

Relationship between Sleep Quality, Functional Ability and Lifestyle Habits of Children with Juvenile Idiopathic Arthritis

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Abstract

Background: Juvenile Idiopathic Arthritis (JIA) is one of the most prevalent pediatric rheumatic disorders causing severe impairments such as persistent pain, impaired physical function and subsequent sleep disturbance that may increase the risk of an overall sedentary lifestyle. **Aim of this study** was to identify the relationship between sleep quality, functional ability and lifestyle habits of children with juvenile idiopathic arthritis. **Design:** A descriptive correlational design was utilized. **Setting:** The study was took place at the outpatient clinic of the rheumatology and rehabilitation department at Zagazig University Hospitals. **Subjects:** Purposive sample of fifty-five children with JIA aged 6–16 years were included from the previous mentioned setting. **Tools:** Four tools were used to gather the required data. **Tool I:** Children bio socio demographic characteristics. **Tool II:** Sleep quality scale (SQS). **Tool III:** Functional ability questionnaire. **Tool IV:** Lifestyle questionnaire. **Results:** It was clarified that more than one third of children had poor sleep quality and two fifths of them had low functional ability, as well as more than two fifths of them had poor lifestyle habits. **Conclusion:** Juvenile idiopathic arthritis had a negative effect on sleep quality, functional ability and lifestyle habits of the studied children. Moreover, there was highly statistically significant positive correlation between children's sleep quality, functional ability and their lifestyle habits. **Recommendations:** Developing an educational program regarding lifestyle modifications is mandatory for children with JIA.

Keywords: Children, Functional ability, Juvenile idiopathic arthritis, Lifestyle habits & Sleep quality.

Introduction

Juvenile idiopathic arthritis is the most prevalent chronic musculoskeletal condition in children aged sixteen or younger and comprises a clinically heterogeneous group of chronic arthritis leading to long-term morbidity and physical disabilities (Washington, 2023). Juvenile idiopathic arthritis is a complex inflammatory health condition encompassing multiple genetic, environmental and immunological factors (Garner et al., 2021 & Sherry et al., 2022).

Approximately three million children and adolescents are diagnosed with JIA worldwide, with girls more likely than boys to develop the disorder (McHugh, 2020). Globally, the estimated prevalence of JIA is 1 in 1000 children, with a rate of occurrence per year 2–20 cases per 100,000 children (Sherry, 2022). In Egypt, the prevalence rate was 3.43 per 100,000 children (El-Refaey et al., 2022).

Juvenile idiopathic arthritis can be presented in different subtypes, such as oligoarthritis, psoriatic arthritis, enthesitis-related arthritis, undifferentiated arthritis, polyarthritis, rheumatoid factor (RF) positive or negative and systemic onset arthritis (Thatayatikom et al., 2023).

Symptoms of JIA vary depending on the type, but the most common manifestations of all types are persistent joint pain, swelling, stiffness, warmth and soreness of the joint with unanticipated alterations in symptoms from remission to flare-ups and discomfort. In severe cases, deformity and injury to the joints may result from these symptoms. The goals of therapy are to minimize pain, enhance function and guard against harm (Zelman, 2022).

Children with JIA experience severe negative effects on their social, psychological and physical development which results in functional deficits. These contribute to marked growth problems, eye inflammation, increased metabolic and mental complications and a dramatically reduced quality of life (Saidi et al., 2022).

Children with JIA have substantial daily lifestyle disruptions and struggle to engage in normal daily activities like playing, going to school and interacting with others. Physical impairment was found to have the most adverse impact on quality of life in JIA children (Onel et al., 2022 & Thatayatikom et al., 2023). According to Soulsby et al. (2023) up to 70% of children have functional disabilities and experience limitations in their adult lives.

Sleep disturbance is highly comorbid in children with JIA, which could have an impact on their mental, emotional and physical health (Zhai et al., 2021). Those children are more likely to experience sleep disorders than their healthy peers, which may also gradually get worse with time (Tsipoura et al., 2018). Poor sleep quality has been linked to behavioral and psychological comorbidities including hyperactivity, irritability, disorientation, reduced performance and attentiveness throughout the day, challenges with social and emotional functioning and school attendance.

Also, nearly half of children with JIA have fatigue and sleep disturbances. Sleep problems in children with JIA involve sleep delay, waking up after bedtime, fragmented sleep, parasomnias, anxiety, daytime sleepiness and feeling tired easily (Tarakci et al., 2019). According to Saidi et al. (2023) functional disability and daytime sleepiness worsened in the days that followed nights of less restful sleep when pain, sleep duration, and sleep quality were predictors of fatigue severity. Therefore, lifestyle modifications at all stages of disease have an important role in controlling symptoms in all children with JIA.

The major role of the pediatric nurse is directed toward implementing methods to relieve pain and manage symptoms, controlling inflammation, helping with position and mobility, promoting good health, as well as educating the child and family about the disease and assisting them develop strategies to cope effectively with the psychological and social problems related to it (Iversen et al., 2022 & Kyle T, 2022).

Significance of the study:

Juvenile idiopathic arthritis is a significant contributor to both short- and long-term disabilities affecting daily life, intellectual well-being and academic achievement of the child. Juvenile idiopathic arthritis is characterized by poor sleep quality, lethargy throughout the day, acute and chronic pain, joint stiffness and restricted movement in children. Also, children with JIA may endure elevated stress during the course of their disease. A child's capacity to carry out regular daily activities is significantly impacted by chronic pain and physical disability, which are associated with more sleep disturbance and exhaustion (Di Ludovico et al., 2023 & Makhlof et al., 2023). Therefore, it is crucial to assess sleep quality, functional ability and lifestyle habits of children with JIA for optimum disease control.

Aim

To identify the relationship between sleep quality, functional ability and lifestyle habits of children with juvenile idiopathic arthritis.

