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Relationship Between Body Mass Index and Diagnosis of Overweight or Obesity in Veterans Administration Population

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Abstract: Introduction: A new class of drugs for weight loss has become available and is showing promising results. That is welcome news, as a recent report shows that half of the world's population is expected to be overweight or obese by 2035, and the veteran population is at particular risk. Although obesity is a modifiable risk factor for several comorbidities, it is underdiagnosed. Furthermore, for appropriate treatment for and management of obesity, a proper diagnosis should be made and documented. Objective: This paper examines the gap between obesity and its diagnosis for cohorts of patients with overweight, obesity, and morbid obesity patients in the Veterans Administration population. Using the risk adjustment models, it also identifies factors associated with the underdiagnosis of obesity in the VA population.Methods: Analysis was performed on a VA data set. We then identified two cohorts: Diagnosed Patients and Undiagnosed Patients (patient groups identified through BMI but not diagnosed by ICD-10 codes). The two groups were compared based on demographics (sex, age, race, and comorbidities) by using nonparametric chi-square tests. We used logistic regression analysis to predict the likelihood of the omission of diagnosis of all obese patients.Results: A total of 2,900,067 veterans had excess weight problems; of those, 46% were overweight, 46% had obesity, and 8% of them had morbid obesity. The overweight patients were the most underdiagnosed (96%), followed by the obese (75%) and morbidly obese cohorts (69%). Older, male, and white patients were more likely to be undiagnosed as overweight and obese, yet younger male patients were more likely to be undiagnosed as morbidly obese. ($p<.05$) Comorbidities significantly contributed to diagnosis. For the overweight and obese populations, patients were more likely to be diagnosed if they had hypertension. Among the morbidly obese group, patients were more likely to be diagnosed if they had hyperlipidemia. Conclusion: Despite obesity's high prevalence in the US Veteran population, underdiagnosis continues to be a significant problem. Considering effective treatments, it is crucial to diagnose obesity accurately to provide effective management, improving patients' overall quality of life.

1. Introduction

By the year 2000, the human race reached a milestone, when, for the first time in history, the number of adults with excess weight surpassed those who were underweight [1,2]. The average American today is overweight or obese [3]. In the United States (US), the prevalence of obesity has been accelerating every year since the World Health Organization (WHO) declared it a pandemic by in 2007, affecting individuals of all ages and all segments of society [2]. The prevalence of obesity in the US has nearly tripled in recent decades, increasing from 13% in 1960-1962 to 36.5% in 2011-2014 [4], thus affecting an estimated 60 million American adults. A 2017 report from the National Health and Nutrition Examination Survey (NHANES) showed that in the US, over 40% of young adults 20 to 39 years of age, 44% of middle-aged adults 40 to 59 years old, and 43% of older (>65years) adults are obese [5].

Obesity is a particular concern among veterans [3]. People who have served in the US military suffer from obesity in higher numbers and overall have disproportionately poorer health status when compared with that of the older non-veteran US population. This disproportionate effect on veterans may further compound their overall risk for morbidity and mortality [3]. Of the 6 million patients

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who receive Veterans Administration (VA) health care yearly, 80% fall into the categories of either being overweight or obese [3,6]. Previous studies done in this population have highlighted certain sub-groups that are at a higher risk, such as black women veterans, women veterans with schizophrenia, younger veterans (<65 years), and Native Hawaiian/Other Pacific Islander and American Indian/Alaska Native veterans [3,7]. The prevalence of obesity among veterans with post-traumatic stress disorder (PTSD) is higher than the prevalence of obesity among veterans overall within the VA (47% vs. 41%, respectively) [3,8].

The continued growth of the obesity epidemic is particularly concerning because obesity can have psychological, physical, and social impacts on an individual's well-being. In addition, obesity is a significant risk factor for chronic diseases such as cardiovascular disease, hypertension, type 2 diabetes mellitus, hyperlipidemia, stroke, certain cancers, obstructive sleep apnea, liver and gallbladder disease, osteoarthritis, and gynecological problems [3,9-13]. Obesity and its comorbidities are a major cause of morbidity and mortality in the US [3,14]. Furthermore, it results in poor long-term health outcomes, which are costly to the affected individual, their families, and, ultimately, to the US healthcare system [3,13].

