Sleep Disturbance in Patients with Liver Transplants and its Relationship to Quality of Life

BTC 1859H: DATA SCIENCE IN HEALTH I

Team 2 (Praetor): Kevin Schubert, Vivian Pan, Kaiwen Zhang

Abstract

01

The Problem

Decreased HRQOL post-liver transplantation

02

Prevalence

Of sleep disturbance

03

Predictors of Sleep

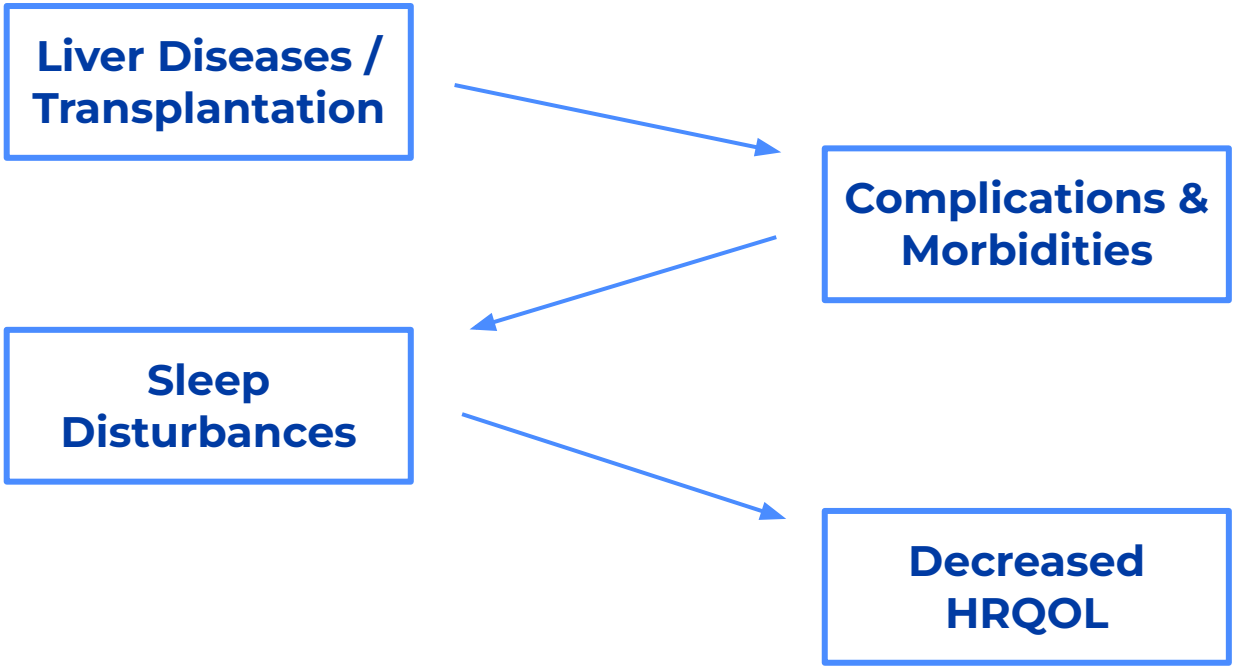
Strongest predictors of sleep disturbance

04

Predictors of QOL

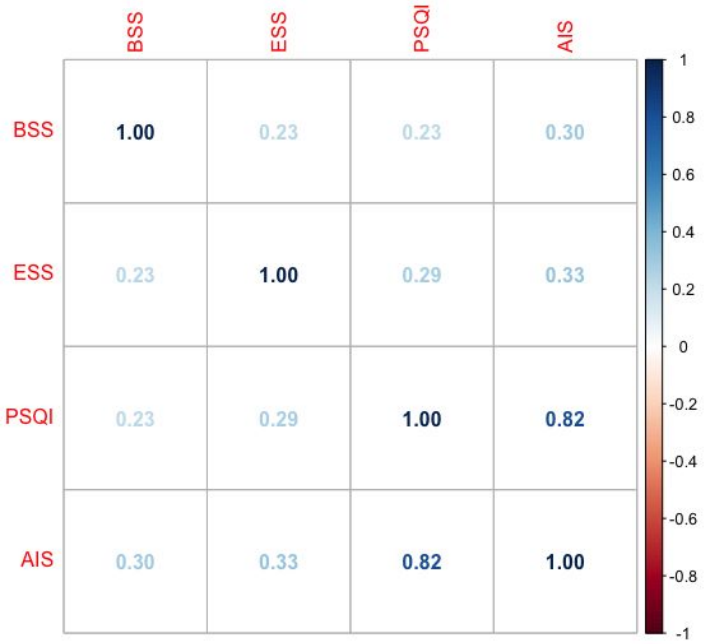
Effect of sleep disturbance on QOL

The Problem


Liver Diseases / Transplantation
Complications & Morbidities
Sleep Disturbances
Decreased HRQOL