Research questions

1. What are the sleep quality and functional ability of children with JIA?
2. How does JIA affect lifestyle habits of studied children?
3. What is the relationship between sleep quality, functional ability and lifestyle habits among children with JIA?

Subjects and Method

Technical design:

The study's technical design composed a description of the research design, study setting, participants and data collection instruments.

Research design:

A descriptive correlational design is an appropriate method to examine the relationship between two or more variables; was utilized in carrying out the present study.

Setting:

The study was conducted at the outpatient clinic in the rheumatology and rehabilitation department at Zagazig University Hospitals. It contains a waiting hall, a bathroom and ten nursing and medical rooms. It presents on the first floor of the outpatient clinics. It offers services every day from Saturday to Thursday. The children accompanied with their parents, attended the outpatient clinic once a month for a checkup and medication.

Subjects:

A purposive sample of 55 children with JIA aged between 6 and 16 years old, who attending the previous settings and diagnosed with the disease based on the International League of Associations for Rheumatology (ILAR) Classification of Juvenile Idiopathic Arthritis were selected in this study between March 2023 and August 2023.

Exclusion criteria:

- Children under 6 years with disease duration less than 1 year.
- Children suffering from other chronic diseases that may influence their function.

Sample size:

The sample size was calculated based on a study carried out by Tarakci et al. (2019) found that 75% of JIA patients had moderate to high fatigue severity and 40% had poor sleep quality. Therefore, with a 90% confidence level and a 10% margin of error, the required sample size is 55 children with JIA.

Tools for data collection:

Tool (I): Children bio socio demographic characteristics

It included the following two parts:

Part A: Characteristics of the studied children including their age and sex.

Part B: Clinical characteristics of the studied children such as (disease duration, signs & symptoms, number of active joints affected, JIA subtypes, required laboratory tests, disease relapse and body mass index (BMI)).

Tool II: Sleep Quality Scale (SQS)

It is a broad, efficient measure suitable to evaluate sleep quality among children with JIA during the last one month **Shahid et al. (2012)**. It consisted of 28 questions asking about six domains of sleep quality including (problems initiating and maintaining sleep, restoration after sleep, daytime symptoms, difficulty waking, and sleep satisfaction). This scale was adjusted so that it complies with the requirements and the aim of the present study, **question (5)** "I wake up easily because of noise?" was modified to "I wake up easily because of pain?".

Scoring System

This scale uses a four-point, Likert-type scale, children or parents indicated how frequently they exhibit certain sleep behaviors, zero = "rarely" means that sleep behaviors occurs (none /1-3 times/month)", 1 = "sometimes" means (1-2times/week), 2 = "often" means (3-5times/week) and 3 = "almost always" means (6-7 times/week). The overall score ranges from 0 to 84, with higher scores indicating more acute sleep problems. Sleep quality was considered to be **good** if the percent score was less than 50%, **moderate** 50-70% and **poor** if more than 70%.

Tool III: Functional ability Questionnaire:

It was created by researchers and guided by [**Eldadamony et al. (2018)**; **Ahmed & Amen, (2021)**]. It included 16 questions to assess physical function in eight areas, as follows: dressing/grooming (Q1), arising (Q2-3), eating (Q4), walking (Q5-6), hygiene (Q7-11), reaching (Q12), grip (Q13), and activities (Q14-16). Parents are asked to note the level of difficulty their child may be experiencing for each of these categories. Parents are asked to report solely the difficulties related to arthritis.

Scoring system

The items in each category were scored (0)= without any difficulty, (1) = some difficulty, (2) = much difficulty and (3) = unable to do. The total scores can range from 0 to 48. The higher score indicates great disability. They were categorized into **high** (less than 50%), **moderate** (50-70%) and **low** (more than 70%).

Tool IV: Lifestyle Questionnaire

It was designed by the researchers with guidance from [**Paediatric Rheumatology European Society, (2016)**; **Woods, (2016)**; **Shoop-Worrall et al. (2021)**; **Onel et al., (2022)** & **Washington, (2023)**]. It was applied to determine lifestyle habits among children with JIA. It was divided into three categories: diet habits (Q1-11), exercise habits (Q12-16) and compliance to treatment regimen (Q17-21).

Scoring system

The items in each category were scored as 0, 1, and 2 for the responses never, sometimes and always, respectively. To determine the mean score for each section, the item scores were added together and the total score was divided by the number of items. These scores were converted into percent scores. The total scores range from 0 to 42. The life style was considered **good** if the percent score was less than 70%, **moderate** (50-70%) or **poor** (more than 70%) based on statistical analysis.

Operational design

Validity and reliability

Five professors (two in pediatric nursing, one in pediatric medicine, one in rheumatology & rehabilitation, and one in medical statistics) reviewed children bio socio demographic characteristics, sleep quality scale, functional ability questionnaire and lifestyle questionnaire. All jury members (100%) agreed that the existing research tools and their validity were relevant to the study goal. The Cronbach's alpha test was used to judge the tools' reliability. The reliability coefficient was good for both sleep quality scale (0.801) and functional ability questionnaire (0.834), excellent for lifestyle questionnaire (0.913).

Ethical consideration

After being informed of the study's purpose, respondents gave their consent to participate. They were guaranteed that the information would be kept private and used solely for research and the study was given approval by the nursing faculty research ethics committee at Zagazig University. They were also given the option to decline participation and informed that they could withdraw at any time during the study.

Pilot study

Five children (10%) with JIA participated in a pilot study to test the tools' applicability and clarity and gauge how long it would take to complete the data. This pilot investigation indicates that the necessary adjustments were implemented. Those children who were participated in the pilot study were excluded from the study.

