INFO550 Report

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The study recruited 82 veteran twin pairs (a total of 164 veterans). Each subject had a clinical diagnosis of PTSD. All of them underwent one-night in-lab polysomnography (PSG) for objective sleep monitoring. In this study, different twin pairs came to visit on different dates, so the visit date can be used to identify twin pairs. Additionally, investigators have collected covariates, such as body mass index (BMI), diabetes history, hypertension history, high blood cholesterol history, marital status, employment status, and education levels, which were considered to be potentially important in the investigation of the relationship between PTSD and sleep architecture and disturbance. In particular, the investigators believed that being obese may modify the relationship between PTSD and sleep architecture/sleep disturbance.

The marginal association between time-to-event and each covariate was summarized in Table 1. Except for predetermined confounding effects of BMI/ Obesity status, diabetes history (DM) and hypertension history (HTN), no other confounders showed marginal survival differences in univariate analysis. The marginal Kaplan-Meier plots (Figure 1) also justified this phenomenon.

The final stratified Obesity-included Cox-PH model was: (Table 2)

$$h(t|\mathbf{X}) = h_0(t)exp{-0.215 \times PTSD - 0.176 \times Obese + 1.521 \times PTSD \times Obese - 0.039 \times HTN + 0.448 \times DM}$$

Adjusting for hypertension and diabetes history, among non-obese patients, the relative risk of having REM sleep of PTSD patients compared to non-PTSD patients was 0.806 (95% CI: 0.393–1.655). Adjusting for hypertension and diabetes history, among obese patients, the relative risk of having REM sleep of PTSD patients compared to non-PTSD patients was 3.689 (95% CI: 1.624–8.38). We referred to them as the confounder-adjusted association between PTSD and time to the occurrence of REM sleep stratified by obesity status. The difference between two association was statistically significant (p=0.008). It implied that among non-obese group, PTSD patients were not significantly associated with shorter time to the occurrence of REM sleep. However, among obese group, PTSD patients were more likely to have shorter time to the occurrence of REM sleep. The association in obese patients was significantly different from the association in non-obese patients.

Table 1: Summary Statistics by Cox-PH Model with Respect to Categorical Covariate

Covariates	Comparison	Relative Risk	Lower .95	Upper .95	p-value
Obesity Status	Yes vs. No	1.174	0.741	1.86	0.494
Hypertension History	Yes vs. No	0.993	0.632	1.561	0.976
High Blood Cholesterol	Yes vs. No	1.203	0.759	1.906	0.43
Diabetes	Yes vs. No	1.34	0.774	2.318	0.294
PTSD	Yes vs. No	1.343	0.805	2.243	0.257
Marital Status	Widowed	0.541	0.074	3.94	0.791
(ref) Married	Divorced	0.935	0.499	1.75	0.791
	Separated	1.225	0.381	3.943	0.791
	Never Married	0.527	0.162	1.713	0.791
Employment Status	Employed(Part-time)	1.861	0.755	4.583	0.128
(ref) Employed-full time	Unemployed				0.128
	Unable to Work due to Disability	2.344	0.774	7.094	0.128
	Retired	1.92	1.082	3.409	0.128
Education	High School	2.171	0.286	16.483	0.577
(ref) Less than High School	Some College or Associate	1.767	0.24	13.022	0.577
	College Degree	2.9	0.372	22.583	0.577
	Graduate Education/Degree	1.753	0.226	13.582	0.577

Table 2: Model Fitting Results for Obesity-included Cox-PH Regression Model

	Estimate	Std.Err	Z-value	p-value
PTSD	-0.2154574	0.3670981	-0.5869205	0.5572571
Obesity	-0.1763472	0.3031318	-0.5817508	0.5607345
HTN	-0.0385600	0.2553707	-0.1509964	0.8799786
DM	0.4482652	0.3093988	1.4488265	0.1473860
PTSD*Obesity	1.5207207	0.5759860	2.6402045	0.0082856

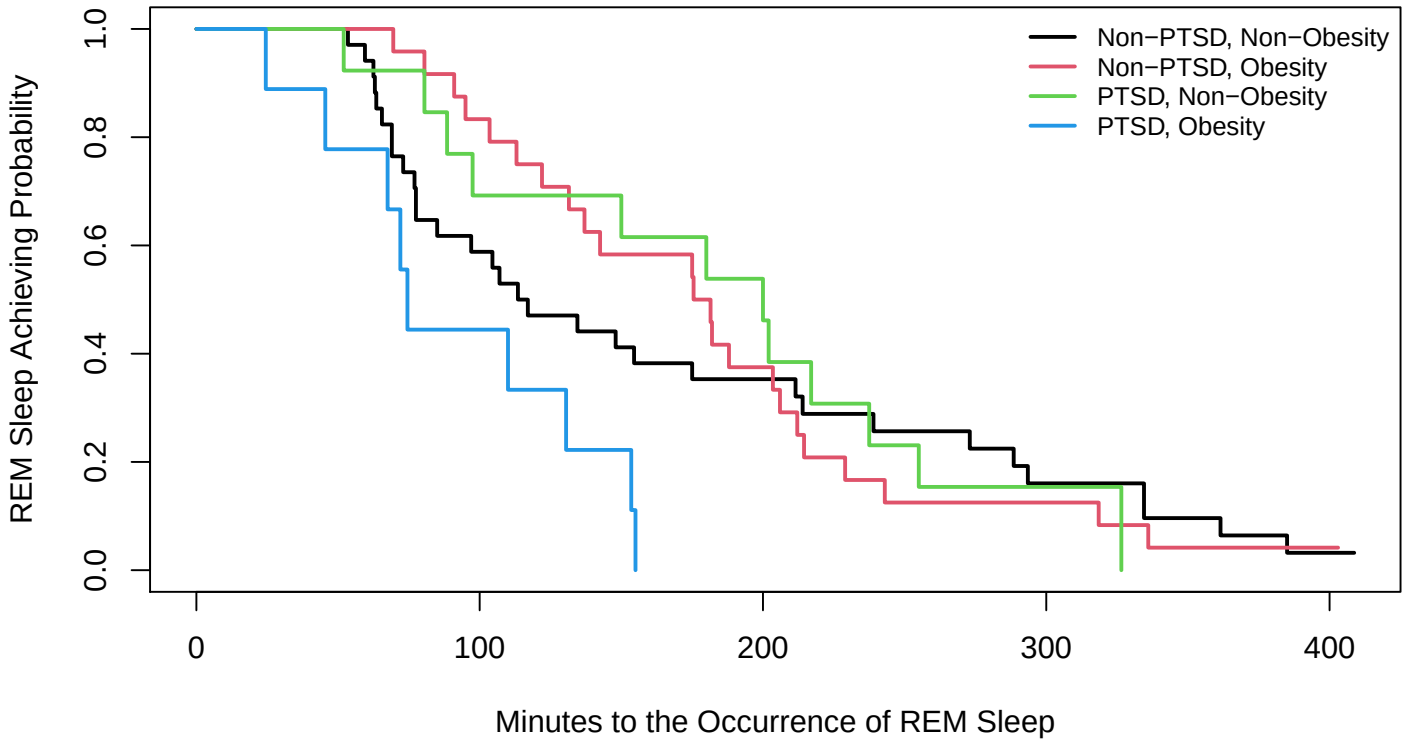

Figure 1: Kaplan-Meier Plot