Sleep Disturbance and Quality of Life in CF and PCD Patients

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Topics

1 **Introduction**
Literature review and study objectives

2 **Methods**
Research population, questionnaires and patient record review

3 **Results**
Sleep quality and QOL characterization, and correlations

4 **Discussion**

Introduction

Sleep in patients with lung disease:

- Reduction in activity of the respiratory center

- Airway collapse ⟶ Reduction in gas exchange ⟶ Hypoxemia and hypercapnia

- Bronchial mucus accumulation

- Pain, nocturnal cough, anxiety and depression

Katz ES. 2014

Literature review

Congleton

Adult patients:
1. Poor sleep quality
2. Day time sleepiness
3. Association with disease severity and decrease in QOL.

Amin

Pediatric patients:
1. Lower sleep efficacy
2. Short sleep latency
3. Diffculty initiating sleep
4. Awakenings with cough and for bathroom use
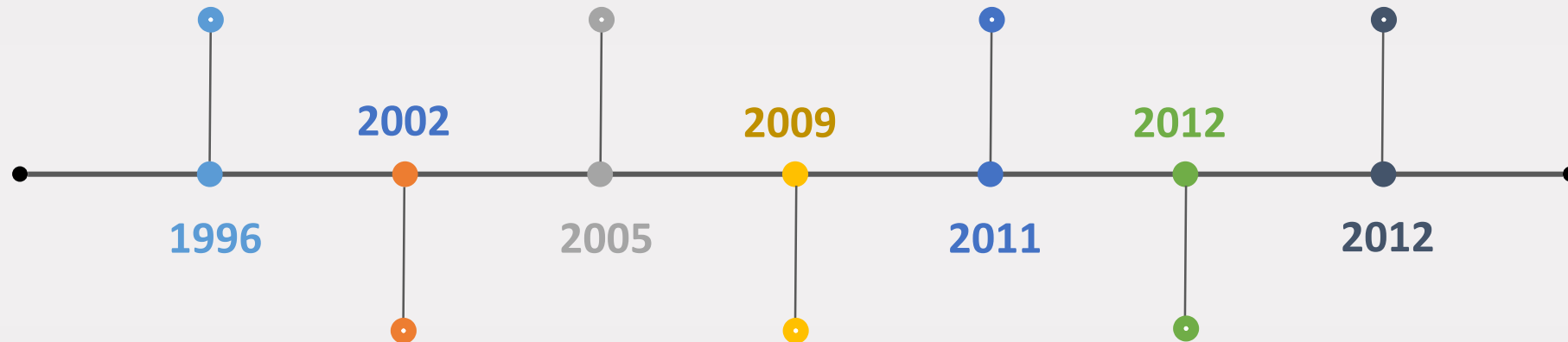5. Correlated with FEV1 level

Perin

Adult patients:
1. Efficacy / OSA / REM - normal
2. Poor subjective sleep quality
3. Desaturation
4. Daytime sleepiness
5. Wake So2 – the best predictor

Spicuzza

Pediatric patients:
1. Lower BMI
2. Lower wake FEV1 / FVC
3. Lower nocturnal mean SaO_2
4. Increased risk of OSA
5. Less REM
6. Lower sleep efficacy

2002

2009

2012

1996

2005

2011

2012

Dancey

Adult patients:
1. More awakenings
2. Nocturnal hypoxemia
3. Short sleep latency
4. Daytime sleepiness
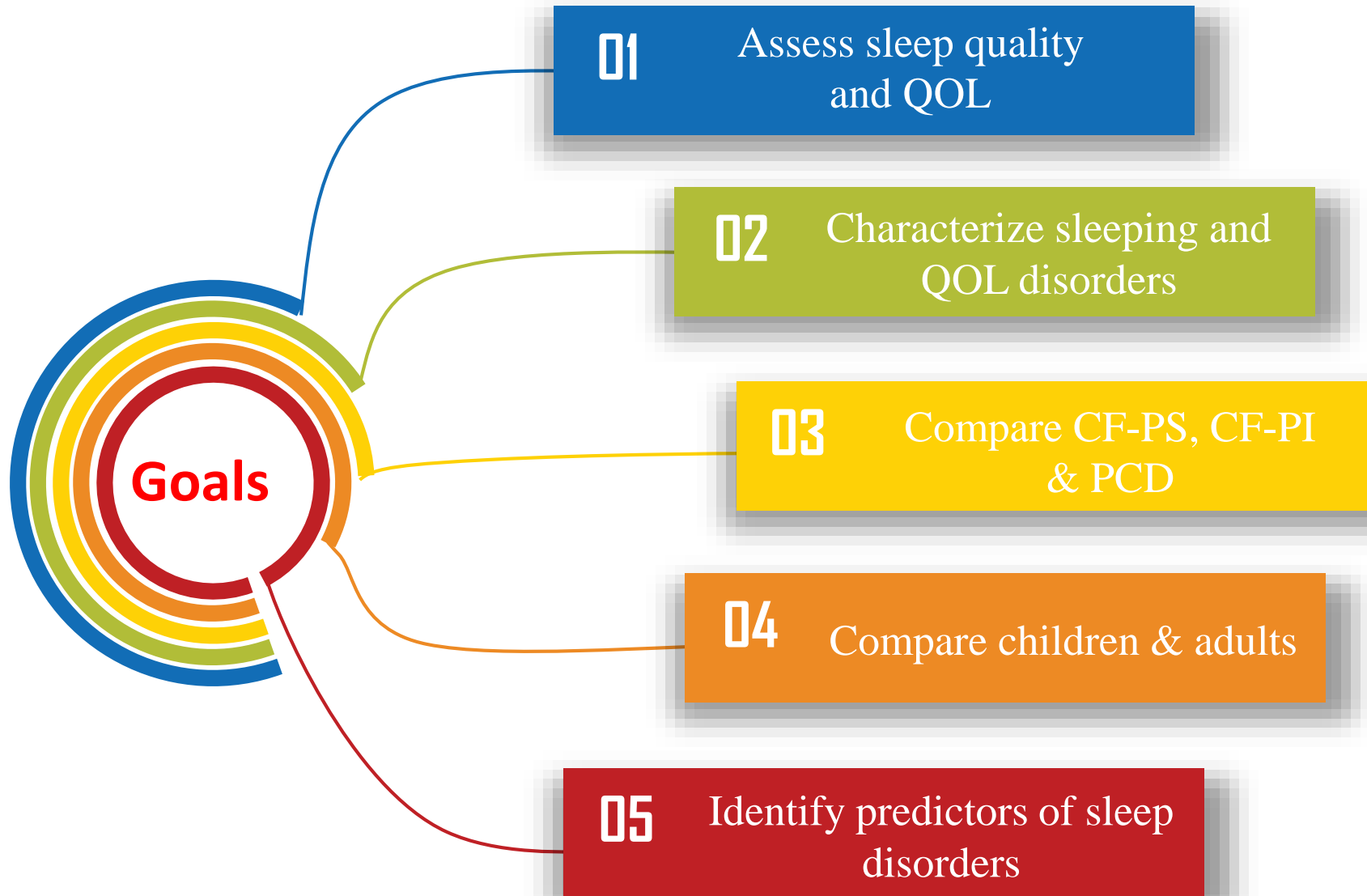5. Impaired neurocognitive function

Van der giessen

Pediatric patients:
1. Nocturnal coughing, mostly 1st hour of sleep
2. Correlated with disease severity

Meltzer

Pediatric patients:
1. Sleep 30m less
2. Wake up 18m earlier

Goals

01 Assess sleep quality and QOL

02 Characterize sleeping and QOL disorders

03 Compare CF-PS, CF-PI & PCD

04 Compare children & adults

05 Identify predictors of sleep disorders

Methods

- **Research population**

- **Questionnaires :**

  Sleep quality

  Quality of life

|	Adults	Children
Sleep quality	Pitssburgh	SDSC
Quality of life	QOL-BE	PedQL
Epworth	+	+

Methods

Patients record review

- **Saturation**
- **FEV1**
- **Smoking**
- **Caffeine**
- **Pseudomonas**
- **Hospitalization**
- **Abx PO**
- **Abx IV**
- **DM**
- **Vitamin D**
- **Hemoglobin**
- **Height, Weight, BMI**

Result

- **Study population** – 80 patients from the CF Center at Hadassah Medical Center