The accurate identification and diagnosis of obesity are essential before the evaluation and treatment of obesity and its associated comorbidities [15]. The US Preventive Services Task Force (USPSTF) recommends screening all adults for obesity [16]. It also recommends that once a diagnosis of obesity has been established by body mass index (BMI) ≥30 kg/m^2, the patient should be offered or referred to an interdisciplinary lifestyle intervention program [16].

Despite these recommendations and formal recognition by the American Medical Association as a disease [17], obesity continues to be underdiagnosed in clinical practice [18]. Furthermore, newly approved medications for chronic weight management have been shown in clinical trials to improve weight loss by 15% or more than 10 pounds in one year. However, since these drugs are available only by prescription, a correct diagnosis of obesity should be made. Without an appropriate prescription and insurance coverage, these drugs cost between $1000 and $1300 per month, placing a heavy economic burden on the patient. Hence, identifying undiagnosed obesity will allow more patients to access these treatments and receive the recommended care, comprising of an interdisciplinary lifestyle intervention program.

This paper examines the diagnosis of overweight, obesity, and morbid obesity in VA patients and identifies factors associated with the underdiagnosis of obesity in this population.

2. Methods

The VA data set used for the analysis included data from 25 million enrollees as of December 2022, and contain inpatient and outpatient files, lab information, survival, and vital statistics (e.g., height, weight, and blood pressure) collected from 152 VA hospitals, 133 VA Community Living Centers, and 958 outpatient clinics. BMI was calculated as weight (kg)/[height (m)]^2 using the vital statistics from the data set.[19]

Three groups of patients were defined using the BMI: overweight (≥25 kg/m^2, <30 kg/m^2), obese (≥30 kg/m^2 to <40 kg/m^2), and morbidly obese (≥40 kg/m^2). Among these patients, diagnosed patients were classified by ICD-10 codes as follows:

- Overweight identified by E66.3, Z68.26, Z68.27, Z68.28, Z68.29, Z68.53
- Obesity identified by E66.9, E66.09, E66.1, E66.8, Z68.3, Z68.54
- Morbid obesity identified by E66.01, E66.2, Z68.4, Z68.54

We then identified two cohorts: diagnosed patients and undiagnosed patients (patient groups identified through BMI but not diagnosed by ICD-10 codes). The two groups were compared based on demographics (sex, age, race, and comorbidities,) using non-parametric chi-square tests. We used logistic regression analysis to predict the likelihood of the omission of diagnosis of all obese patients. Age, gender, race, and comorbidities such as coronary artery disease, hypertension, hyperlipidemia, diabetes, sleep apnea, osteoarthritis, hyperuricemia, and gallbladder disease were used as explanatory variables, and each variable's impact on the odds ratio (OR) of the omission of the

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diagnosis was calculated. An alpha level of .05 was used as the threshold level of significance. All statistical analyses were performed using SAS 9.4 (SAS Institute, Cary, NC).

3. Results

A total of 2,900,067 veterans had excess weight problems: 46% of these veterans were overweight, 46% had obesity, and 8% of them had morbid obesity. The overweight population was the most underdiagnosed by ICD-10 codes. Of 1,333,473 patients who were overweight, only 57,675 (4%) were diagnosed by ICD-10 codes as overweight at VA facilities. Of 1,343,968 obese patients, only 329,338 patients (25%) were diagnosed as obese. Of the total 222,626 patients with morbid obesity, only 63,380 patients (31%) were diagnosed as having morbid obesity (**Table 1**).

For the overweight groups, relative to diagnosed patients, undiagnosed patients were more likely to be older (63.99 years vs. 61.11 years, p<.001), male (93.53% vs. 88.92%, p<.001), and white (71.36% vs. 69.22%, p<.001). Additionally, undiagnosed patients were more likely to have hypertension (40.87% vs. 43.15%, p<.001), hyperlipidemia (29.10% vs. 34.61%, p<.001), diabetes (20.72% vs. 23.97%, p<.001), sleep apnea (6.92% vs. 10.74%, p<.001), osteoarthritis (11.46% vs. 12.80%, p<.001), and hyperuricemia (0.84% vs. 1.22%, p<.001). There were no statistical differences in coronary artery disease (7.13% vs. 6.92%, p=.0568) and gallbladder disease (0.06% vs. 0.08%, p=.1041) (**Table 2**).