Field work

Following the identification of the subjects who met the study's criteria, the researchers gave a brief explanation of the study purpose and procedures and obtained written consent from parents. The meeting location and schedule were also established by the researchers between 9:00 a.m. and 2:00 p.m. on the morning shift. The researchers attended the study settings three days a week (Sunday, Tuesday and Thursday) at the outpatient clinic of the rheumatology and rehabilitation department at Zagazig University Hospitals. Children with their parents were invited for personal interviews and phone calls were scheduled

for children who missed their appointments during the period between March and August 2023.

Administrative Design.

Formal permission was obtained from the directors of the chosen setting to conduct this study.

Statistical Analysis

The collected data was coded and entered into IBM SPSS Statistics for Windows, version 24 (IBM Corp., Armonk, NY, USA). The data was then reviewed to detect any entry errors. It was then analyzed by the same program to create frequency tables with percentages. Qualitative data was

presented as a number and a percent, and quantitative data was described as mean or standard deviation. A t-test is an inferential statistic used to determine if there is a significant difference between the means of two groups and how they are related. Analysis of Variance (ANOVA) is a statistical formula used to compare variances across the means (or average) of different groups. The correlation coefficient is a statistical measure of the strength of a linear relationship between two variables. **The results were considered statistically significant at $P \leq 0.05$ and high significant if $p < 0.01^{**}$.**

Results:

Table (1): Demographic and Clinical characteristics of Children with JIA (n=55).

Demographic & Clinical Characteristics	N= 55	%
Age (years):		
▪ 6 – <11	24	43.6
▪ 11 – 16	31	56.4
Mean \pm SD 11.31 \pm 3.9		
Sex:		
▪ Male	18	32.7
▪ Female	37	67.3
Disease duration:		
▪ <5 years	25	45.5
▪ \geq 5 years	30	54.5
Clinical manifestation*:		
▪ Joint pain	27	49.1
▪ Joint stiffness	21	38.2
▪ Limited movement	20	36.4
▪ Swelling joint	17	30.9
Number of active joints:		
▪ <5 joints	37	67.3
▪ \geq 5 joints	18	32.7
Juvenile idiopathic arthritis subtypes:		
▪ Systemic arthritis	5	9.1
▪ Polyarticular RF-	11	20
▪ Polyarticular RF+	7	12.7
▪ Oligoarthritic	32	58.2
Lab investigations*:		
▪ Rheumatoid factor (RF)	39	70.9
▪ Antinuclear antibodies (ANA)	28	50.9
▪ HLA-B27	29	52.7
▪ Erythrocyte sedimentation rate (ESR)	13	23.6
▪ C-reactive protein (CRP)	17	30.9
Disease relapse:		
▪ Two weeks	40	72.7
▪ One month	13	23.6
▪ Two months	2	3.6
Body Mass Index (BMI) (kg/m²):		
▪ Normal	38	69.1
▪ Underweight	13	23.6
▪ Overweight	4	7.3

*Select more than one answer



Figure (1): Total Sleep Quality Scores among Children with JIA (n=55)

Table (2): Functional Ability Domains among Children with JIA (n=55)

Items	N	%	Mean ± SD
Dressing/grooming			
▪ High	12	21.8	1.40 ± 0.13
▪ Moderate	18	32.7	
▪ Low	25	45.5	
Arising			
▪ High	13	23.6	1.93 ± 0.28
▪ Moderate	21	38.2	
▪ Low	21	38.2	
Eating			
▪ High	14	25.4	1.97 ± 0.35
▪ Moderate	20	36.4	
▪ Low	21	38.2	
Walking			
▪ High	12	21.8	2.51 ± 0.39
▪ Moderate	19	34.6	
▪ Low	24	43.6	
Hygiene			
▪ High	11	20	6.7 ± 1.3
▪ Moderate	18	32.7	
▪ Low	26	47.3	
Reach			
▪ High	11	20	1.87 ± 0.29
▪ Moderate	17	30.9	
▪ Low	27	49.1	
Grip			
▪ High	13	23.6	1.79 ± 0.20
▪ Moderate	20	36.4	
▪ Low	22	40	
Activities			
▪ High	9	16.4	7.3 ± 2.1
▪ Moderate	18	32.7	
▪ Low	28	50.9	

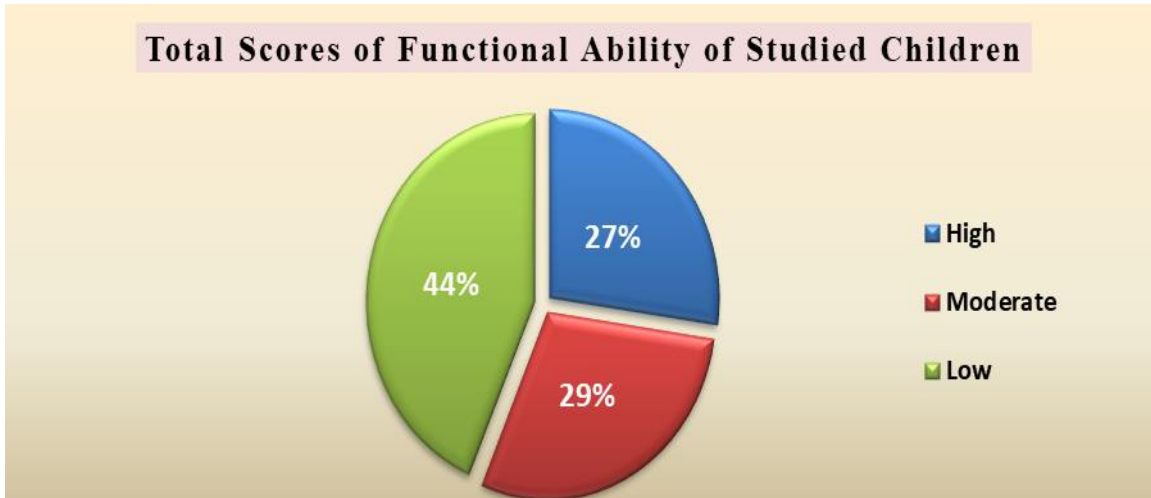


Figure (2): Total Scores of Functional Ability of Children with JIA (n=55).