- **Patients' characteristics-**

	Children	Adult
Number	39	41
Mean age	11.1	30.3
Sex (female)	19	21
CF PS patients	13	14
CF PI patients	16	17
PCD patients	10	10
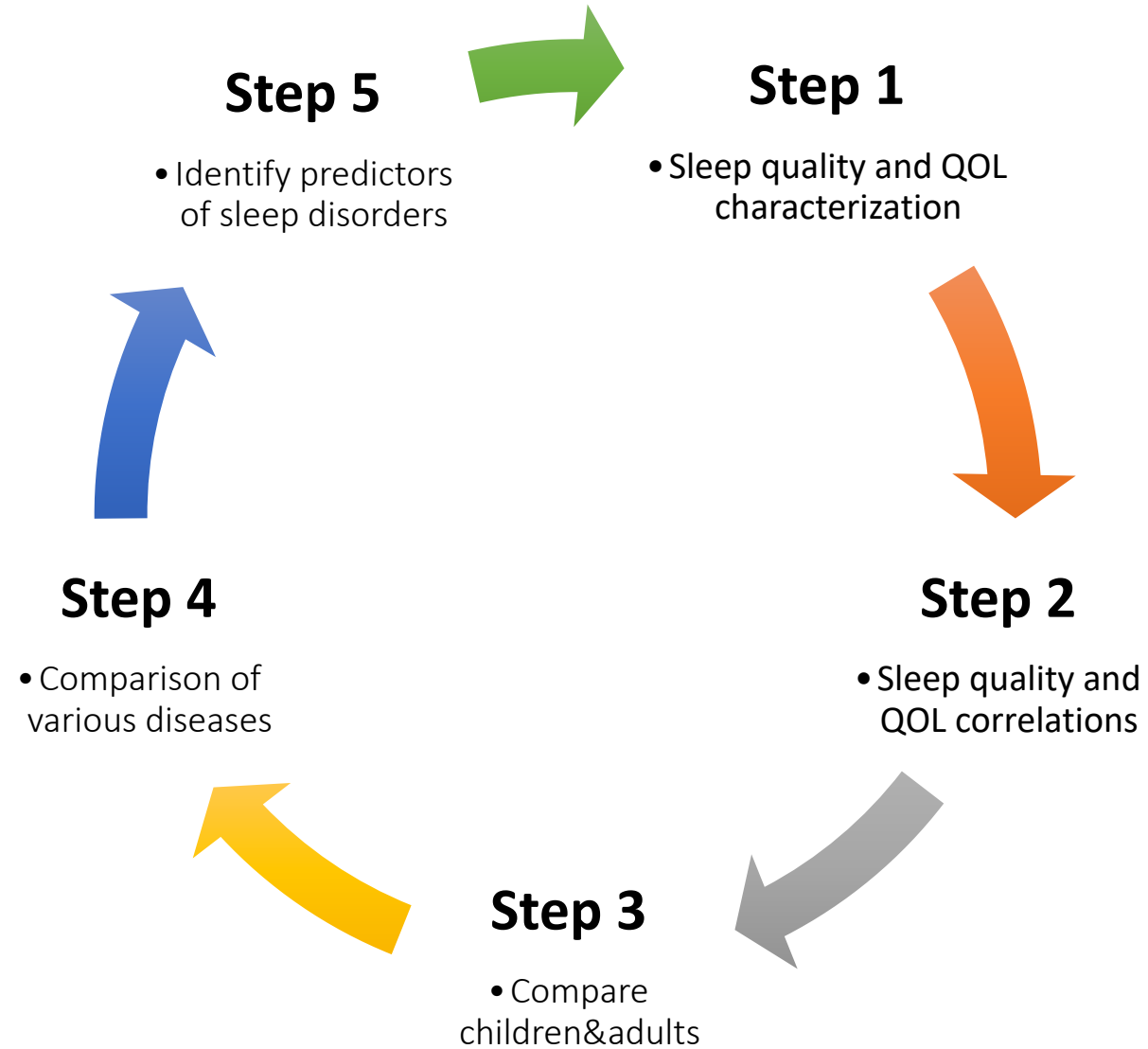
Sleep Disorders

SDSC – Most children:

➤ Took < 30 min (80%) to fall asleep,

➤ Slept 8-11 hours (78%)

➤ Woke up between 6-7 o'clock (75%)

The remaining items were within normal ranges

PSQI – Most patients :

➤ Took < 15 min (76%) to fall asleep,

➤ Slept 6-7 hours (55%)

➤ Woke up between 6-7 o'clock (62%)

➤ 27% of patients had reduced sleep quality (PSQI > 5).

Waking up

53% reported waking up

during the night

Snoring

47% complained of a

breathing disorder, snoring

or coughing during the night

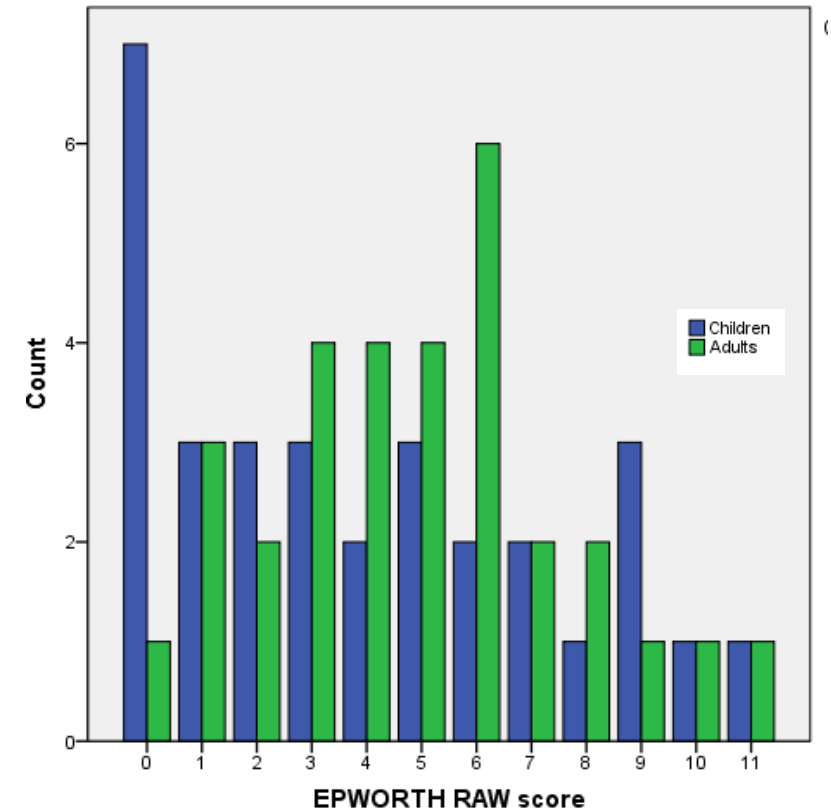## Body temperature

29% reported body
temperature disorders
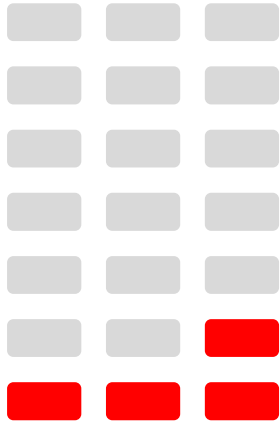
Pain

27% suffer from pain

Nightmare

20% suffer from
nightmares during
the night

Epworth

➤ 2 patient suffered from excessive daytime sleepiness

➤ 36% of patients had increased normal daytime sleepiness

➤ The average score was 4.5
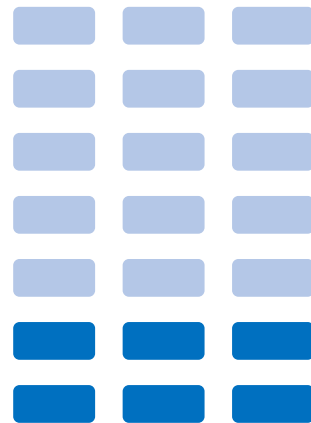
QOL in Pediatric Patients

20.5%

Global score

The average score was 85%.
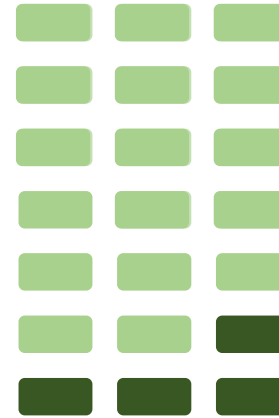For 8 patients (20.5%) the score was lower then 77

26.3%

Physical

The average score was 84.3%
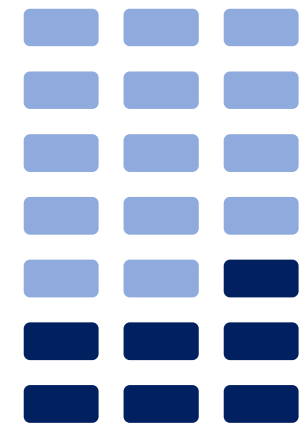For 10 patients (26.3%) the score was lower then 76.3%

21%

Emotional

The average score was 86.2%
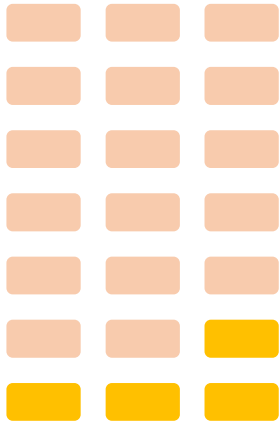For 8 patients (21%) the score was lower then 72.5%

31.5%

School

The average score was 75.7%
For 12 patients (31.5%) the score was lower then 67.2%

QOL in Adult Patients

31.7%

Global score

The average score was 71.4%. For 13 patients (31.7%) the score was lower then 65%
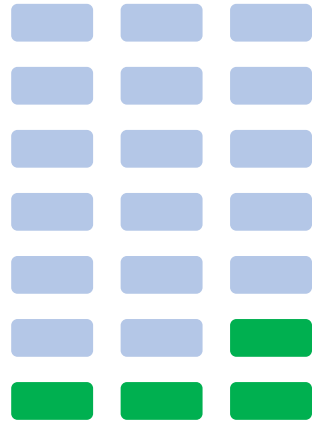
19.5%

