

## Relationship between polypharmacy and comorbidity in adults with complex, severe obesity in a tertiary weight management program; A prospective observational study

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**Introduction/Objectives:** Obesity is typically associated with greater comorbidities and a corresponding increase in medication use. Few studies have examined the relationship between polypharmacy, therapeutic categories and pharmacological classes of medication and body mass index (BMI), Edmonton Obesity Staging System (EOSS) Stage, as well as obesity-related comorbidities such as coronary artery disease (CAD), type 2 diabetes mellitus (T2DM), hypertension and non-alcoholic fatty liver disease (NAFLD) within a complex, severely obese population, constituting the objectives of this study.

**Design:** A prospective observational cross-sectional study (2018-2020) of complex obese patients (n=270) referred by their general practitioner to the Blacktown Metabolic and Weight Loss Program in Sydney, Australia, with BMI ≥ 35 kg/m<sup>2</sup> with T2DM or BMI ≥ 40 kg/m<sup>2</sup> with at least two obesity complications. Total number, therapeutic categories and pharmacological classes of medications were correlated with clinicopathologic parameters.

### Results/Discussion

**Table 1: Cohort Characteristics**

Baseline Parameters	Mean±SD, n(%)
Age (years)	48.94±12.38
Male	n=95 (35.2%)
Female	n=175 (64.8%)
BMI (kg/m <sup>2</sup> )	51.26±11.80
EOSS	2.32±0.59
- EOSS Stage 1	n=17 (6.3%)
- EOSS Stage 2	n=150 (55.6%)
- EOSS Stage 3	n=103 (38.1%)
Medications	5.37±3.74
- Polypharmacy (use of ≥5 medications)	n=143 (53.0%)
- Mean age with polypharmacy	53.89±12.38
Pathology	
- Coronary artery disease (CAD)	29 (10.7%)
- Hypertension (HTN)	192 (71.1%)
- Hyperlipidaemia (HL)	143 (53%)
- Diabetes mellitus (DM)	150 (55.6%)
- Non-alcoholic fatty liver disease (NAFLD)	256 (94.8%)
- Psychiatric history (e.g. depression, anxiety, schizophrenia)	189 (70.0%)

### Cohort Characteristics

A total of 270 patient records were analysed. As shown in **Table 1**, the mean±SD age of participants was 48.94±12.38 years (95 (35.2%) male, 175 (64.8%) female). The mean±SD BMI was 51.26±11.80kg/m<sup>2</sup> and mean±SD EOSS Stage was 2.32±0.59. Participants affected by polypharmacy (n=143 (53%)) had a mean age 53.89±12.38 yrs. The majority of the population had a history of HTN, HL, DM, NAFLD and/or psychiatric conditions.