Results for the obese groups were similar to the overweight groups except for comorbidities. For obese groups, relative to diagnosed patients, undiagnosed patients were more likely to be older (61.63 years vs. 59.45 years, p<.001), male (92.69% vs. 89.64%, p<.001), white (70.86% vs. 68.80%, p<.001), and more likely to have coronary artery disease (7.06% vs. 7.52%, p<.0001), hypertension (45.91% vs. 50.33%, p<.001), hyperlipidemia (30.95% vs. 36.26%, p<.001), diabetes (28.83% vs. 33.71%, p<.001), sleep apnea (14.02% vs. 21.97%, p<.001), osteoarthritis (13.57% vs. 16.00%, p<.001), hyperuricemia (1.02% vs. 1.49%, p<.001). There were no statistical differences in gallbladder disease (0.06% vs. 0.08%, p=.0008).

For morbidly obese patients, unlike the obese and overweight group, relative to the diagnosed group, undiagnosed patients were slightly younger (59.00 years vs. 59.22 years, p<.0001) and were more likely to be male (88.68% vs. 90.32%, p<.001) and white (68.73% vs. 70.78%, p<.001). Having a comorbidity increased the likelihood of diagnosis. These patients were more likely to have coronary artery disease (6.85% vs. 9.19%, p<.0001), hypertension (52.70% vs. 61.85%, p<.001), hyperlipidemia (32.31% vs. 39.01%, p<0.001), diabetes (39.55% vs. 49.03%, p<.001), sleep apnea (28.56% vs. 42.21%, p<.001), osteoarthritis (16.62% vs. 22.57%, p<.001), and hyperuricemia (1.25 % vs. 1.78 %, p<.001). There were no statistical differences in gallbladder disease (0.06% vs. 0.09%, p=.0095).

Results of logistic regression analyses indicate that the patient characteristics assessed were predictive of an obesity diagnosis (including overweight, obesity, or morbid obesity). As the ORs indicated, overweight, obese, and morbidly obese patients were more likely to be undiagnosed if they were older (OR=1.34, 1.44, and 1.16, respectively) and male (OR=1.64, 1.38, and 0.92, respectively. Other than white and black, patients were more likely to be undiagnosed for the obese and morbidly obese population (OR= 0.97 [95% confidence interval (CI), 0.95-0.99]; OR= 0.94 [95% CI, 0.88-0.99], respectively) (**Table 3**).

Any comorbidity increased the likelihood of an obesity diagnosis, including coronary artery disease and gallbladder disease. Therefore, comorbidity consistently increased the likelihood of diagnosis across the groups after controlling for age, gender, and race. As a result, almost all ORs are under one and significant. For the overweight and obese population, patients were more likely to be diagnosed if they had hypertension (OR=0.96 [95% CI, 0.94-0.98]; OR= 0.92 [95% CI, 0.91-0.92], respectively). However, for the morbid obesity population, patients were more likely to be diagnosed if they had hyperlipidemia (OR=0.94 [95% CI, 0.92-0.96]).

4. Discussion

It is estimated that less than 30% of adults with obesity receive this diagnosis during their primary care physician visits [18]. The present study confirmed that underdiagnoses of obesity is clear for both genders and across all age groups and races within the VA population. Our data showed that 69% of morbidly obese patients were undiagnosed, 75% of obese patients were underdiagnosed, and almost all of the overweight patients (96%) went undiagnosed. Our findings are consistent with those of Betancourt et al. [3], who examined the obesity and morbidity risk in the US veteran population and found that 69.7% of the population had obesity/overweight status, similar to the 69% of undiagnosed morbidly obese patients in our study. This highlights that patients' overweight or obese status according to BMI does not necessarily translate to clinical practice and administrative data, therefore increasing the likelihood of not receiving proper treatment. However, comparisons must be interpreted with the understanding that VA data reflect a treatment-seeking population, who may be older and sicker than the general population [7].