Table (3): Lifestyle Habits among Children with JIA (n=55).

Items	N	%	Mean ± SD
Diet habits			
▪ Good	13	23.6	14.7±2.3
▪ Moderate	20	36.4	
▪ Poor	22	40	
Exercise habits			
▪ Good	9	16.4	5.9 ±1.4
▪ Moderate	21	38.2	
▪ Poor	25	45.4	
Compliance to treatment regimen			
▪ Good	10	18.2	6.3 ±1.8
▪ Moderate	25	45.4	
▪ Poor	20	36.4	

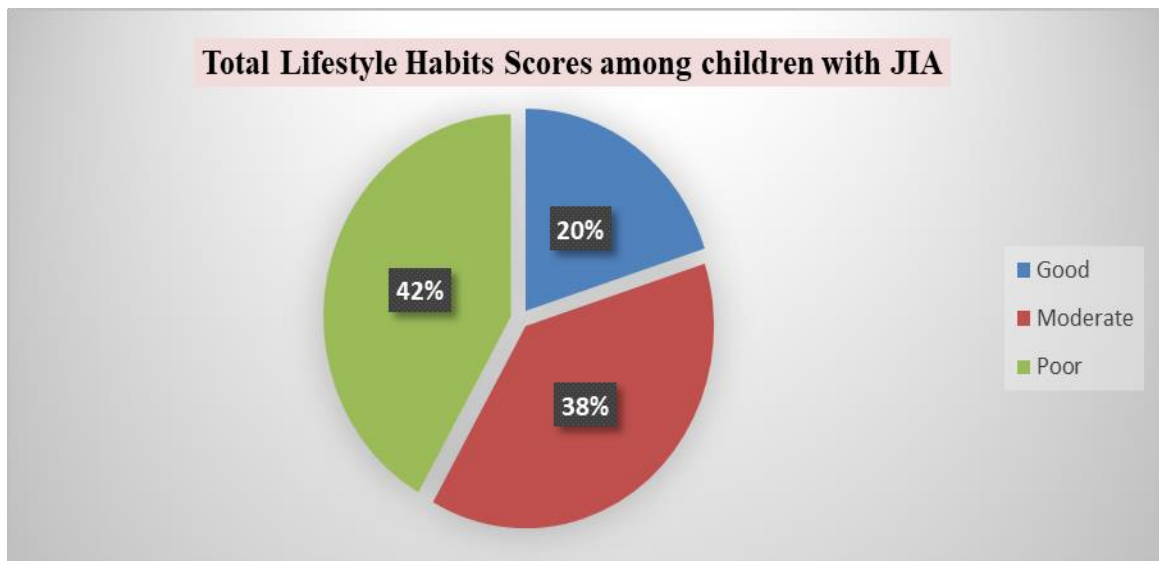


Figure (3): Total Lifestyle Habits Scores among Children with JIA (n=55).

Table (4): Correlation between Sleep Quality, Lifestyle Habits and Functional Ability of Children with JIA.

Variables		Sleep quality	Lifestyle habits	Functional ability
Sleep quality	r			
	p			
Lifestyle habits	r	0.599		
	p	<0.01**		
Functional ability	r	0.603	0.644	
	p	<0.01**	<0.01**	

** Highly statistically significant differences

Table (5): Relation between Demographic & Clinical Characteristics of Children and their Sleep Quality.

Demographic & Clinical Characteristics	Sleep Quality	
	Mean ±SD	Test p. value
Age:		t test
▪ 6 – <11	54.1 ± 6.8	0.988
▪ 11 – 16	55.6 ± 7.0	>0.05
Sex:		t test
▪ Male	53.2 ± 7.4	1.003
▪ Female	55.6 ± 6.9	>0.05
Disease duration:		t test
▪ <5 years	53.9 ± 6.0	1.029
▪ ≥5 years	55.1 ± 8.3	>0.05
Number of active joints:		t test
▪ <5 joints	51.2 ± 6.1	6.102
▪ ≥5 joints	62.3 ± 7.6	<0.01**
Juvenile idiopathic arthritis subtype:		ANOVA test
▪ Systemic arthritis	53.7 ± 6.0	1.024
▪ Polyarticular RF-	54.2 ± 8.3	>0.05
▪ Polyarticular RF+	53.8 ± 6.3	
▪ Oligoarthritic	54.1 ± 7.4	
Disease relapse:		ANOVA test
▪ Two weeks	67.3 ± 7.2	6.123
▪ One month	56.7 ± 8.3	<0.01**
▪ Two months	48.1 ± 8.1	
Body Mass Index (BMI):		ANOVA test
▪ Normal	52.9 ± 6.8	3.577
▪ Underweight	57.3 ± 6.2	<0.05*
▪ Overweight	60.5 ± 7.0	

** Highly statistically significant differences

Table (6): Relation between Demographic & Clinical Characteristics of Children and their Functional Ability.

Demographic & Clinical Characteristics	Functional Ability	
	Mean ±SD	Test p. value
Age:		t test
▪ 6 – <11	26.3 ± 3.0	3.011
▪ 11 – 16	22.7 ± 2.7	<0.05*
Sex:		t test
▪ Male	25.1 ± 3.9	0.761
▪ Female	25.9 ± 4.1	>0.05
Disease duration:		t test
▪ <5 years	24.1 ± 4.1	3.660
▪ ≥5 years	29.6 ± 3.7	<0.05*
Number of active joints:		t test
▪ <5 joints	22.9 ± 2.4	6.500

Demographic & Clinical Characteristics	Functional Ability	
	Mean ±SD	Test p. value
▪ ≥5 joints	29.3 ±3.1	<0.01**
Juvenile idiopathic arthritis subtype:		
▪ Systemic arthritis	25.1 ±2.7	ANOVA test 1.345 >0.05
▪ Polyarticular RF-	25.6 ±3.1	
▪ Polyarticular RF+	24.9±3.6	
▪ Oligoarthritic	25.6 ±2.7	
Disease relapse:		
▪ Two weeks	29.4 ±2.7	ANOVA test 7.003 <0.01**
▪ One month	23.7 ±3.1	
▪ Two months	21.4 ±3.6	
Body Mass Index (BMI):		
▪ Normal	23.1 ±4.0	ANOVA test 4.998 <0.01**
▪ Underweight	26.9 ±3.1	
▪ Overweight	28.3 ±3.9	

** Highly statistically significant differences

Table (7): Relation between Demographic & Clinical Characteristics of Children and their Lifestyle Habits.