Physical

The average score was 78.4% For 8 patients (19.5%) the score was lower then 65%
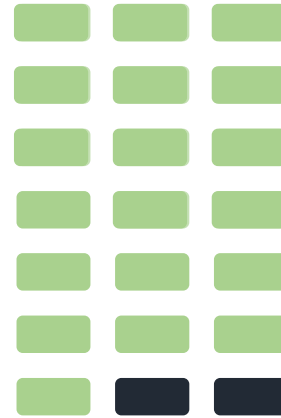
7.4%

Emotional

The average score was 92.3% For 3 patients (7.4%) the score was lower then 65%
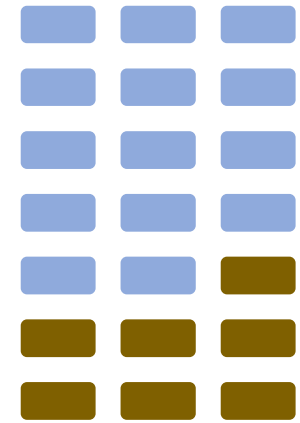
31.5%

Social

The average score was 72.5% For 12 patients (29.3%) the score was lower then 65%

Results

Step 5
- Identify predictors of sleep disorders

Step 1
- Sleep quality and QOL characterization

Step 2
- Sleep quality and QOL correlations

Step 3
- Compare children&adults

Step 4
- Comparison of various diseases
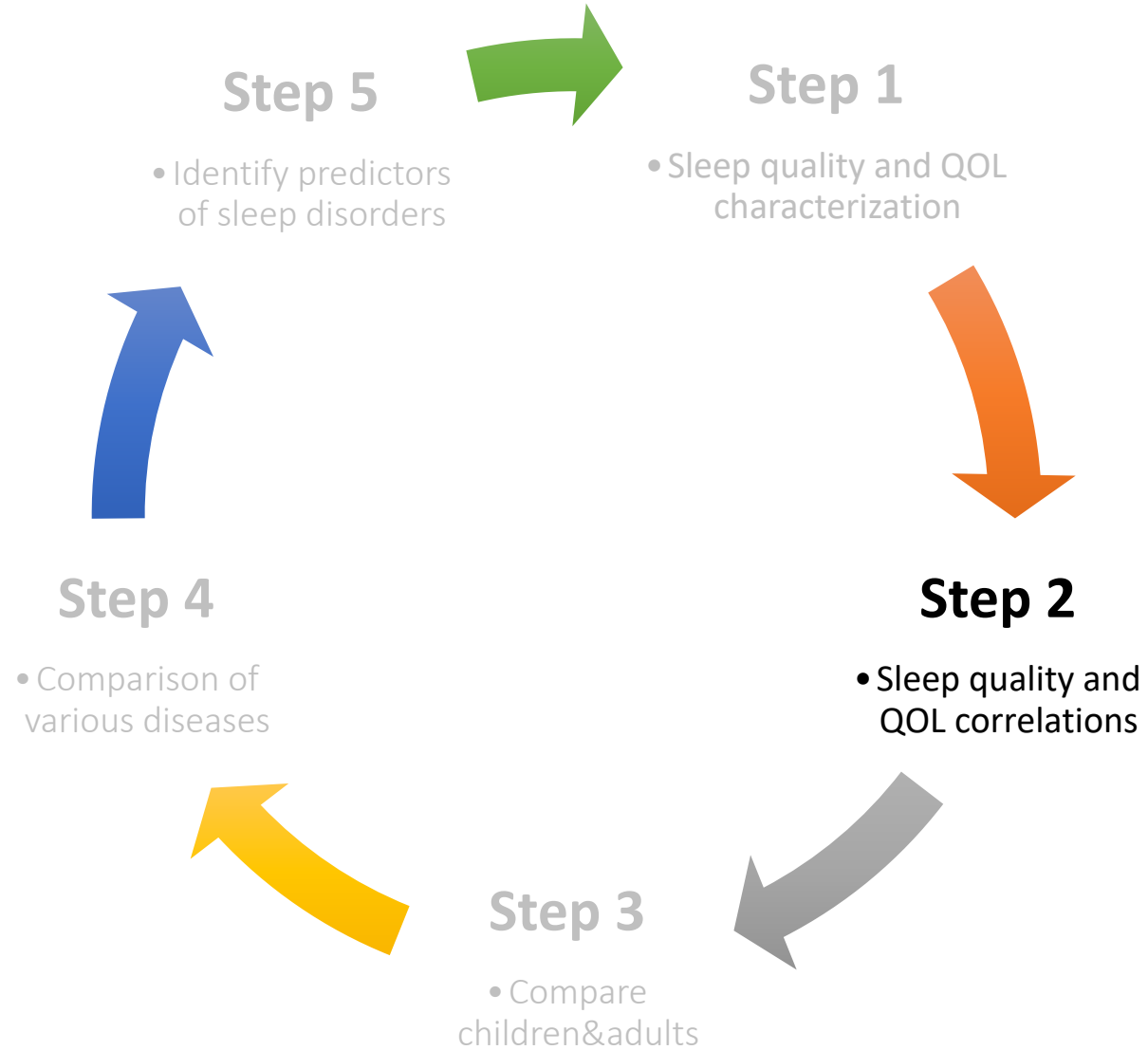
Association Between Sleep Quality and QOL