Cleaning the Data

- Check: outliers and invalids
- Removing NA's
- Check: collinearity



$$R^2 = 0.82$$

$$VIF = \frac{1}{1 - R^2} = 5.55$$

Prevalence of Sleep Disturbance

- Convert scales to binary
- Calculate: prevalence of sleep disturbance

100%

of patients experienced some type of sleep disturbance

27%

ESS
(EDS)

55%

PSQI
(general, long- and short-term)

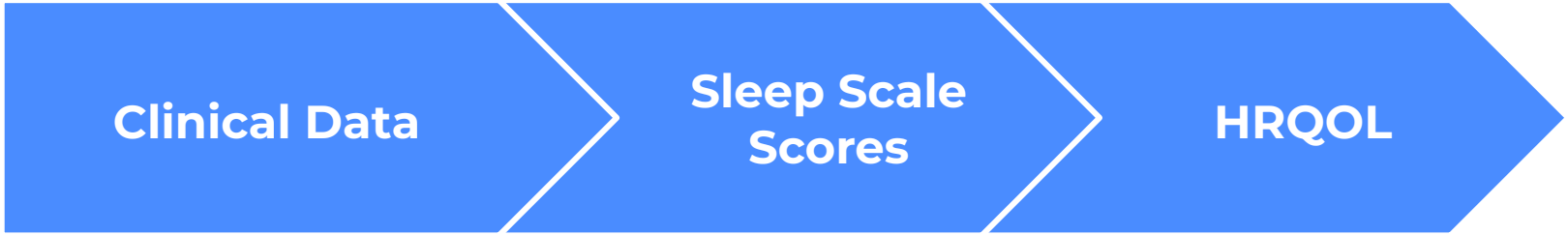
55%

AIS
(general, EDS)

39%

BSS
(OSA)

Methods: Machine Learning Pipeline



- Cleaned data goes through pipeline

- **Linear and logistic regression models**
- Predictors: clinical data
- Response: sleep scale scores

- **Linear regression models**
- Predictors: sleep scale scores
- Response: SF-36 scores

Results - BSS

Features	AIC	Anova
(1) BMI	274.1265	-
(2) + Renal Failure	272.0417	(1) vs (2), p = 0.04327
(3) + Age	**269.7642**	(2) vs (3), p = 0.05997
(4) + Others	Increases	Favours (3), p > 0.05

Results - AIS

Features	AIC	Anova
(1) Corticoid	1471.812	-
(2) + Recurrence	1462.772	(1) vs (2), p = 0.00097
(3) + Age	1456.622	(2) vs (3), p = 0.0047
(4) + BMI	**1455.562**	(3) vs (4), p = 0.08382
(5) + others	Increases	Favours (4), p > 0.05

Results - ESS

Features	AIC	Anova
(1) RGD (Graft Rejection)	1359.122	-
(2) + Depression	1357.192	(1) vs (2), p = 0.04917
(3) + Gender	**1354.957**	(2) vs (3), p = 0.04159
(4) + Others	Increases	Favours (3), p > 0.05

Results - MCS

Features	AIC	Anova
(1) AIS, ESS, BSS	1752.804	-
(2) AIS, ESS	**1750.987**	(1) vs (2) p = 0.6721
(3) AIS	1756.541	(2) vs (3) p = 0.006378
(4) ESS	1805.883	(2) vs (4) p = 7.098e-14

Results - PCS

Features	AIC	Anova
(1) BSS, AIS, ESS	**1772.192**	-
(2) AIS, BSS	1778.566	(1) vs (2) p = 0.004161
(3) ESS, BSS	1793.657	(1) vs (3) p = 1.611e-6
(4) AIS, ESS	1775.888	(1) vs (4) p = 0.01811

Conclusion

100% Prevalence

of sleep disturbance

Predictors of Sleep

Age and BMI were most commonly used

Predictors of QOL

AIS and ESS in both, BSS in PCS

Thank You

Are there any questions?