Demographic & Clinical Characteristics	Lifestyle Habits	
	Mean ±SD	Test p. value
Age:		
▪ 6 – <11	28.1 ±2.9	t test 2.786 <0.05*
▪ 11 – 16	26.3 ±2.1	
Sex:		
▪ Male	27.5 ±2.8	t test 0.568 >0.05
▪ Female	26.8 ±3.1	
Disease duration:		
▪ <5 years	24.4 ±2.9	t test 4.201 <0.01**
▪ ≥5 years	31.3 3.7	
Number of active joints:		
▪ <5 joints	23.8 ±3.1	t test 6.700 <0.01**
▪ ≥5 joints	30.8 ±3.8	
Juvenile idiopathic arthritis subtype:		
▪ Systemic arthritis	26.4 ±2.9	ANOVA test 1.100 >0.05
▪ Polyarticular RF-	25.9 ±3.0	
▪ Polyarticular RF+	25.7±3.5	
▪ Oligoarthritic	26.1 ±2.9	
Disease relapse:		
▪ Two weeks	30.1 ±2.8	ANOVA test 6.800 <0.01**
▪ One month	24.6 ±2.9	
▪ Two months	22.3 ±3.4	
Body Mass Index (BMI):		
▪ Normal	24.1 ±3.5	ANOVA test 3.156 <0.05*
▪ Underweight	27.0 ±4.6	
▪ Overweight	28.7 ±4.1	

** Highly statistically significant differences

Table (1): Shows that 56.4% of children were in the age from 11 to 16 years old, with a mean age of 11.31 ± 3.9 years and 67.3% of them are females. It was found that 54.5% of children were suffering from the disease for 5 years and more. The same table portrays that 49.1% of children complained from joint pain and 67.3% of them had less than five active joints affected, as well as 58.2% of them had an

oligoarthritic JIA subtype. Moreover, 70.9% & 72.7% of children obtained rheumatoid factor (RF) as a lab investigation and had disease relapses for two weeks, respectively. As regards BMI, 69.1% of studied children were normal.

Figure (1): Represents that 38%, 35% of children had poor and moderate sleep quality, respectively and 27% had good sleep quality.

Table (2): Indicates that 45.5%, 38.2%, 38.2% of studied children had low scores regarding dressing/grooming, arising and eating areas of functional ability, respectively. As well as 43.6%, 47.3% of them had low walking and hygiene scores, respectively. Additionally 49.1%, 40%, 50.9% of them had low scores about reach, grip and activities areas of functional ability, respectively.

Figure (2): Clarifies that 44% of children had low functional ability, while 29% & 27% had moderate and high functional ability, respectively.

Table (3): Indicates lifestyle habits scores among children with JIA. It was found that 40% of studied children had poor diet habits and 45.4% of them had poor exercise habits. Additionally, 36.4% of them had poor compliance to treatment regimen.

Figure (3): Portrays that 42% of the studied children had poor lifestyle habits, 38% of them had moderate lifestyle habits, while 20% of them had good lifestyle habits.

Table (4): Declares that there was a highly positive correlation with statistical significance between children's sleep quality, functional ability and their lifestyle habits ($p < 0.01$).

Table (5): Reveals that there was a highly statistically significant relation between children's mean scores of sleep quality and their number of active joints and disease relapse ($p \leq 0.01$). In addition, there was a statistically significant relationship with their BMI ($p \leq 0.05$), while there was no statistically significant relationship with their age, sex, disease duration and JIA subtype ($p > 0.05$).

Table (6): Demonstrates that there was a highly statistically significant relationship between children's mean scores of functional ability, their number of active joints, disease relapse and BMI ($p \leq 0.01$). As well, there was a statistically significant relationship with their age and disease duration ($p \leq 0.05$), but there was no statistically significant relationship with their sex & JIA subtype ($p > 0.05$).

Table (7): Illustrates a highly statistically significant relationship between children's mean scores of lifestyle and their disease duration, number of active joints and disease relapse ($p \leq 0.01$). Additionally, there was a statistically significant relationship with their age and BMI ($p \leq 0.05$), while there was no statistically significant relationship with their sex & JIA subtype ($p > 0.05$).

Discussion

Juvenile idiopathic arthritis is a prevalent systemic autoimmune disease distinguished by the presence of destructive polyarthritis which may cause functional impairment, pain and fatigue that lead to unhealthy lifestyle and morbidity in adulthood (Fazaa et al., 2021). The present study was conducted on 55

children with JIA aged 6 to 16 years, to identify the relationship between sleep quality, functional ability and lifestyle habits of children with juvenile idiopathic arthritis. This study was in accordance with Tarakci et al. (2019) who carried out their study to assess the relationship between functional ability, sleep quality in children and adolescents with JIA and mentioned that sleep disturbances are problems in children with JIA and are associated with impairments in daily activities. Similarly, Heale et al. (2021) reported that JIA children had lower lifestyle that affect negatively on their functional ability.

