerebral palsy doesn't change with time, so the symptoms usually don't worsen with age. However, as the child gets older, some symptoms might become more or less apparent, and muscle shortening and muscle rigidity can worsen if not treated aggressively.\(^4\)

The most common type of cerebral palsy is spastic cerebral palsy, which includes stiff muscle and exaggerated reflexes.

Other types of cerebral palsy include movement disorders involving poor balance and coordination (ataxic) and difficulty controlling voluntary muscles (dyskinetic).\(^5\)

Risk factors such as inbreeding, maternal distress, preterm birth, birth asphyxia, low birth weight, multiple pregnancy, neonatal spasticity, jaundice, postpartum CNS infection, and brain injury were recorded.\(^6\)

Musculoskeletal disorders of mother who have CP children:

Musculoskeletal disorders (MSDs)\(^7,8\), Neck pain\(^9,10\), Shoulder pain\(^11,12,13\) Elbow pain\(^14\), Wrist pain\(^15\), Low back pain\(^16\), Hip pain\(^17–20\), Knee pain\(^21–23\), Foot pain\(^24,25\)

**Objective:**

To determine the frequency of musculoskeletal disorders among mothers of children with cerebral palsy, evaluate if the mother’s career is affected by musculoskeletal disorders, assess types of musculoskeletal disorders are common in mothers of children with cerebral palsy, determine mother pain and the pain intensity, and to evaluate the level of independent of child on his mother.

**Materials And Methods**

**Study design and Study area:**

A hospital-based descriptive cross-sectional study conducted in three centers in Khartoum, Sudan (Shaheen pediatric rehabilitation center, Youmna care center and Roya physiotherapy clinic in Khartoum, Sudan).

**Study population**
51 Sudanese patients mothers aged between 16 to 50 years, were involved in the study.

**Inclusion criteria**

Mother with musculoskeletal disorders and suffer from pain after getting cerebral palsy child.

**Exclusion criteria**

Mother who has musculoskeletal disorders before getting cerebral palsy child.

**Ethical Considerations**

The university administration granted permission, verbal and written approval from the head department to conduct the current study will obtain. Verbal and written approval from the mothers.

**Data analysis**

Data analyzed using Statistical Package of Social Sciences (SPSS) version 19.

**Results**

25 (49%) from participants were aged less than 32 years old and 26 (51%) were aged above 32 years old. 96.1% from women in the study were married while others were divorced. Regarding body mass index, 62.4% from women in the study were has normal body mass index, 33.7% were overweight, while 3.9% were under weight.

Regarding number of children's, 11.8% from women in the study have the CP children only, 49% from women have less than 3 children one of them CP children and 39.2% has 3 children or more including CP children.

3 (5.9%) from mothers have more than one CP children. 14 (27.5%) from women in the study have job while others were not working, half of them (7 women) not carrying their CP children cause of problem in the musculoskeletal while others were not.

19 (37.3%) mothers didn't have any musculoskeletal problem before getting cerebral palsy child and 32 (62.7%) mothers had musculoskeletal problem before get cerebral palsy child.

Majority of mothers (64.7%) suffer from neck pain while 41.2% suffer from shoulder pain. (Table 1)
Table 1
Frequencies of pain type in women with CP children (n = 51).

<table>
<thead>
<tr>
<th>Type of pain</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck</td>
<td>33 (64.7)</td>
</tr>
<tr>
<td>Shoulder</td>
<td>21 (41.2)</td>
</tr>
<tr>
<td>Elbow</td>
<td>4 (7.8)</td>
</tr>
<tr>
<td>Wrist</td>
<td>10 (19.6)</td>
</tr>
<tr>
<td>Low back</td>
<td>32 (62.7)</td>
</tr>
<tr>
<td>Hip</td>
<td>1 (1.7)</td>
</tr>
<tr>
<td>Knee</td>
<td>2 (3.4)</td>
</tr>
<tr>
<td>Feet</td>
<td>1 (1.7)</td>
</tr>
</tbody>
</table>

No statistical significance between dependence of CP child on his mother and low back pain, while there is statistical significance between dependence of CP child on his mother and low back and neck pain, P-value (less than 0.005). 18 (35.3%) women have neck pain due to dependence of their children on them.

There is no relationship between shoulder pain and the dependency of child on his mother, despite 30 (58.8%) women have shoulder pain due dependence of their children on them.

There is no relationship between Elbow pain and the dependency of child on his mother despite there were 16 (31.4%) women have elbow pain due to child full dependency.

There is no relationship between Wrist pain and the dependency of child on his mother, despite 14 (27.5%) women have wrist pain due to child full dependency.

There is no relationship between hip pain and the dependency of child on his mother, despite 16 (31.4%) women have hip pain due to child full dependency.

There is no relationship between Knee pain and the dependency of child on his mother, despite 17 (33.3%) women have hip pain due to child full dependency.

There is no relationship between feet pain and the dependency of child on his mother, despite 18 (35.3%) women have feet pain due to child full dependency.