Children
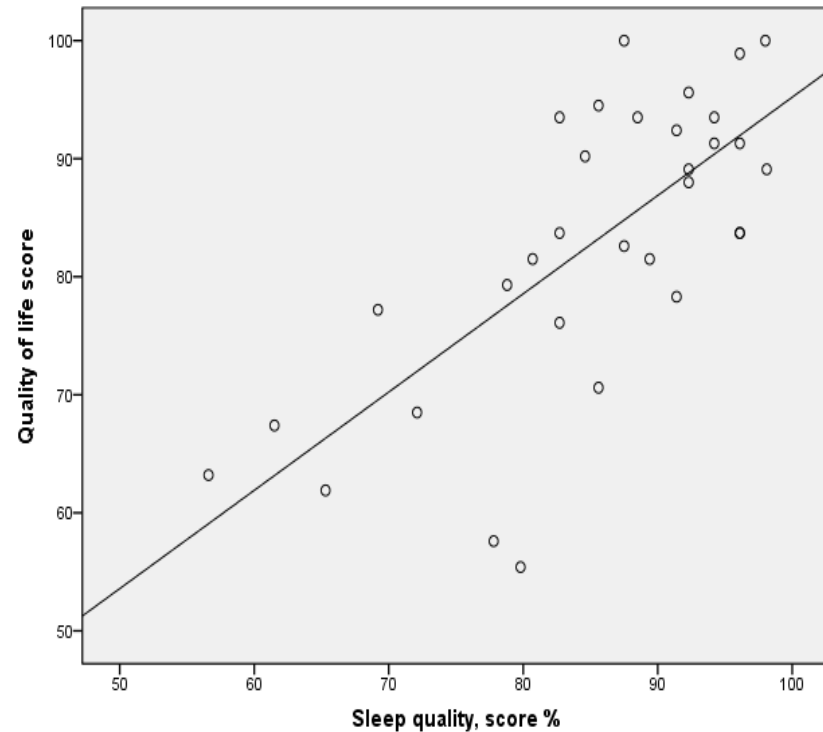
Adult

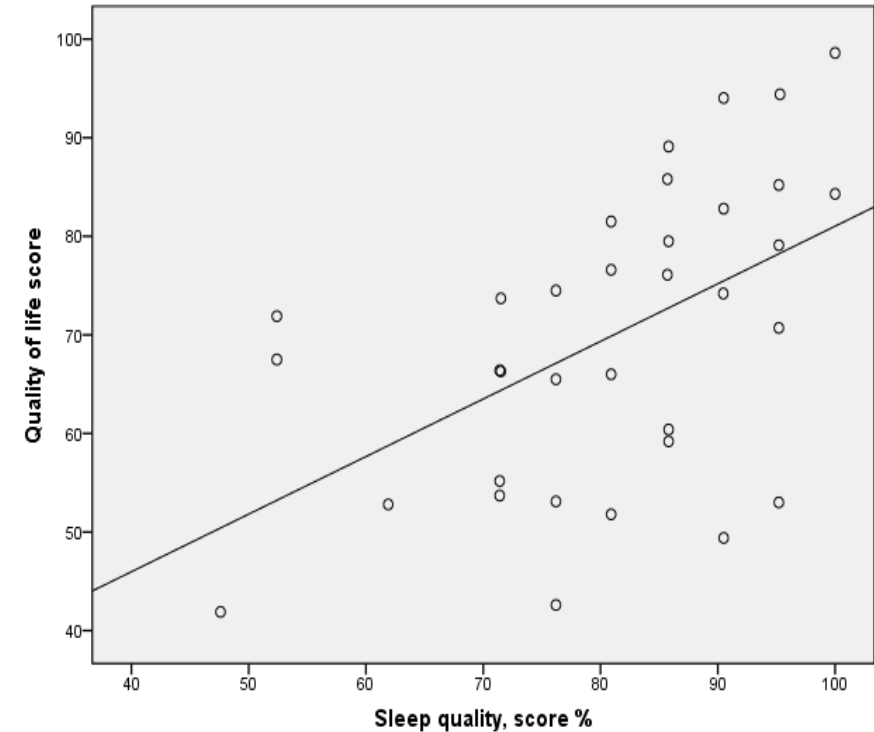|		Quality of life score	Physical score	Emotional score	Social score	School score
Sleep quality, score %	Pearson	**0.721**[**]	**0.493**[**]	**0.434**[*]	**0.629**[**]	**0.457**[**]
	Sig. (2-tailed)	**0.000**	**0.005**	**0.015**	**0.000**	**0.010**
Breathing, score	Pearson	**0.589**[**]	**0.482**[**]	0.253	**0.510**[**]	**0.309**
	Sig. (2-tailed)	**0.000**	**0.006**	0.169	**0.003**	**0.040**
Waking up, score	Pearson	**0.398**[*]	0.257	0.221	**0.433**[*]	0.151
	Sig. (2-tailed)	**0.024**	0.162	0.233	**0.015**	0.418
Transition from sleeping to waking, score	Pearson	**0.551**[**]	**0.397**[*]	**0.334**	**0.565**[**]	**0.428**[*]
	Sig. (2-tailed)	**0.001**	**0.027**	**0.043**	**0.001**	**0.016**
Night sweats, score	Pearson	**0.498**[**]	**0.494**[**]	0.068	**0.617**[**]	0.107
	Sig. (2-tailed)	**0.004**	**0.005**	0.718	**0.000**	0.567
Falling asleep, score	Pearson	**0.475**[**]	0.236	**0.433**[*]	**0.361**[*]	0.312
	Sig. (2-tailed)	**0.006**	0.202	**0.015**	**0.046**	0.087
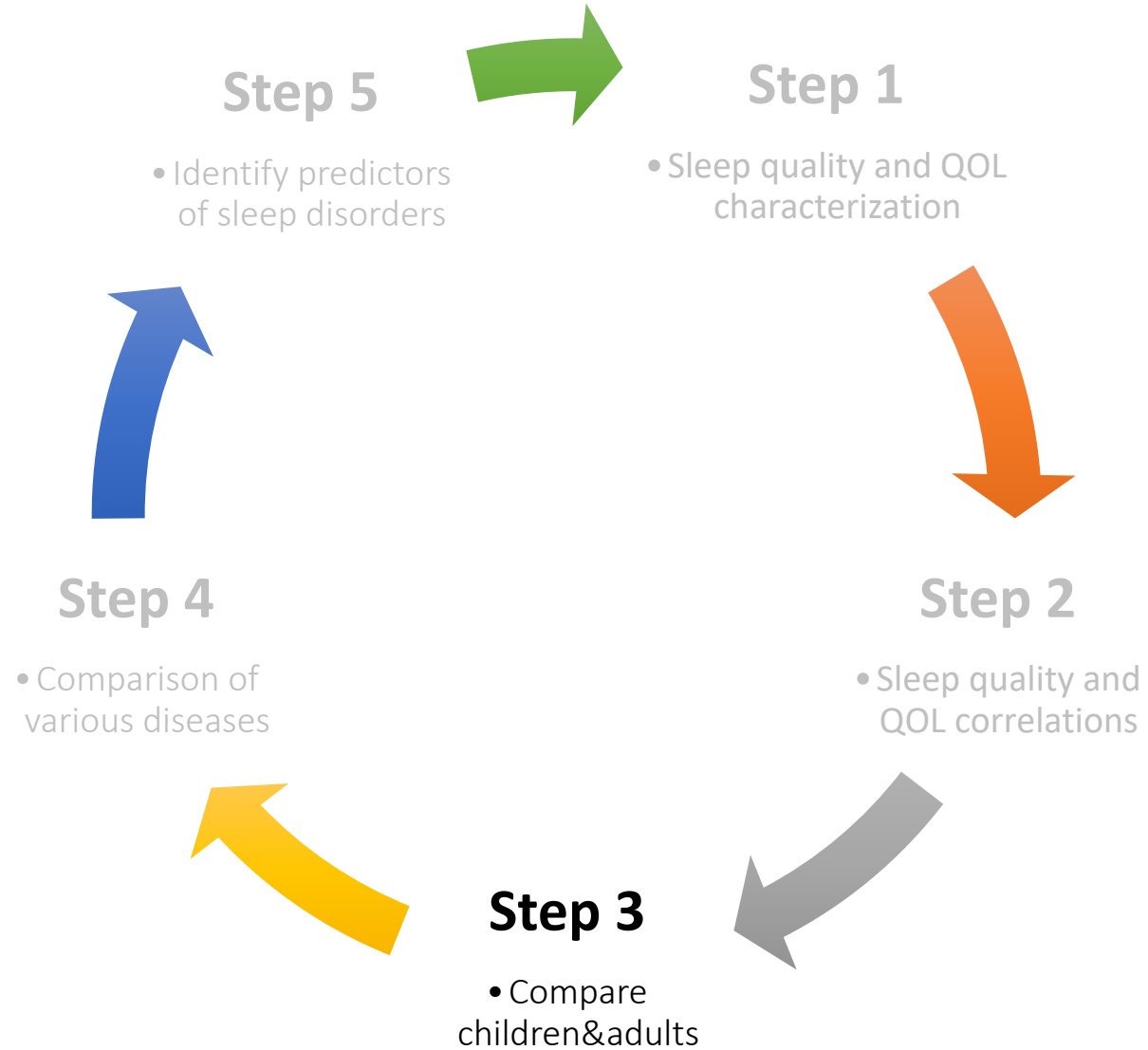
Analysis by age group

	Children	Adult	P- value
Saturation (mean)	96	96	0.924
FEV1 (mean)	85.5	69.2	0.00001
Weight (mean)	36.7 (%-ile)	64.1 kg	-
Height (mean)	33.3(%-ile)	166 cm	-
BMI (mean)	43.8 (5-ile)	23.1	-
Diabetic mellitus	1	10	-
Vitamin D (mean)	26.7	23.3	0.209
Hemoglobin (mean)	13.7	14.3	0.07
Pseudomonas intermittent	9	8	-
Pseudomonas chronic	4	15	0.024
Hospitalization	10	9	0.65
ABx PO	29	23	0.058
ABx IV	4	13	0.022

Analysis by age group

Sleep disorder & QOL

	Children	Adult	P- value
Sleep quality (mean)	86.3	82.1	0.124
Hours of sleep (mean)	8.7	6.7	< 0.001
Wake up hour (mean)	6:36 AM	7:01 AM	0.058
Epworth score (mean)	3.8	4.9	0.104
Quality of life (mean)	85	71.3	< 0.001
QOL – Physical score (mean)	84.3	78.4	0.219
QOL – Emotional score (mean)	86.2	92.3	0.066
QOL – Social score (mean)	93.8	72.5	< 0.001

Effect of Patient's Age
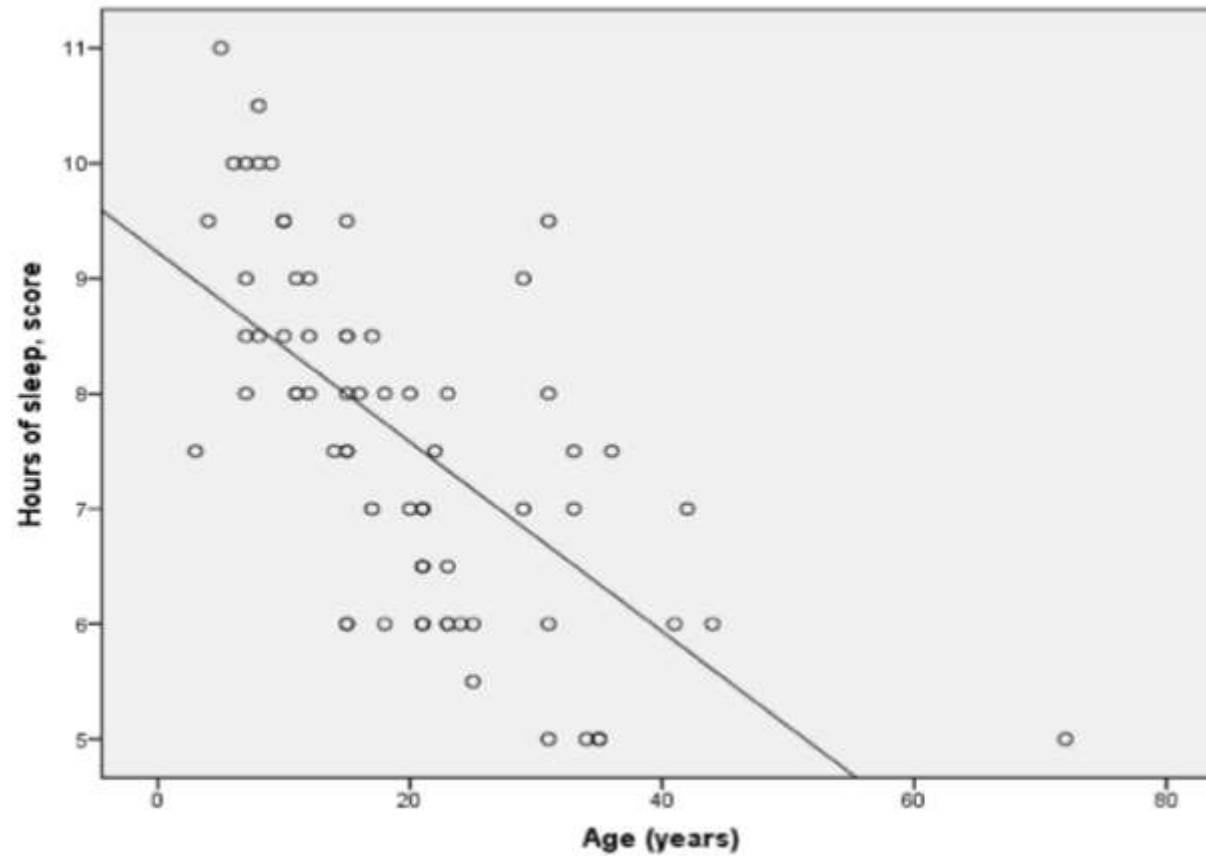
Analysis by age group