Regarding demographic data of the studied children, more than half of them were aged between 11 and 16 years with mean age \pm SD was 11.31 ± 3.9 years and more than two thirds of them are females. This may be explained by the fact that onset of the disease beginning at any age but has its peak between 10-16 years with higher prevalence rates in girls (Al-Mayouf et al., 2021). This finding agrees with Adriano et al. (2017), who showed that the mean age of participants was 11.12 years and more than two thirds of them are females. On the other hand, this result contrasts with Fazaa et al. (2021), who reported that two thirds of JIA are boys with mean age \pm SD was 8.5 ± 4.12 years.

According to the present study more than half of children had oligoarthritic and nearly one quarter of them was underweight. Such result matches with Neto et al. (2021), who indicated that the most common disease category was oligoarticular JIA and the minority of them was underweight. On the other hand, this finding contradicts with Mostafa et al. (2019), who reported that the most common observed type is polyarticular rheumatoid factor positive. This could be explained by variations in genetic and environmental factors as well as potential exposure to various infections (Garner et al., 2021).

As regards to the period of disease relapse, the study portrays that less than three quarters of children had disease relapse for two weeks. This might be due to more than one third of studied children were not compliant to treatment regimen. This result corresponds with Eldadamony et al. (2018), who clarified that more than two thirds of patients had relapses for two weeks. Conversely, such result disagrees with Azevedo et al. (2022), who found that one third of patients had relapse on average 10 months.

It is clear from the current study that almost half of children suffered from joint pain and more than one third of them had joint stiffness. This may be related to the disease itself that pain and stiffness are the chief complaints among JIA. This finding goes in line with (Brandelli et al., 2023 & Pedersen et al., 2023)

who found that pain was the most frequently reported experiences among children with JIA

Tarakci et al. (2019) stated that sleep quality was poor in two fifths of children, as well as the relation between sleep quality and the clinical features as age, sex, disease duration and type were not statistically significant. This result agrees with the present study that revealed more than one third of children had poor sleep quality and there was no statistically significant relation between children' mean scores of sleep quality and their age, sex, disease duration and JIA subtype ($P > 0.05$).

As regard, the answer of research questions about lifestyle habits among JIA children, the findings of the present study revealed that two fifths of children had poor total life style habits. This might be due to two fifths of studied children had poor diet and exercise habits and more than one third of them had poor compliance to treatment regimen. This finding is in agreement with **Zare et al. (2023)**, who found that high prevalence of unhealthy lifestyle habits among rheumatoid arthritis patients.

Heale et al. (2021) found no significant relationship between lifestyle score and sex. Such result is consistent with the current study that revealed there was no statistically significant relation between children' mean scores of life style habits and their sex ($p \leq 0.05$). This finding indicating that JIA affect lifestyle habits of both sexes (females and males).

A highly statistically significant relation was found between children' mean scores of lifestyle and clinical characteristics such as disease duration, number of active joints and disease relapse ($p \leq 0.01$). This might be related to longer disease duration, increased number of affected joints and disease relapse were associated with poor lifestyle habits. Such finding contrasts with **Calik et al. (2020)**, who indicated that there was no statistical difference between lifestyle and history of disease.

The results of the current study clarified that almost half of studied children complained from difficulties in activities, hygiene and grooming. This may be attributed to almost half of them suffer from joint pain and more than one third of them had stiffness that interferes them to execute the activities of daily living. This finding is the same way with **Albokhari & Muzaffer (2019)** who demonstrated that one third of them had difficulties in activities and minority of them had grooming & hygiene difficulties.

In the present study, it was seen that more than two fifths of studied children had low functional ability. This may be attributed to nearly half of them had poor exercise habits and studied children suffering from pain and had stiffness of their joints that hinder functional ability. This result is consistent with

Abdelaleem et al. (2021), who discovered that one fifth of cases had severe disability.

Highly statistically significant relation was found between children' mean scores of functional ability and number of active joints ($p \leq 0.01$). As well, there was statistically significant relation with disease duration ($p \leq 0.05$). This may be due to more joints affected and longer disease duration was linked to greater functional impairment. Such result matches with **Abdelaleem et al. (2021)**, who revealed a significant correlation between functional ability and the number of active joints. On the other hand, this contradicts with **Sontichai & Vilaiyuk (2018)** who demonstrated that there was no relation between disease duration and physical ability.

As observed from the current study, no statistically significant relation among children' mean scores of functional ability and JIA subtype ($p > 0.05$). This conflicts with **Abdelaleem et al. (2021)**, who discovered that the subtype of JIA were a determinant of functional impairment. Also, the present study revealed that there was highly statistically significant positive correlation between studied children' functional ability and their sleep quality ($p < 0.01$). This could be due to functional deficits were increased by poor sleep quality. This finding agrees with (**Hrelc et al., 2023 & Rochette et al., 2023**) who explained that sleep disorders are common in children with JIA and had a big impact on their functional ability.

Moreover, the finding of the current study showed that there was a positive correlation with statistical significance between children's sleep quality, functional ability and their lifestyle habits ($p < 0.01$). This might be explained with poor sleep quality and low functional ability among studied children associated with poor lifestyle habits. This agrees with **Hrelc et al. (2023)** who clarified that there was statistical significant association between sleep abnormalities, overall health and functional status ($p < 0.05$). Conversely, such result disagrees with **Heale et al. (2021)** who found a negative correlation between lifestyle and functional ability.

Conclusion:

Juvenile idiopathic arthritis had a negative effect on sleep quality, functional ability and life style habits of the studied children. Moreover, there was highly statistically significant positive correlation between children's sleep quality, functional ability and their lifestyle habits.

Recommendation:

1. Developing educational programs on lifestyle modifications is mandatory for children with JIA.

2. Dissemination of educational programs for mothers or family caring for children suffering from JIA regarding healthy lifestyle habits.
3. Developing strategies for improving the sleep quality and functional ability in children with JIA.
4. Providing pediatric nurses with educational booklets and videos regarding all aspects of care of children with JIA to improve their lifestyle habits.
5. Further studies should focus on all factors that may affect functional ability and sleep quality comprehensively and investigate the effects of these factors on the treatment of children with JIA.
6. Also, further studies should be conducted to apply and demonstrate the research on a larger population for generalization of the results.

