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Determinants of Treatment For Obesity

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Background

- The negative physical, social, and psychological effects of having obesity demand that its underdiagnosis be addressed.
- As of 2014, **37.9%** of the adult population had a Body Mass Index (BMI) $\geq 30\text{kg/m}^2$
- A cross-sectional study found:
 - 48%** of patients with BMI $\geq 30\text{ kg/m}^2$ had electronic documentation of obesity.¹
- A large study of patients with obesity found:
 - 17.6%** received weight reduction counseling
 - 25.2%** received diet counseling
 - 20.5%** received exercise counseling.²
- The initial assessment of a randomized controlled trial focused on the effect of obesity on the problem list found:
 - 36.2%** of obese patients had obesity on the problem list
 - 5.1%** of obese patients with obesity not on the problem list had obesity addressed by a physician.³

Primary Objective

To identify the patient factors that are associated with an obesity diagnosis.

Secondary Objectives

To identify the lab orders associated with an obesity diagnosis.

To identify patient factors, obesity diagnosis code usage, and obesity related lab orders associated with weight loss.

Methods

- Through retrospective chart review, a database of 96,019 patients with a BMI $\geq 30\text{kg/m}^2$ was established. The following data was collected from each patient:

- BMI $\geq 30\text{kg/m}^2$
- Seen by a Lehigh Valley Physician Group Family or Internal Medicine between 6/1/16 – 5/31/19
- Aged 16-65 between 6/1/16 – 5/31/19
- No pregnancies between 6/1/16 – 5/31/19

Data Type	Data Elements
Demographics	Age, sex, race, ethnicity, primary language, smoking history
Vitals	Height, Weight, BMI, Blood pressure
Lab results	Lipids, Hgb A1c
Co-morbidities	Diagnosis of weight-related medical co-morbidity
Obesity on problem list	Whether or not an obesity-related diagnosis code is on the patient's problem list
Diagnosis code	Use of obesity-related diagnosis code (including BMI codes, and obesity codes)
Orders	Lab orders (lipids and Hgb A1c), medications (medications that are FDA approved or used off-label for weight loss), and referrals (for nutrition, counseling, bariatric medicine, or bariatric surgery) that are associated with an obesity-related diagnosis code
Weight loss	Calculate % baseline weight loss using first and last weight in EPIC during 3 year study period

	Obesity Diagnosis Used 43708 (45.5%)	No Obesity Diagnosis Used 52311 (55.5%)	Total 96019	Chi Test	p-value
Demographics					
Age	45 ± 13	45 ± 13	45 ± 13	-	-
Race				268.987	<0.001
American Indian or Alaska Native	124 (56.6)	95 (43.4)	219 (0.2)	-	-
Asian	303 (41.6)	425 (58.4)	728 (0.8)	-	-
Black or African American	4055 (50.1)	4046 (49.9)	8101 (8.4)	-	-
Pacific Islander or Native Hawaiian	46 (46.9)	52 (52.1)	98 (0.1)	-	-
White or Caucasian	34088 (44.8)	42065 (55.2)	76153 (82.5)	-	-
Multi-Racial	2110 (54.1)	1793 (45.9)	3903 (4.1)	-	-
Hispanic	7601 (52.4)	6898 (47.6)	14499 (15.1)	373.047	<0.001
Female	26556 (49.7)	26915 (50.3)	53471 (55.7)	836.310	<0.001
Primary Language				241.416	<0.001
English	40929 (45.2)	49722 (54.8)	90651 (94.4)	-	-
Spanish	2410 (55.7)	1915 (44.3)	4325 (4.4)	-	-
Other	186 (41.4)	263 (58.6)	449 (0.5)	-	-
Smoking Status				414.008	<0.001
Past	12829 (48.1)	13832 (51.9)	26661 (27.8)	-	-
Current	6287 (40.7)	9165 (59.2)	15452 (16.1)	-	-
Never	24566 (45.9)	29004 (54.1)	53570 (55.8)	-	-
Comorbidities					
Diabetes mellitus	8926 (55.0)	7317 (45.0)	16243 (16.9)	701.436	<0.001
Obstructive Sleep Apnea	8771 (68.7)	3998 (31.3)	12769 (13.3)	3188.076	<0.001
Osteoarthritis	3689 (56.7)	2822 (43.3)	6511 (6.8)	349.384	<0.001
Hyperlipidemia	16007 (49.9)	16089 (50.1)	32096 (33.4)	368.222	<0.001
Impaired Fasting Glucose	2105 (52.0)	1943 (48.0)	4048 (4.2)	71.576	<0.001
Impaired Glucose Tolerance	108 (52.9)	96 (47.1)	204 (0.2)	4.540	0.033
Prediabetes	2292 (66.8)	1140 (33.2)	3432 (3.6)	648.883	<0.001
Polycystic Ovarian Syndrome	841 (69.0)	378 (31.0)	1219 (1.3)	274.264	<0.001
Hypertension	19073 (50.7)	18567 (49.3)	37640 (39.2)	662.616	<0.001
Gestational Diabetes	374 (59.6)	253 (40.4)	627 (0.7)	50.804	<0.001
Obesity on Problem List	35562 (81.4)	7639 (14.6)	43201 (45.0)	42880.837	<0.001