Several reasons have been attributed to the underdiagnosis of obesity, including the perception by healthcare providers that obesity is not a disease, low expectations for patient success, lack of time or knowledge to provide appropriate advice regarding nutrition, societal stigma, concerns with denials of payment for services, and limited therapeutic tools to treat patients with obesity [20]. A recent survey of people with obesity (n = 3,008) and healthcare providers (HCPs) (n = 606) discovered that although obesity is perceived as a disease by the majority of people with obesity (65%) and HCPs (80%), providers and patients struggle with talking about weight for various reasons [15,21]. Patients report that they do not seek help from their HCP because they believe it is their personal responsibility (44%); they already know what to do (37%); and/or they do not have financial means to support a weight loss effort (23%) [15,21]. The primary reasons HCPs do not initiate discussions about weight loss are time constraints (52%) and having more important issues to discuss with the patient (45%) [15,21]. Other HCPs cite that the patient was not motivated to lose weight (27%) or was not interested in weight loss (26%), and/or expressed concern about the patient's emotional state or psychological issues (22%) [15,21]. Furthermore, recognition and coding for obesity in civilian healthcare settings are poor [15]. Previous studies have shown that among patients who met the objective criteria for obesity, few were diagnosed with an obesity code [15,22,23] or clinical visits lacked a complete height and weight record to facilitate calculating BMI [15]. Additionally, another study showed that patients with known comorbidities (e.g., type 2 diabetes, hypertension, sleep apnea,) were not diagnosed with obesity [15,21]. Additionally, some studies indicated that older patients and men were significantly less likely to have an obesity diagnosis, and the presence of an obesity diagnosis was the strongest predictor of creating a plan to address obesity [15,24].

Our data add to the literature indicating that the underdiagnosis of obesity could be attributable to the low documentation of overweight and obesity due to under-coding and the general perception that these conditions are not identified as a significant problem in primary care [15,22]. Similarly, Mattar et al. [22] examined the prevalence of obesity documentation among patients with corresponding BMI as contained in patients' electronic medical records and found that 5.6% of patient records listed obesity as a problem.

Furthermore, a reason why morbid obesity is more likely to be diagnosed could be the visual undeniability of the problem's severity [22]. Additionally, these results indicate that providers may often wait until the health condition becomes severe enough to warrant an ICD-10 diagnosis.

There was a clear demographic divide among our overweight, obese, and morbidly obese patient population as to whether they received a diagnosis. Older, male, and White patients were more likely to have undiagnosed overweight and obesity, while younger male patients were more likely to have undiagnosed morbid obesity. This finding is consistent with a recent study of nearly 5 million VA primary care patients (347,112 females; 4,567,096 males), in which 37% were overweight and 41% were obese [7,9]. In that study, obesity was common among male veterans 18 to 44 years of age [7]. Our data support these statistics, showing that patients with obesity and morbid obesity were more likely to be male (295,498 males and 61,763 males, respectively). However, in contrast with

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that study, our statistics found that older patients (>65 years) were undiagnosed with obesity or and morbid obesity (147,232 males and 27,934 males, respectively). Again, this discrepancy could be due to VA data reflecting a treatment-seeking population that may be older and sicker than the general population [7].

The discrepancies involving gender and age could be explained by weight-related beliefs and behaviors. The younger male veterans may have the perception that men are heavier due to muscle mass, although with a BMI of 30 or higher, the correlation with obesity is generally strong [15]. In light of the negative connotation of being labeled "obese," this finding might imply a negative effect on a population who is susceptible to depression [3,9]. Regardless, obesity should be identified and addressed early to prevent morbidity and mortality from associated medical conditions.

Our study highlights that comorbidities can signify a diagnosis of obesity or morbid obesity. Hypertension, hyperlipidemia, diabetes, and osteoarthritis were significantly associated with a diagnosis of overweight, obesity, and morbid obesity. Furthermore, a multivariate analysis study [22] showed that in addition to age and gender, morbid obesity and the cumulative number of comorbidities were significantly associated with obesity documentation. Nonetheless, this highlights the concern that delaying the proper diagnosis of obesity until a comorbidity is diagnosed might delay prevention, health education, and early weight management and treatment.

In an effort to stem the tide of the obesity epidemic, the VA healthcare system offers various weight-management programs [3,9]. Some VA initiatives aimed at providing the tools for veterans to better manage their weight include education on proper nutrition and the benefit of regular exercise, the use of technology such as daily apps, medications, and, when warranted, bariatric surgery [3]. However, these interventions are not being properly utilized due to the underdiagnosis of obesity in the veteran population.

5. Limitations

This study has several limitations related to the use of administrative data sets, which may be subject to inaccurate coding of patient clinical diagnoses and procedures, with clinical information limited to conditions and treatments defined by ICD-10-CM codes. Furthermore, a consensus is still lacking among experts regarding how to define and measure obesity properly. While BMI is the accepted standard, it has been shown to suffer from various limitations. First, BMI is an indirect measure of body fat and has been shown to have high specificity but low sensitivity to identify adiposity [25]. In addition, BMI measurements do not factor in age-related changes in body composition such as increased body fat and decreased muscle mass [26].