References:

- **Abdelaleem E, Ezzat D & Mostafa G (2021):** Functional Disability and Health-Related Quality of Life in Juvenile Idiopathic Arthritis Children from Beni-Suef. *Egypt Rheumatol Rehabil*; 48 (12). <https://doi.org/10.1186/s43166-021-00060-7>
- **Adriano L, Fonteles M, Azevedo M, Beserraa P & Romero N (2017):** Medication Adherence in Patients with Juvenile Idiopathic Arthritis. *Rev Bras Reumatol Engl Ed*; 57(1):23–29.
- **Ahmed K & Amen MR (2021):** Activities of Daily Living and Quality of Life in Patients with Rheumatoid Arthritis. *Journal of Cardiovascular Disease Research*; 12(3): 2643- 2658.
- **Albokhari S & Muzaffer M (2019):** Health-Related Quality of Life of Children and Adolescents with Juvenile Idiopathic Arthritis in Western Saudi Arabia. *Journal of Rheumatology and Autoimmune Diseases*; 9(2): 69-83. Doi: 10.4236/ojra.2019.92007.
- **Al-Mayouf S, Al-Mutairi M, Bouayed K, Habjoka S, & Hadeif D, (2021):** Epidemiology and Demographic of Juvenile Idiopathic Arthritis in Africa and Middle East. *Pediatric Rheumatology*; 19(166). <http://doi.org/10.1186/s12969-021-00650-x>.
- **Azevedo S, Tavares-Costa J, Melo A T, Freitas R, & Cabral M, (2022):** Predictive Factors of Relapse after Methotrexate Discontinuation in Juvenile Idiopathic Arthritis Patients with Inactive Disease. *ARP Rheumatology*; 1(1):12-20.
- **Brandelli Y, Chambers C, Mackinnon S, Parker J & Huber A, (2023):** A Systematic Review of Psychosocial Factors of Children with JIA. *Pediatric Rheumatology*; 21(57): 1-35.
- **Calik B, Korkmaz C, Tekin Z, Yener G, & Yuksel S, (2020):** The Efficacy of Clinical Pilates Exercises in Children and Adolescents with Juvenile Idiopathic Arthritis: A pilot study. *Rev Colomb Reumatol*; 27(4):269–277. [doi:10.1016/j.rcreu.2020.06.015](https://doi.org/10.1016/j.rcreu.2020.06.015).
- **Di Ludovico A, La Bella S, Di Donato G. Felt J, & Chiarelli F, (2023):** The Benefits of Physical Therapy in Juvenile Idiopathic Arthritis. *Rheumatol Int*; 43 (9):1563–1572. <https://doi.org/10.1007/s00296-023-05380-9>.
- **Eldadamony N, Taha N & Mohamoud S (2018):** Nutritional Status and Life style among Rheumatoid Arthritis Patients at Zagazig University Hospitals. *Zagazig Nursing Journal*, 14(2): 80-96. DOI 10.21608/znj.2018.
- **El-Refaey A, Sobh N, Shahin D, & Darwish A (2022):** The Epidemiological Profile of Juvenile Idiopathic Arthritis: Single Center Study in Delta Region of Egypt. *Research Square*. DOI: 10.21203/rs.3.rs-2263598/v1.
- **Fazaa A, Sellami M, Ouenniche K, Miladi S, & SKassab S (2021):** Physical Activity Assessment in Children and Adolescents with Juvenile Idiopathic Arthritis Compared With Control. *Arch Pediatr*; 28(1):47-52. Doi:10.1016/j.arcped.2020.10.008.
- **Garner J, Saatchi R, Ward O, & Hawley D (2021):** Juvenile Idiopathic Arthritis: A Review of Novel Diagnostic and Monitoring Technologies. *Health care (Basel)*; 9(12), 1683. <https://doi.org/10.3390/healthcare9121683>.
- **Heale L, Houghton K M, Rezaei E, Baxter-Jones A, & Susan M, (2021):** Clinical and Psychosocial Stress Factors are Associated with Decline in Physical Activity Over Time in Children with Juvenile Idiopathic Arthritis. *Pediatric Rheumatology*; 29:19(1): 97. <https://doi.org/10.1186/s12969-021-00584-4>.
- **Hrelc D, Stevens K, Geewanter H Kemper K (2023):** Sleep and Mood, Pain, Functional Status and Health-Related Quality of Life in Children with Juvenile Idiopathic Arthritis. *Journal of Pain Management*; 3(2). <https://www.researchgate.net/scientific-contributions/D-Hrelc-2052959705>.
- **Iversen, M, Andre M & von Heideken J (2022):** Physical Activity Interventions in Children with Juvenile Idiopathic Arthritis: A Systematic Review of Randomized Controlled Trials. *Pediatric health, Medicine and Therapeutics*, 13, 115–143. <https://doi.org/10.2147/PHMT.S282611>.
- **Kyle T (2022):** Primary Care Pediatrics for the Nurse Practitioner: A Practical Approach. Springer Publishing Company, USA. P. 572.
- **Makhlouf Y, Rachdi M, Fazaa A, Miladi S, & Boussaa H, (2023):** Sleep Disturbance Among Juvenile Idiopathic Arthritis Patients. *Rheumatology*; 62 (3): kead323.012, <https://doi.org/10.1093/rheumatology/kead323.012>.
- **McHugh J (2020):** Global Prevalence of JIA, JSLE and Club Foot. *Nat. Rev. Rheumatol*.16, 408. <https://doi.org/10.1038/s41584-020-0465-6>.