	Obesity Diagnosis Used 43708 (45.5%)	No Obesity Diagnosis Used 52311 (55.5%)	Total 96019	Chi Test	p-value	T-test	p-value
Vitals							
BMI							
First Visit	38.0 ± 7.0	33.7 ± 4.4	35.6 ± 6.3	-	-	113.542	<0.001
Last Visit	37.9 ± 6.9	34.0 ± 4.4	35.7 ± 6.0	-	-	107.967	<0.001
Change	-0.04 ± 3.8	0.22 ± 2.5	0.1036 ± 3.2	-	-	-12.471	<0.001
Height (m) / Weight (kg)							
First Visit	1.7 ± 0.1 108.1 ± 23.4	1.7 ± 0.1 97.3 ± 14.8	1.7 ± 0.1 102.2 ± 20.8	-	-	-16.3, 82.5	<0.001
Last Visit	1.7 ± 0.1 107.8 ± 23.1	1.7 ± 0.1 97.9 ± 16.8	1.7 ± 0.1 102.5 ± 20.6	-	-	-17.5, 76.8	<0.001
Blood Pressure (mmHg)							
Systolic							
First Visit	127 ± 15	126 ± 15	126 ± 15	-	-	8.078	<0.001
Last Visit	125 ± 14	125 ± 14	125 ± 14	-	-	2.749	0.006
Diastolic							
First Visit	79 ± 10	79 ± 10	79 ± 10	-	-	5.491	<0.001
Last Visit	78 ± 9	78 ± 9	78 ± 9	-	-	-3.211	0.001
Labs							
Total Cholesterol (mg/dL)							
First Visit	188 ± 42	191 ± 43	190 ± 42	-	-	-9.746	<0.001
Last Visit	183 ± 40	187 ± 41	185 ± 40	-	-	-12.496	<0.001
Hemoglobin A1c							
First Visit	6.4 ± 2.4	6.57 ± 2.2	6.5 ± 2.3	-	-	-6.394	<0.001
Last Visit	6.4 ± 1.8	6.6 ± 3.2	6.5 ± 2.5	-	-	-7.090	<0.001
Change	-0.02 ± 1.7	-0.0025 ± 1.9	-0.012 ± 1.8	-	-	-1.778	0.075

Notable Results

- According to the Chi-squared analysis, the following patient characteristics **are** associated with the use of an obesity diagnosis code:
 - Race and Ethnicity
 - Sex
 - Primary Language
 - Smoking Status
 - All specified comorbidities **except** impaired glucose tolerance
- Women are **more** likely to receive an obesity diagnosis than men.
- HA1c for diagnosis group was slightly **lower** than HA1c for non-diagnosis group. This is likely due to a **higher testing rate** for diagnosis group relative to the non-diagnosis group.
- Total cholesterol for diagnosis group was slightly **lower** than total cholesterol for non-diagnosis group **despite** similar testing rates between the groups.
- Inclusion** of obesity on **problem list** is a significant marker for obesity diagnosis. However, **14.6%** of patients with obesity on the problem list do **not** have an obesity diagnosis.
- Internal medicine is responsible for more obesity diagnoses than family medicine.
- 0.42%** of the total patient pool received a nutrition referral.
- Those with an obesity diagnosis saw a **decrease** in BMI, whereas those without an obesity diagnosis saw an **increase** in BMI.
- 55.7%** of those who have **Spanish** as a primary language were diagnosed as obese compared to **45.2%** of those who have **English** as a primary language.

Outcomes

- In the future, one might look at the relationship between a physician's BMI and their diagnosis of obesity in patients.
- There is opportunity for improvement to decrease the number of patients who have obesity on the problem list without an obesity diagnosis.
- There is also opportunity for improvement to increase the percentage of patients that have obesity on the problem list given that studies show that it is more likely to be addressed.³

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