We have studied the VA population. Although the data set is nationally representative, it is predominantly male and contains a vulnerable population. Replication of this study in other data sets that are more representative in terms of gender and income distribution would be useful.

6. Conclusion

Despite obesity's high prevalence in the US veteran population, underdiagnosis continues to be a significant problem. Additionally, our study findings also highlight how obesity is improperly coded and could be a reason for low documentation. Furthermore, we identified predictors of obesity documentation such as age, gender, and comorbidities. Specifically, we demonstrated that obesity is underdiagnosed, but those with morbid obesity were much more likely to be diagnosed than overweight patients. This finding could be associated with the visual undeniability of the problem severity and the fact that morbidly obese patients tend to have more severe associated comorbidities. Nonetheless, obesity is a modifiable risk factor for multiple comorbidities that, when promptly and properly treated, can improve the overall health of the patient, and lower healthcare costs. Therefore, it is crucial to diagnose obesity accurately to provide effective management, improving patients' overall quality of life. Additionally, it is important to address the factors that are associated with the underdiagnosis of obesity. For example, BMI as a core measure of vital signs is not fully harnessed and applied in the delivery of health care. Another factor contributing to the underdiagnosis of obesity could be the low documentation of obesity in the administrative data and electronic health records, as shown in our data.

Further studies are recommended to investigate the underlying causes of lower rates of obesity documentation for certain socio-demographic groups. Moreover, studies looking at physician-specific factors that play a role in determining diagnosed obesity are warranted. Especially with the availability of new treatments, insurance companies require a diagnosis for coverage. Therefore, closing the underdiagnosis gap is important.

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Table 1. Attrition.

	Overweight: BMI ≤25 to < 30	Obesity: BMI ≥30 to < 40	Morbid Obesity: > BMI 40
BMI measurement	1,275,798	1,014,330	154,246
ICD-10 codes	57,675	329,638	68,380
Total population	1,333,473	1,343,968	222,626

Table 2. Population Characteristics.

	Overweight by BMI *(N = 1,275,798)*		Overweight by ICD 10 code *(N = 57,675)*			Obese by BMI *(N = 1,014,330)*		Obese by ICD 10 code *(N = 329,638)*			Morbid Obese by BMI *(N = 154,246)*		Morbid Obese by ICD 10 code *(N = 68,380)*		
	N/Mean	%/Std	N/Mean	%/Std	p-value	N/Mean	%/Std	N/Mean	%/Std	p-value	N/Mean	%/Std	N/Mean	%/Std	p-value
Age (years)	63.99	15.71	61.11	14.54	<.0001	61.63	14.61	59.45	13.64	<.0001	59.00	13.19	59.22	11.90	0.0001
18-45	182,585	14.31%	9,163	15.89%	<.0001	157,969	15.57%	56,166	17.04%	<.0001	26,084	16.91%	9,588	14.02%	<.0001
46-54	117,499	9.21%	7,074	12.27%	<.0001	124,346	12.26%	49,427	14.99%	<.0001	25,027	16.23%	11,562	16.91%	0.0001
55-64	231,405	18.14%	12,490	21.66%	<.0001	204,899	20.20%	76,813	23.30%	<.0001	37,871	24.55%	19,296	28.22%	<.0001
65+	744,309	58.34%	28,948	50.19%	<.0001	527,116	51.97%	147,232	44.66%	<.0001	65,264	42.31%	27,934	40.85%	<.0001
Gender															
Male	1,193,314	93.53%	51,283	88.92%	<.0001	940,225	92.69%	295,498	89.64%	<.0001	136,790	88.68%	61,763	90.32%	<.0001