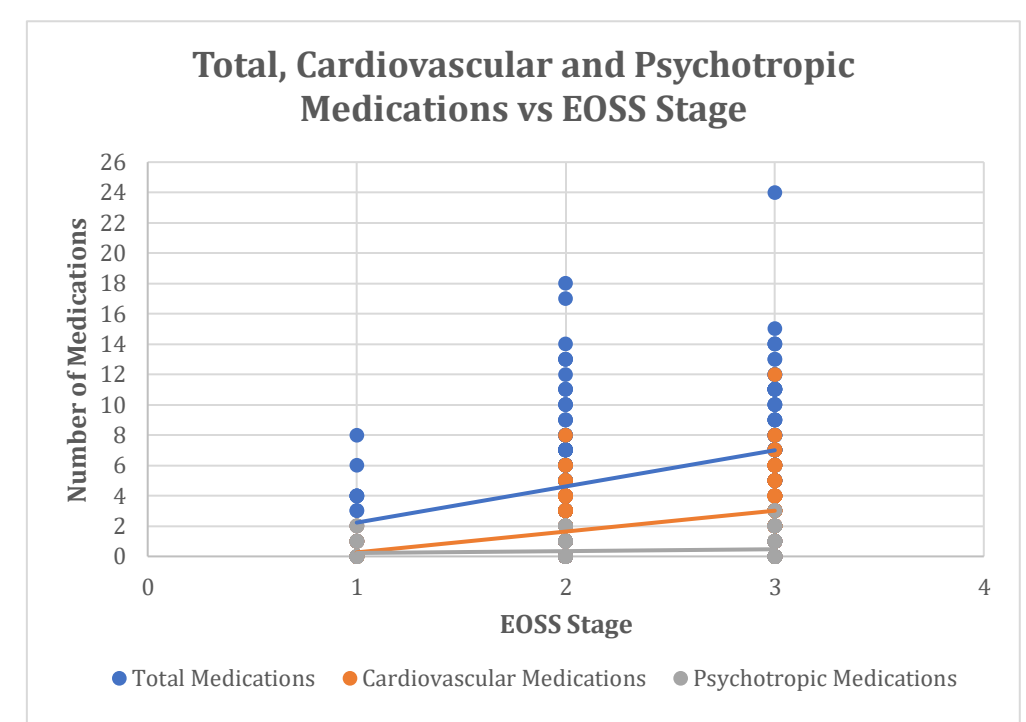
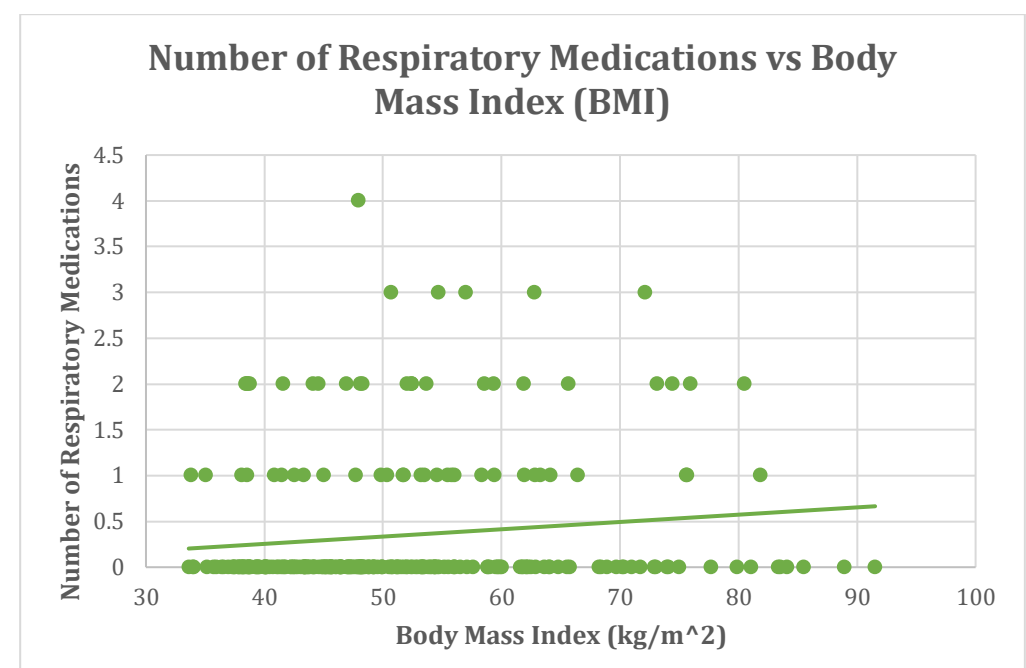
### BMI vs EOSS as a Predictor of Medication Burden

Only number of respiratory medications correlated with increased BMI. Total, cardiovascular and respiratory medications correlated with increased EOSS stage, suggesting a utility for routine EOSS staging for obese patients in clinical practice as a predictor of medication burden. These results are shown in **Figure 1**.

### Therapeutic Categories and Pharmacological Classes of Medication vs Pathology

As shown in **Table 2**, polypharmacy (total number of medications) and number of cardiovascular (CV) medications correlated significantly with diagnosis of CAD, HTN, HL, T2DM and increased HbA1c. Within CV medications, statins and aspirin were significantly increased with diagnosis of HL and T2DM with high %HbA1c. DM medications correlated with diagnosis of HL and T2DM. Respiratory medications increased with a psychiatric diagnosis.

**Figure 1: Total No. of Medications and Therapeutic Classes vs BMI and EOSS Stage**



**Table 2: Therapeutic Categories of Medication vs. Pathology**

\*Result is statistically significant (p<0.05)

	CAD	HTN	HL	T2DM	HbA1c	NAFLD	Psych Hx
Polypharmacy (Total meds)	*	*	*	*	*		
CV Meds	*	*	*	*	*		
- ARBs		*		*			
- Statins	*	*	*	*	*		
- Aspirin	*	*	*	*	*		
DM Meds			*	*	*		
Resp Meds							*
Analgesics		*					
Psychotropics							*

**Conclusions:** EOSS Stage may be a superior predictor for polypharmacy than BMI in severely obese patients. Certain conditions, namely coronary artery disease, hypertension, hyperlipidaemia and diabetes mellitus were found to be associated with increased medication burden, for which cardiovascular medication use was a significant driver. Severely obese, hyperlipidaemic patients exhibited an increase in diabetic medication use. Diabetic patients with higher HbA1c% exhibited an increase in aspirin and statin use, but not of antihypertensives, which may imply substandard hypertension control in this sub-cohort of patients. An increase in respiratory medications in patients with a psychiatric history may reflect comorbidity of respiratory pathology (e.g. asthma, COPD) with psychiatric disorders. Further research is required across larger cohorts and to incorporate more validated measures of medication burden.

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