31 (60.8%) mothers were felled pain during daily activities, and 11 (21.6%) were felled pain during day, 6 (11.8%) during night and 3 (5.8%) were felled pain in morning.
The degree of the pain felled by mothers was severe for 5 (9.8%), moderate 27 (52.9%) and mild for 19 (37.3%). (Table 2)

<table>
<thead>
<tr>
<th>Degree of pain</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>19 (37.3%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>27 (52.9%)</td>
</tr>
<tr>
<td>Severe</td>
<td>5 (9.8%)</td>
</tr>
</tbody>
</table>

Only 3 (5.9%) mothers did visit physiotherapist, while other 48 (94.1%) didn't visit physiotherapist. (Table 3)

<table>
<thead>
<tr>
<th>Visit physiotherapist</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>3 (5.9)</td>
</tr>
<tr>
<td>No</td>
<td>48 (94.1)</td>
</tr>
</tbody>
</table>

Majority (80.4%) of CP child aged less than seven years old, while others aged more than seven years old. (Table 4)

<table>
<thead>
<tr>
<th>CP child age (years old)</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 7</td>
<td>41 (80.4)</td>
</tr>
<tr>
<td>More than 7</td>
<td>10 (19.6)</td>
</tr>
</tbody>
</table>

Majority (51%) from CP child were in normal weight, 41.2% were under weight, while 7.8% were overweight. (Table 5)

<table>
<thead>
<tr>
<th>CP child weight</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight</td>
<td>4 (7.8)</td>
</tr>
<tr>
<td>Normal</td>
<td>26 (51)</td>
</tr>
<tr>
<td>Under weight</td>
<td>21 (41.2)</td>
</tr>
</tbody>
</table>
There are 13 of mothers (25.5%) hemiplegic paralysis while 10 of mothers (19.7%) has quadriplegic. (Table 6)

<table>
<thead>
<tr>
<th>Paralysis type</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemiplegic</td>
<td>13 (25.5)</td>
</tr>
<tr>
<td>Hemi paresis</td>
<td>9 (17.6)</td>
</tr>
<tr>
<td>Quadriplegic</td>
<td>10 (19.7)</td>
</tr>
<tr>
<td>Quad paresis</td>
<td>9 (17.6)</td>
</tr>
<tr>
<td>Mono pelagic</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Para pelagic</td>
<td>8 (15.6)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>51 (100)</strong></td>
</tr>
</tbody>
</table>

There are 19 children (37.3%) who fully depend on their mother, 19 children who are partially dependent (37.3%), and there are 13 children (25.4%) who do not depend on their mother (Table 7)

<table>
<thead>
<tr>
<th>Level of dependence</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full dependence</td>
<td>19 (37.3)</td>
</tr>
<tr>
<td>Partial dependence</td>
<td>19 (37.3)</td>
</tr>
<tr>
<td>Not dependent</td>
<td>13 (25.4)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>51 (100)</strong></td>
</tr>
</tbody>
</table>

**Discussion**

The presented study showed that the incidence of musculoskeletal disorders common for mothers have children cerebral palsy in age group between (33–37) years old which is in line with study done by Glinac, A. (31) and study done by Ilknur Albayrak and et al which was performed on 101 mothers who had children with CP (43 girls and 58 boys) and 67 mothers who had a healthy child as the control group, the mean age was 34.93 ± 8.7 years for the mothers in the CP group and mean age was 34.28 ± 7.51 years for the mothers in the control group. (32) "No dissenting studies were mentioned due to the difference in the size of the sample and the location of the study.

Our study showed that incidence of neck pain was most common (20%) more than Low back pain (19%) on mother’s have children with cerebral palsy. This result opposite to study done by Khan, S. and et al
study, which founded that the frequency of the disorders are follow: low back pain was 80%, neck pain 56.3%, appropriate attention and precautionary measures should be taken to minimize these musculoskeletal disorders. \(^{(26)}\) This difference might be attributed to the variation in methods of diagnosis between countries.

In area of CP paralysis, our study showed that incidence of hemiplegic was the most common (25.5%) and less common was monoplegia and monoparesis (2%) on children with cerebral palsy. This result opposite to study done by Kavlak E, and et al, which were found that (44%) had tetraplegia, and one child (1%) had monoparesis.\(^{(32)}\) This difference between studies may be related to variation in geographical areas.

The presented study showed that incidence of 2 mothers their weight under normal weigh, and 32 (62.7%) mothers they have normal weight, and there were 11 (21.6%) mothers overweight, and 6 (11.8%) mothers their weight are obese, this indicate that there were no relationship between mother's weight and musculoskeletal disorders that affect a mother who has a child with cerebral palsy. In this area there were no previous studies in line with or opposite to our findings.

Regarding jobs, our study found that 14 (27.5%) of mothers have job, and 37 (72.5%) mothers did not have a job. This indicate that there was no relationship between mother's job and musculoskeletal disorders that affect a mother who has a child with cerebral palsy. There are no previous studies in line with or opposite to this study.

Regarding age of CP child, 32 (62.7%) mothers have child aged between (2 to 4), 9 (17.6%) mothers their child aged between (5 to 7), 8 (15.7%) mothers their child aged between (8 to 10), and 2 (3.9%) mothers their child aged between \(^{(11\text{ to }13)}\). There are no previous studies in line with or opposite to this study, cause most research studied cerebral palsy children only, they did not focus on the relationship of children age and mother's injury.

**Conclusion**

- The common age of mother for musculoskeletal disorders ranging between (27–33) years.
- The most Musculoskeletal disorders of mother is neck pain
- Children with CP who depend on their mother full or partial have the same effect of Musculoskeletal disorders

**Recommendation**

It was found that the child's dependence on his mother causes musculoskeletal disorders, so thought that the doctor who treating the child's condition should advise the mother about the method of carrying the child and the method of caring for it.

**Declarations**
Conflict of interest: The authors have no conflict of interest to report

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