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Female	82,484	6.47%	6,392	11.08%	<.0001	74,105	7.31%	34,140	10.36%	<.0001	17,456	11.32%	6,617	9.68%	<.0001
Race															
White	910,352	71.36%	39,923	69.22%	<.0001	718,767	70.86%	226,780	68.80%	<.0001	106,017	68.73%	48,398	70.78%	<.0001
Black	202,865	15.90%	10,576	18.34%	<.0001	173,197	17.08%	65,461	19.86%	<.0001	30,538	19.80%	13,296	19.44%	0.0527
Other	41,167	3.23%	2,110	3.66%	<.0001	30,437	3.00%	9,895	3.00%	0.9749	4,828	3.13%	1,839	2.69%	<.0001
Unknown	121,414	9.52%	5,066	8.78%	<.0001	91,929	9.06%	27,502	8.34%	<.0001	12,863	8.34%	4,847	7.09%	<.0001
Comorbidities															
Coronary artery disease	90,943	7.13%	3,991	6.92%	0.0568	71,596	7.06%	24,801	7.52%	<.0001	10,568	6.85%	6,286	9.19%	<.0001
Hypertension	521,406	40.87%	24,884	43.15%	<.0001	465,660	45.91%	165,903	50.33%	<.0001	81,292	52.70%	42,291	61.85%	<.0001
Hyperlipidemia	371,263	29.10%	19,962	34.61%	<.0001	313,911	30.95%	119,540	36.26%	<.0001	49,843	32.31%	26,675	39.01%	<.0001
Diabetes	264,291	20.72%	13,826	23.97%	<.0001	292,407	28.83%	111,105	33.71%	<.0001	61,012	39.55%	33,530	49.03%	<.0001
Sleep apnea	88,262	6.92%	6,196	10.74%	<.0001	142,258	14.02%	72,405	21.97%	<.0001	44,050	28.56%	28,862	42.21%	<.0001
Osteoarthritis	146,248	11.46%	7,382	12.80%	<.0001	137,617	13.57%	52,730	16.00%	<.0001	25,637	16.62%	15,433	22.57%	<.0001
Hyperuricemia	10,661	0.84%	702	1.22%	<.0001	10,306	1.02%	4,901	1.49%	<.0001	1,932	1.25%	1,220	1.78%	<.0001
Gallbladder disease	757	0.06%	44	0.08%	0.1041	595	0.06%	249	0.08%	0.0008	88	0.06%	60	0.09%	0.0095

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Table 3. Logistic Regressions.

	Overweight				Obesity				Morbid Obesity			
	Odds Ratio	**Z-Value**	**95% Confidence Limits**		**Odds Ratio**	**Z-Value**	**95% Confidence Limits**		**Odds Ratio**	**Z-Value**	**95% Confidence Limits**	
			Lower	**Upper**			**Lower**	**Upper**			**Lower**	**Upper**
Age (years)												
46-54	0.8925	0.000	0.8641	0.9218	0.9927	0.324	0.9784	1.0072	0.9337	0.000	0.9033	0.9651
55-64	1.0039	0.794	0.9752	1.0334	1.0951	0.000	1.0805	1.1100	0.9302	0.000	0.9018	0.9596
65+	1.3461	0.000	1.3103	1.3830	1.4449	0.000	1.4268	1.4633	1.1632	0.000	1.1282	1.1994
Gender												
Male	1.6614	0.000	1.6149	1.7093	1.3992	0.000	1.3796	1.4190	0.9285	0.000	0.9000	0.9579
Race												
White	1.0613	0.010	1.0144	1.1103	0.9510	0.000	0.9290	0.9736	0.8326	0.000	0.7875	0.8802
Black	1.0334	0.182	0.9848	1.0844	0.9091	0.000	0.8869	0.9318	0.9131	0.002	0.8614	0.9679
Unknown	1.1141	0.000	1.0574	1.1738	0.9900	0.459	0.9639	1.0167	0.9411	0.063	0.8828	1.0032
Comorbidities												
Coronary artery disease	1.0879	0.000	1.0513	1.1259	1.0121	0.136	0.9962	1.0282	0.8982	0.000	0.8679	0.9296
Hypertension	0.9657	0.001	0.9466	0.9852	0.9210	0.000	0.9124	0.9297	0.8739	0.000	0.8551	0.8931
Hyperlipidemia	0.7737	0.000	0.7586	0.7891	0.8501	0.000	0.8422	0.8580	0.9455	0.000	0.9259	0.9656
Diabetes	0.8314	0.000	0.8137	0.8495	0.8126	0.000	0.8049	0.8204	0.7829	0.000	0.7667	0.7994
Sleep apnea	0.6644	0.000	0.6462	0.6830	0.6248	0.000	0.6185	0.6313	0.6175	0.000	0.6055	0.6297
Osteoarthritis	0.9345	0.000	0.9109	0.9587	0.8958	0.000	0.8857	0.9060	0.7798	0.000	0.7619	0.7982
Hyperuricemia	0.7655	0.000	0.7086	0.8271	0.7761	0.000	0.7496	0.8035	0.8366	0.000	0.7773	0.9004
Gallbladder disease	0.8725	0.381	0.6432	1.1837	0.8636	0.055	0.7435	1.0031	0.7658	0.117	0.5488	1.0687