Results

Step 5
• Identify predictors of sleep disorders

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• Sleep quality and QOL characterization

Step 2
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Step 3
• Compare children&adults

Step 4
• Comparison of various diseases
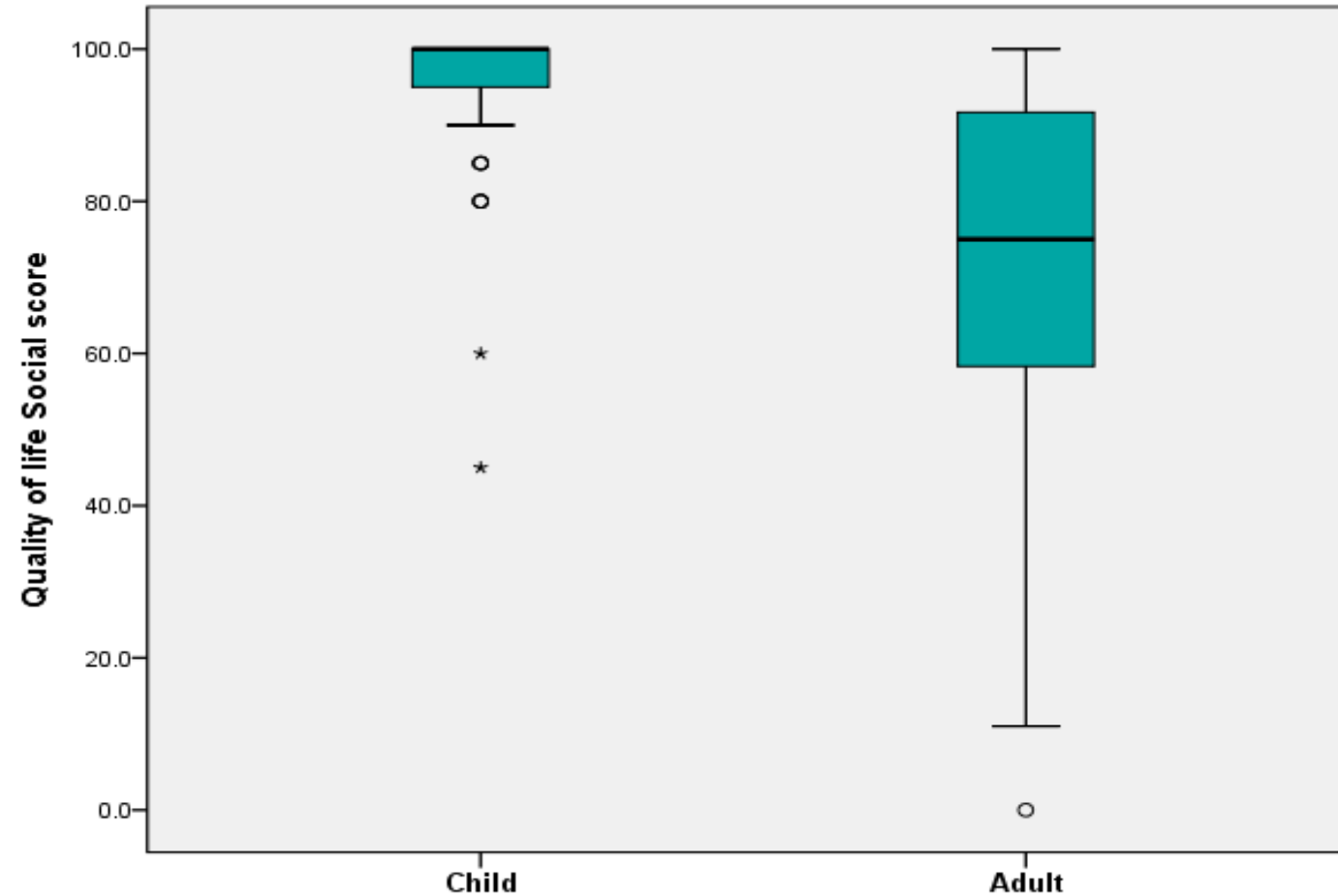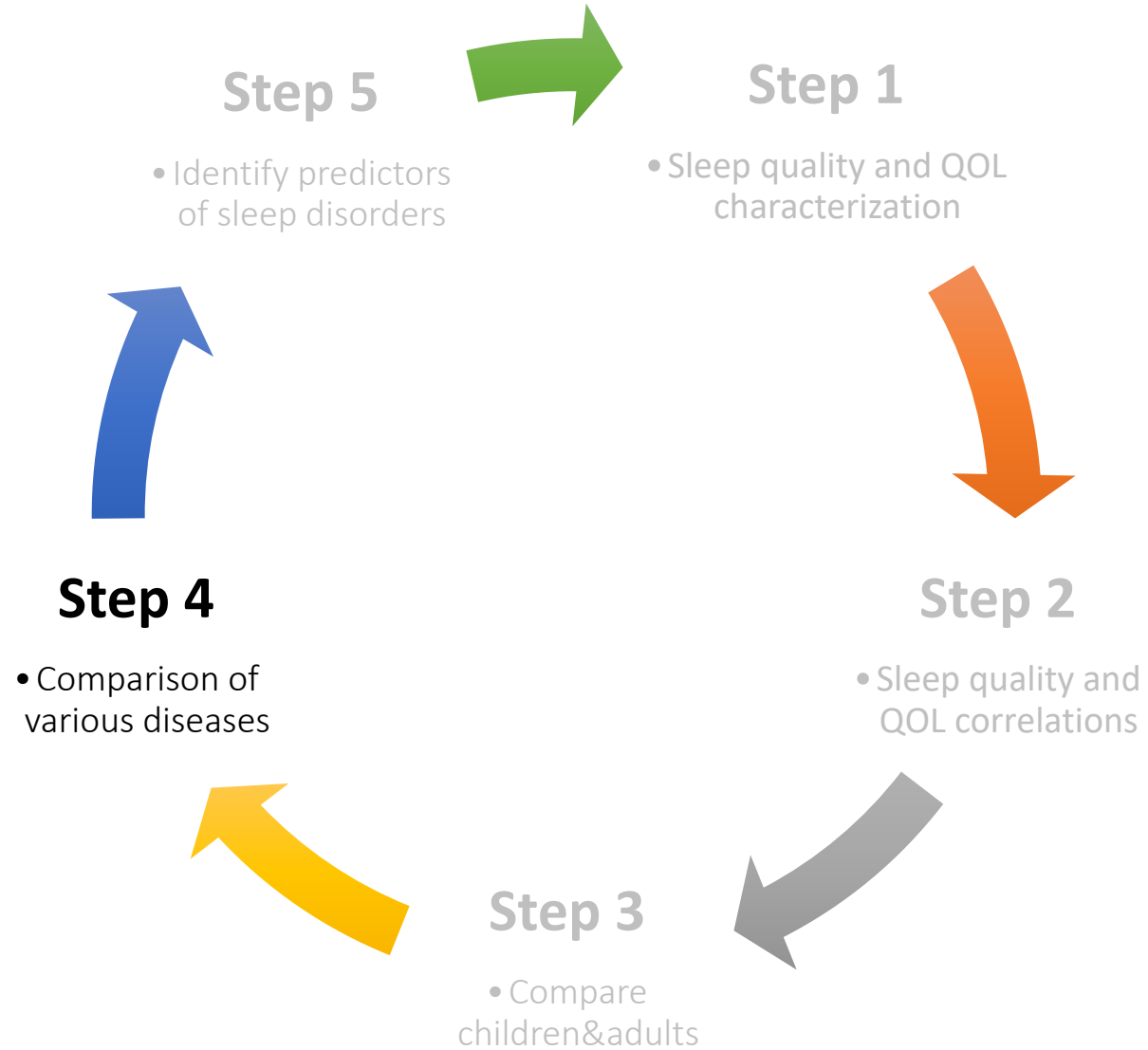
Analysis by disease

General data:

	CF PS	CF PI	PCD	P - VALUE
Number	27	33	10	-
Male	9	14	6	-
Female	18	19	4	-
Age (mean)	21	22	10.4	-
Saturation (mean)	97%	96%	96.3%	0.57
FEV1 (mean)	85%	69%	80.3	0.027
Pseudomonas (intermittent)	6	11	0	0.048
Pseudomonas (chronic)	4	10	1	0.048
Hospitalization	6	10	2	0.47
Abx PO	16	19	8	0.044
Abx IV	5	12	0	0.004
Diabetes	2	9	0	-
Vitamin D	26.4	23.7	25.4	0.68
Hemoglobin	14.1	14	13.9	0.83