- **Mostafa W, Abdul-sattar A & Dawa G (2019):** Prevalence and Factors of Functional Disability in Patients with Juvenile Idiopathic Arthritis. *Zagazig University Medical Journals*; 25(3): 456-463.
- **Neto A, Mourão A, Oliveira-Ramos F, Campanilho-Marques R, & Estanqueiro P, (2021):** Association of Body Mass Index with Juvenile Idiopathic Arthritis Disease Activity: A Portuguese and Brazilian Collaborative Analysis. *Acta Reumatol Port*; 46(1):7-14.
- **Onel K, Horton D, Lovell D, Shenoi S, & Cuello C, (2022):** American College of Rheumatology Guideline for The Treatment of Juvenile Idiopathic Arthritis: Therapeutic Approaches for Oligoarthritis, Temporo mandibular Joint Arthritis and Systemic Juvenile Idiopathic Arthritis. *Arthritis Care Res*; 74(4):521-537. Doi: 10.1002/acr.24853.
- **Pedersen M, Host C, Hansen S, Deleuran B W & Bech B (2023):** Psychiatric Morbidity is Common among Children with Juvenile Idiopathic Arthritis: A National Matched Cohort Study. *The Journal of Rheumatology*; 51(1). DOI: <https://doi.org/10.3899/jrheum.2023-00>.
- **Pediatric Rheumatology European Society (PRES), (2016):** Juvenile Idiopathic Arthritis. Available at: Juvenile Idiopathic Arthritis pdf. Accessed on [February 18, 2023].
- **Rochette E, Saidi R, Merlin E & Duche P (2023):** Physical Activity as A Promising Alternative for Young People with Juvenile Idiopathic Arthritis: Towards an Evidence-Based, *Frontiers In Immunology*; (14): 1-11. <https://doi.org/10.3389/fimmu.2023.1119930>.
- **Saidi O, Rochette E, Bourdier R, Ratel S, & Merlin E, (2022):** Sleep in Children and Adolescents with Juvenile Idiopathic Arthritis: A Systematic Review and Meta-Analysis of Case-Control Studies. *SLEEP Journal*; 45 (2): 1-14.
- **Saidi O, Rochette E, Merlin E & Duche P (2023):** Pathways of Sleep Disturbances in Juvenile Idiopathic Arthritis and Recommendations for Clinical Management Approaches: A Critical Review. *Sleep Medicine Reviews*; 73, 101870. <https://doi.org/10.1016/j.smrv.2023.101870>.
- **Shahid A, Wikinson K, Marc S, & Shapiro C (2012):** STOP, THAT and One Hundred Other Sleep Scales, Springer Science+Business Media. New York. PP: 345-347. DOI 10.1007/978-1-4419-9893-4_85.
- **Sherry D, Bhaskar R, Poduval M, Rabinovich C A, & Talavera F (2022):** Juvenile Idiopathic Arthritis. Available at: <https://emedicine.medscape.com/article/1007276-overview?form=fpf>. Accessed on [May 22, 2022].
- **Shoop-Worrall S, Voshaar M, McDonagh J, Thomson W & Wulffraat N, (2021):** Common Functional Ability Score for Young People with Juvenile Idiopathic Arthritis. *Arthritis Care & Research*; 73(7):947-954. Doi: 10.1002/acr.24204.
- **Sontichai W & Vilaiyuk S (2018):** The correlation between the Childhood Health Assessment Questionnaire and Disease Activity in Juvenile Idiopathic Arthritis. *Musculoskeletal Care*; 16(3):339-344. Doi: 10.1002/msc.1239.
- **Soulsby W D, Balmuri N, Cooley V, Gerber L M, & Lawson E, (2023):** Social Determinants of Health Influence Disease Activity and Functional Disability in Polyarticular Juvenile Idiopathic Arthritis. *Pediatr Rheumatol Online J*; 20(1):7-18. Doi: 10.1186/s12969-022-00676-9.
- **Tarakci E, Arman N, Barut K, Şahin S, & Adroviç A (2019):** Fatigue and Sleep in Children and Adolescents with Juvenile Idiopathic Arthritis: A Cross-Sectional Study. *Turk J Med Sci*; 49(1): 58–65.
- **Thatayatikom A, Modica R, & De Leucio A (2023):** Juvenile Idiopathic Arthritis. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK554605/>. Accessed on [March 5, 2023].
- **Tsipoura P, Lazaratou H, Damigos D & Vougiouka O (2018):** Sleep and its Relationship to Health-Related Quality of Life in Children and Adolescents with Inactive Juvenile Idiopathic Arthritis. *The Egyptian Rheumatologist*; 40 (3): 197-201.
- **Washington N (2023):** American College of Rheumatology, Juvenile Arthritis. Available at: <https://rheumatology.org/patients/juvenile-arthritis>. Accessed on [February 14, 2023].
- **Woods M (2016):** Lifestyle Changes to Manage Rheumatoid Arthritis. Available at <http://www.allegiancehealth.org/wellness/article/20080>. Retrieved [February 21, 2023].
- **Zare N, Mansoubi M, Coe S, Najafi A, & Bailey K, (2023):** Relationship Between Nutritional Status, Dietary Intake, Symptoms and Health Related Quality of Life in Children with Juvenile Idiopathic Arthritis; A Systemic Review and Meta-Analysis. *BMC Pediatr*, 23(3). <http://doi.org/10.1186/s12887-022-03810-4>.
- **Zelman D (2022):** Understanding Juvenile Rheumatoid Arthritis. The Basics. Available at: <https://www.webmd.com/rheumatoid-arthritis/understanding-juvenile-rheumatoid-arthritis-basics>. Accessed on: [July 26, 2023].
- **Zhai S, Ward T, Palermo T & Ringold S (2021):** Sleep Attitudes and Beliefs in Children with Juvenile Idiopathic Arthritis and Their Caregivers. *Sleep*; 44 (2): 228. <https://doi.org/10.1093/sleep/zsab072.576>.

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