Analysis by disease

Pseudomonas
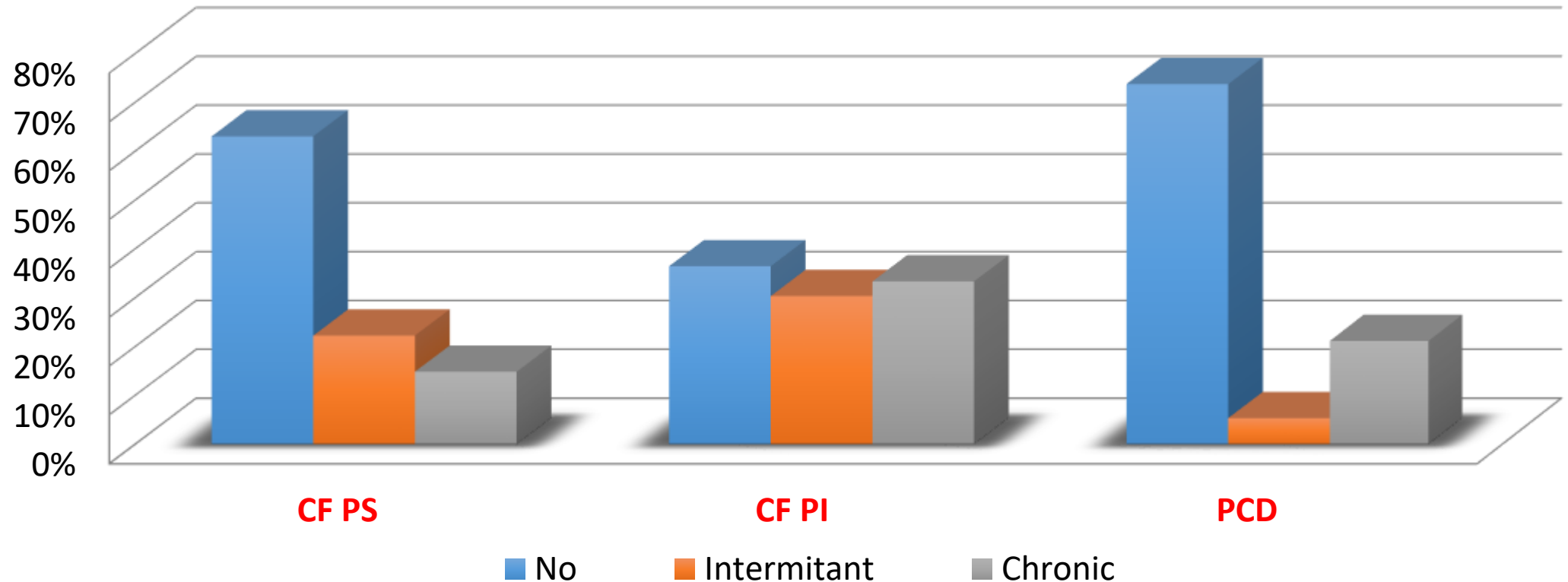
Analysis by disease

Sleep quality & QOL:

	CF PS	CF PI	PCD	P-VALUE
Global score	84.4%	83.6%	84.7%	0.94
Hours of sleep	7.6	7.5	8	0.52
Wake up hour	6:51 AM	6:42 AM	6:58 AM	0.65
Epworth	3.96	5	3.85	0.31
QOL - Global score	78.9	77.1	78.3	0.9
Physical function	85.7	77.6	80.9	0.34
Emotional function	90.6	90.7	85.5	0.40
Social function	82.7	86.5	76.9	0.34

Analysis by disease - Children

General data:

Children	CF PS	CF PI	PCD	P - VALUE
Number	13	14	10	-
Male	5	9	6	-
Female	8	5	4	-
Age (mean)	11.9	10.9	10.4	-
Weight percentile (mean)	43.3	25.8	45.2	-
Height percentile (mean)	28	33.1	41.1	-
BMI percentile (mean)	53.2	32.8	49.6	0.57
Saturation (mean)	97%	96.3%	96.3%	0.001
FEV1 (mean)	97.5%	77.9%	80.3	0.24
Pseudomonas (intermittent)	3	4	0	0.24
Pseudomonas (chronic)	1	2	1	0.9
Hospitalization	3	3	2	1
Abx PO	10	11	8	0.43
Abx IV	1	2	0	0.95
Diabetes	0	16	0	0.11
Vitamin D	26.8	25.6	28.9	
Hemoglobin	14.3	13.5	13.5	

Analysis by disease - Children

Sleep quality

Children	CF PS	CF PI	PCD	P-VALUE
Global score	88.8%	84.%	86.9%	0.18
Disorder of initiating and maintaining sleep	84.8%	80.8%	86.8%	0.13
Sleep breathing disorder	94.4%	84.3%	80.6%	0.2
Disorder of arousal	95.8%	97.9%	98.3%	0.57
Sleep-wake transition disorder	92.4%	84.9%	91.3%	0.08
Disorder of excessive somnolence	83.8%	75.9%	86.3%	0.23
Sleep hyperhidrosis	90.3%	87.5%	81.3%	0.66
Hours of sleep	8.6	8.5	8.95	0.62
Epworth	2.5	4.7	3.9	0.33

Analysis by disease - Children

Quality of life

Children			
	CF PS	**CF PI**	**PCD**	**P-VALUE**
Global score	84.4	82.7	80	0.18
Physical function	89.5	81.5	72.12	0.03
Emotional function	75	89	84.4	0.93
Social function	91.3	94.3	91.3	0.92
School function	81.9	62.66	79	0.01

Analysis by disease - Children
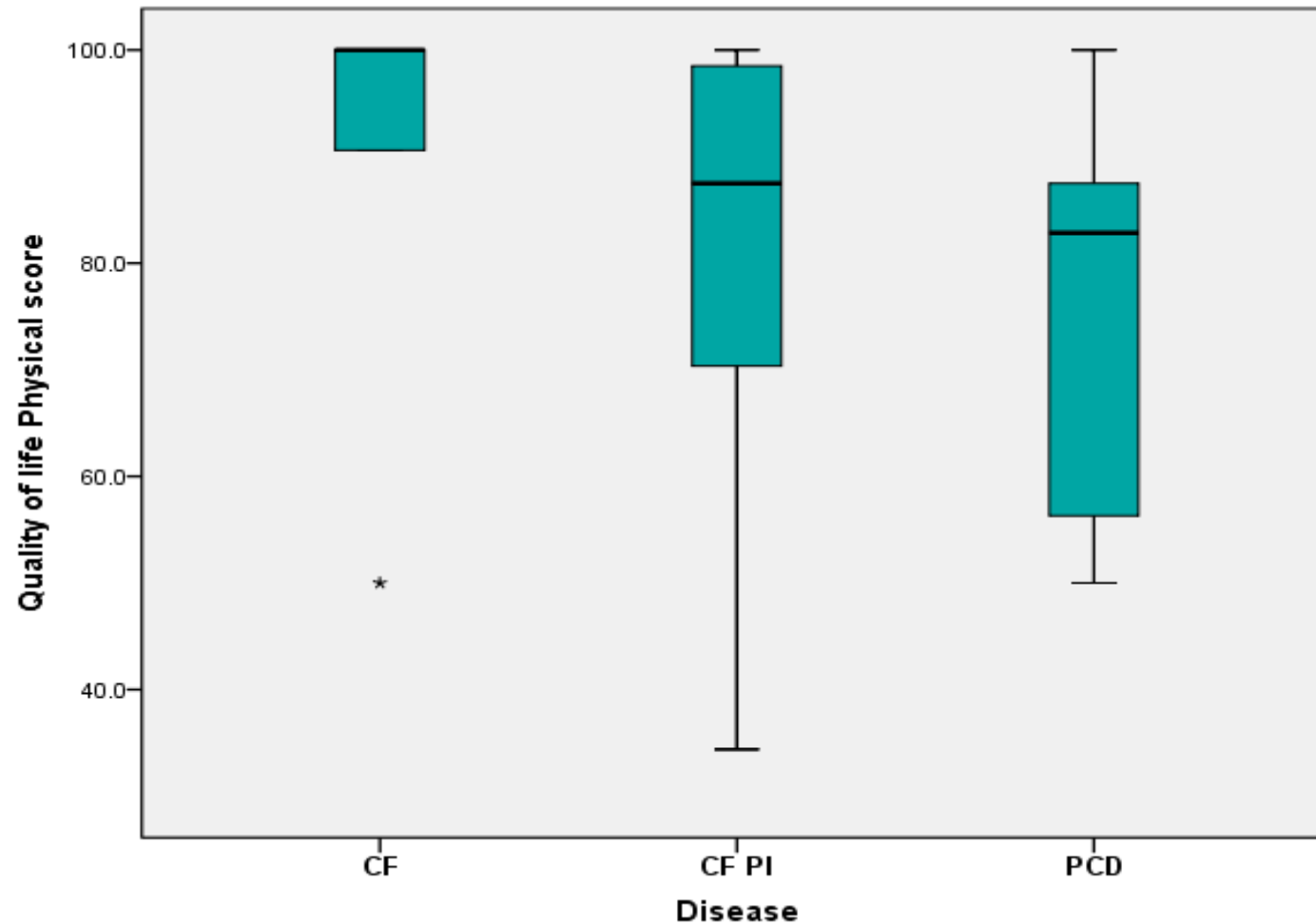
Analysis by disease - Children
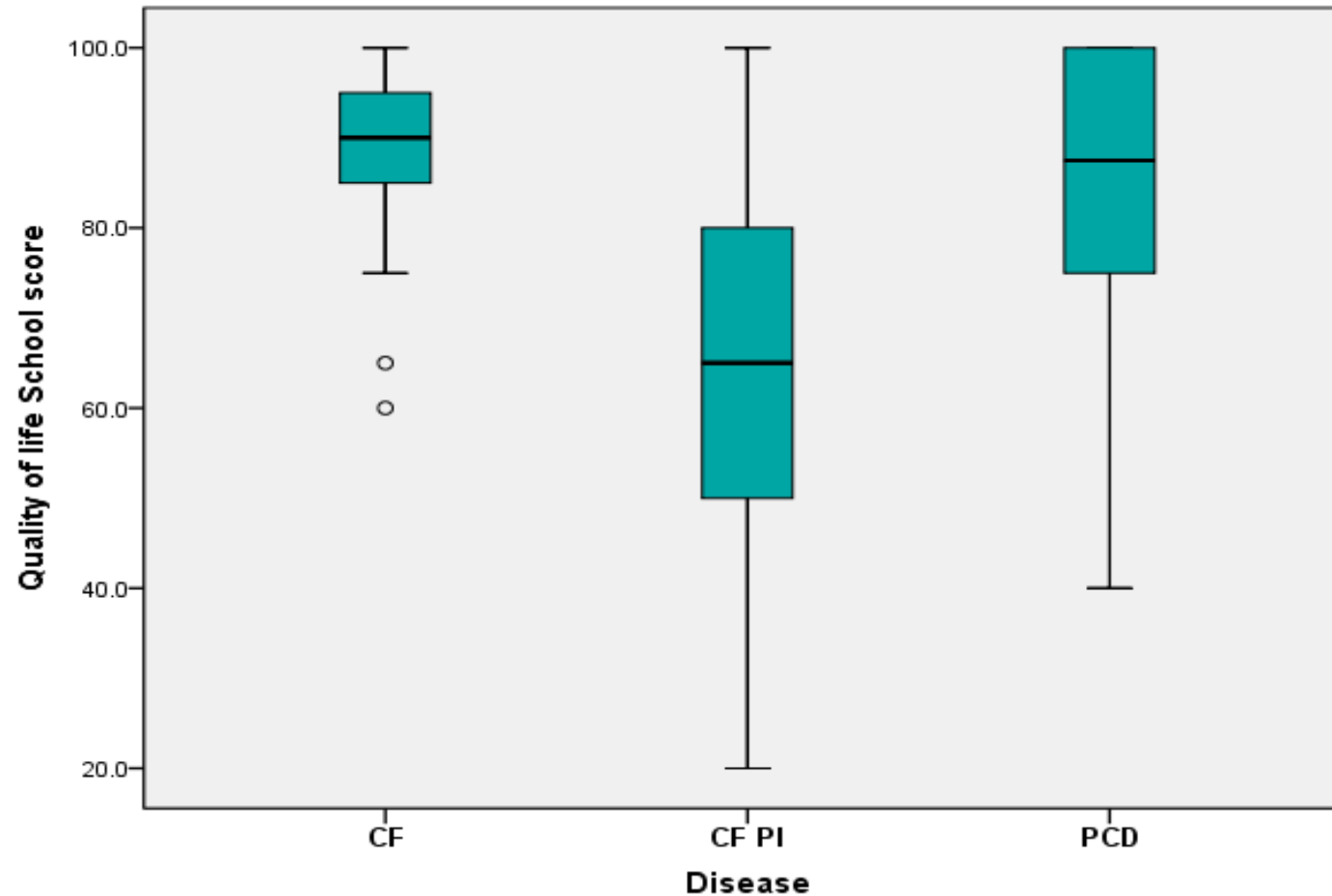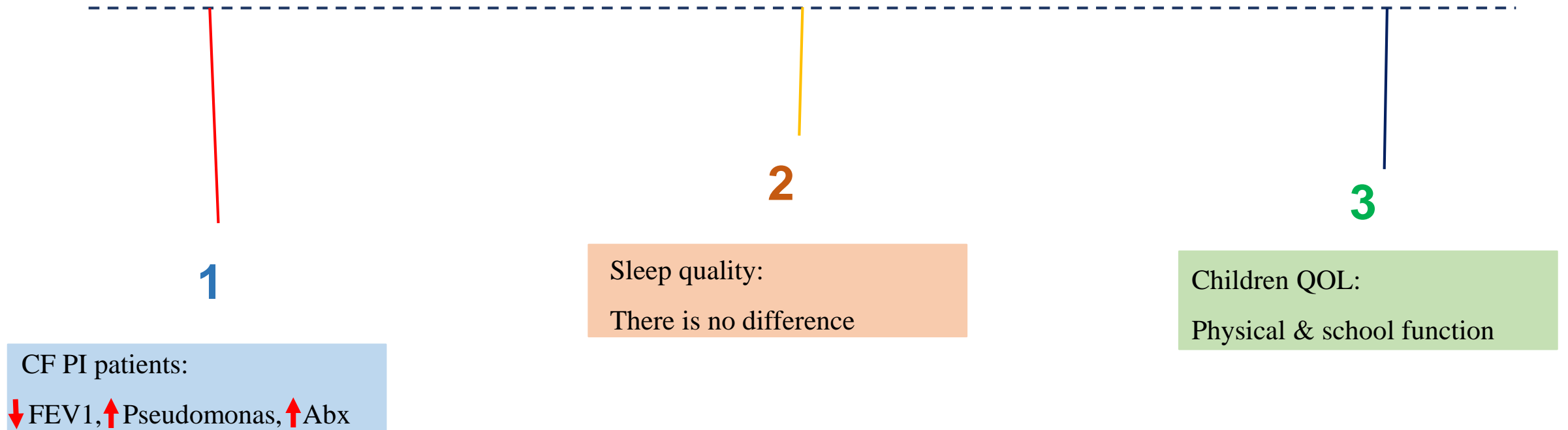
Analysis by disease - Adult

General data:

Adult				
	CF PS	**CF PI**	**PCD**	**P - VALUE**
Number	14	17	10	-
Male	4	10	6	-
Female	10	7	4	-
Age (mean)	29.7	33.4	25.8	-
Weight (kg)	65.3	59.1	71	-
Height (cm)	163.8	163.9	172.5	-
BMI	24.1	21.9	23.6	-
Saturation (%)	96.4	96.2	97.2	0.55
FEV1 (%)	72.9	63	74.7	0.31
Pseudomonas (intermittent)	3	4	1	0.22
Pseudomonas (chronic)	3	9	3	0.22
Hospitalization	3	5	1	0.5
Abx PO	6	6	10	0.004
Abx IV	4	9	0	0.012
Diabetes	2	8	0	
Vitamin D	25.9	21.9	22	0.7
Hemoglobin	13.9	14.6	14.3	0.21

Analysis by disease - Adult

Sleep quality & QOL:

Adult			
	CF PS	**CF PI**	**PCD**	**P-VALUE**
Global score	80.6%	83.2%	82.5%	0.725
Disorder of arousal	84.5%	90.2%	71.6%	0.15
Sleep disturbance	77.8%	82.4%	78.8%	0.81
Use of sleep medication	100%	95.8%	100%	0.49
Subjective sleep quality	81.4%	80.4%	83.3%	0.89
Hours of sleep	6.7	6.5	7	0.56
Epworth	6	5	3.1	0.39
QOL - Global score	68.8	71.9	74	0.71
Physical function	78.5	74.1	85.5	0.45
Emotional function	96.2	92.2	86.9	0.19
Social function	71.6	79.6	61.9	0.21

Analysis by disease

1

CF PI patients:

↓FEV1, ↑Pseudomonas, ↑Abx

2

Sleep quality:
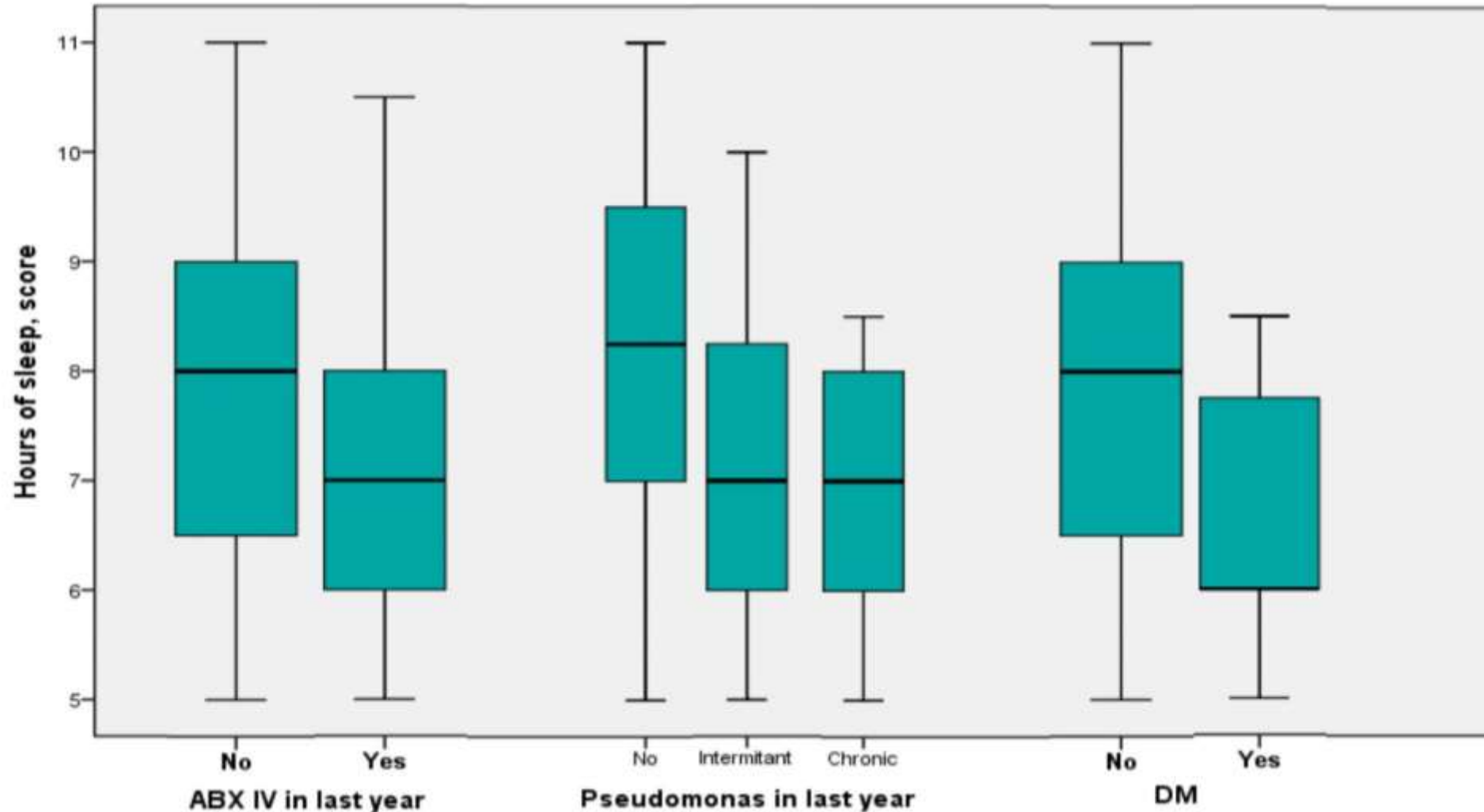
There is no difference
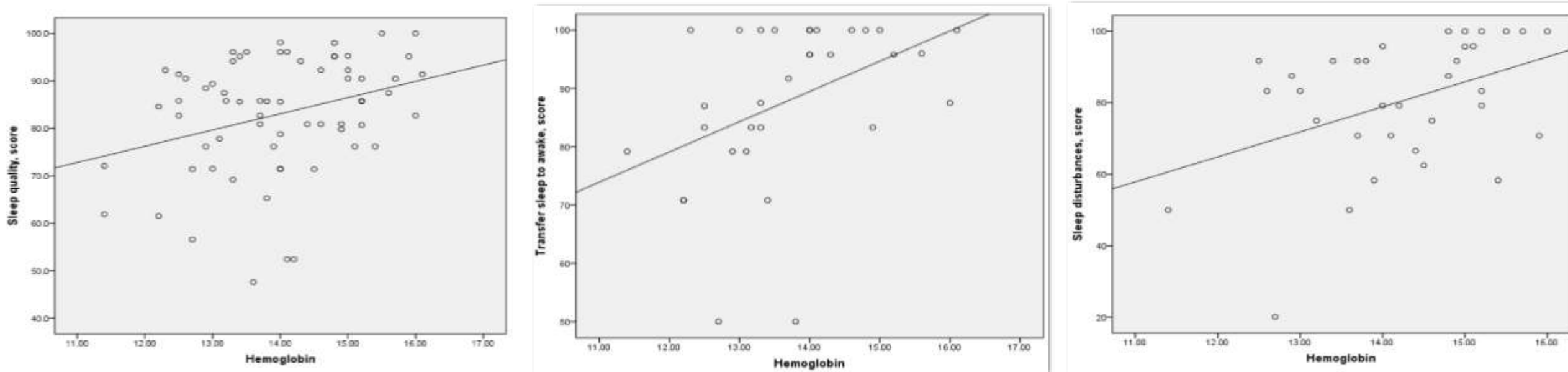
3

Children QOL:

Physical & school function
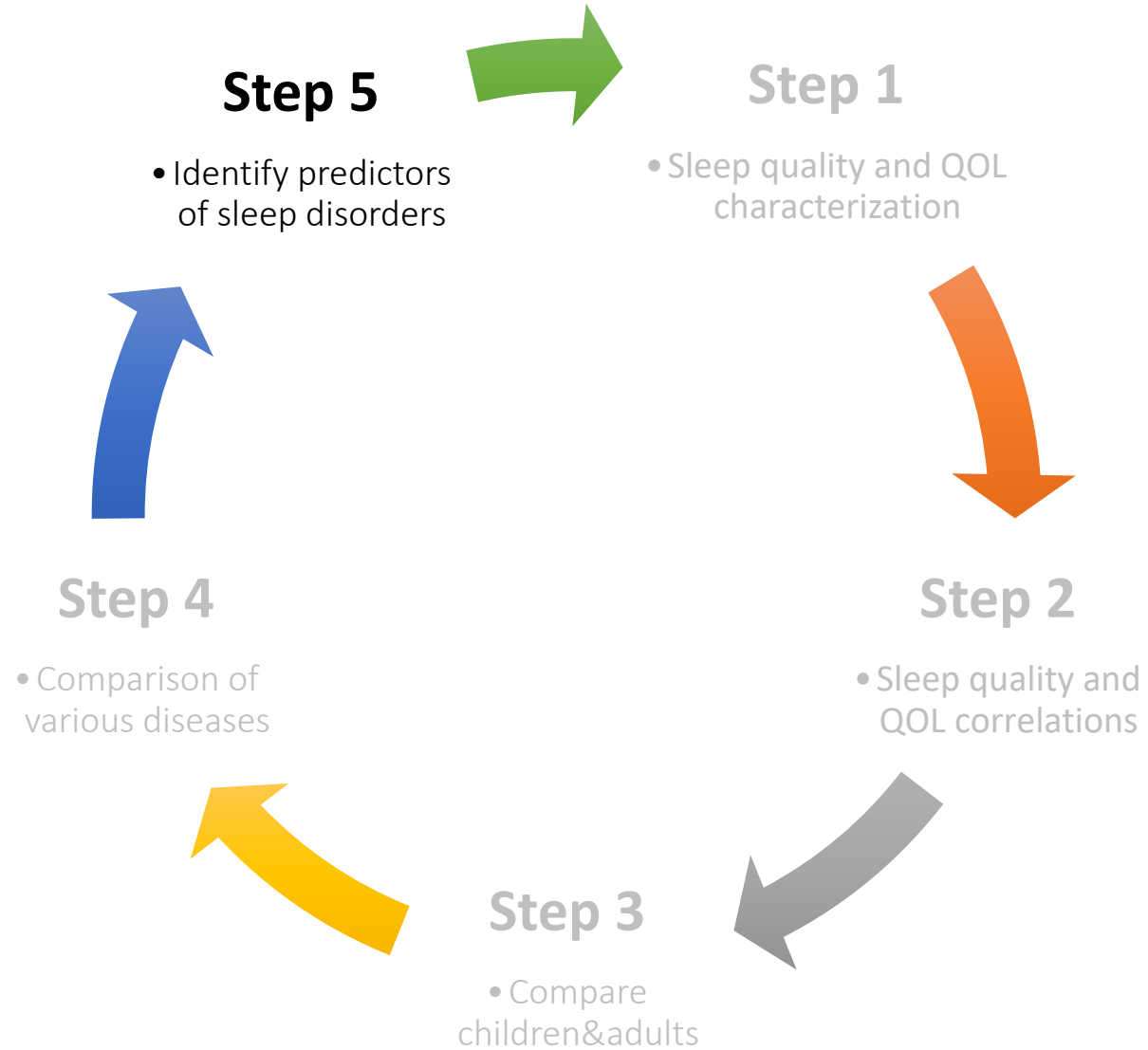
Factors Affecting Sleep Hours

Hemoglobin

This parameter was found to have an effect on: sleep quality, breathing disturbance at night, sleep-wake transition disorders and Sleep disturbances

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Discussion

Previous study:

- There are also several studies that have demonstrated poor sleep quality in adults and children with CF

- These studies showed correlation between sleep quality and level of saturation and FEV1.

Sleep disorder

Waking up during the night,
Breathing disorder,
Body temperature,
Pain, Nightmares

1

QOL

There is a close connection between the quality of the patient's sleep and the quality of his life

2

Influential factors

Patient age
Hemoglobin
Diabetes
pseudomonas
IV antibiotic

3

Comparison

There is difference between clinical measurement and QOL between the different disease

4

Conclusion

Ackowledgment

- **ד״ר יואל רייטר**

- **ד״ר מאלנה כהן - סימברקנו**

- **גברת טלי בדולח**

- **מר מוחמד סאלחי**

- **צוות מרפאת CF בביה״ח הדסה הר הצופים**