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RELATION BETWEEN LENGTH OF (OESOPHAGO-DIAPHRAGMATIC JUNCTION)-(OESOPHAGO-GASTRIC JUNCTION) DIFFERENCE AND BODY MASS INDEX IN SULAIMANI GOVERNORATE

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ABSTRACT

Background: The length of (Oesophago-diaphramgatic junction)-(Oesophago-gastric junction) (ODJ-OGI) difference is the distance between Z line and esophageal hiatus which is normally equal or less than 2 cm. **Objective:** To find relation of ODJ-OGJ length's difference with body mass index, diseases of the foregut, age, gender, smoking status and alcoholic status. **Patients and Methods:** The study involved 520 patients who underwent Oesophago-gastro-deudenoscopy (OGD) at the Endoscopic Department of Teaching Hospital in Sulaimani. The examination involved measuring the Oesophago-gastric and Oesophago-diaphragmatic junction distances, height and weight, and BMI according to the World Health Organization formula. The endoscopist performed the examination. **Results:** The study involved 520 patients, with a mean age of 37.75 years. The majority were overweight and obese (76.35%), with 84.2% showing abnormal OGD findings. Most were nonsmokers and not alcoholic (91.7%). The highest mean difference length was observed in obese and overweight patients, with the longest difference length observed in patients with abnormal OGD findings. Gender and BMI were significant, with females having the highest percentage of obesity and overweight and males having the highest percentage. **Conclusion:** The length of ODJ-OGJ differences increased with BMI, foregut diseases, and patient age, but not with gender, smoking status, or alcoholic status. BMI is more affected by females.

KEYWORDS: BMI, Length distance, Oesophago-diaphramgatic junction, Oesophago-gastric.

INTRODUCTION

Over the past ten years, there has been an alarming rise in the frequency of overweight and obesity worldwide.[1] A measurement of the human body's shape based on body mass index (BMI) or Quetelet's index The Belgian polymath Adolphe Quetelet developed it between 1830 and 1850 while working on "social physics".[2] A person's body mass in kilograms divided by their height in meters squared is their body mass index, or BMI. Patients were classified as underweight if their BMI was less than 18.50 kg/m, normal weight if their BMI was between 18.50 and 24.99 kg/m^2, overweight if their BMI was between 25.00 and 29.99 kg/m^2, and obese if their BMI was greater than 230.00 kg/m^2, according the World Health Organization.[3,4] Before the 20th century, obesity was uncommon for thousands of years.[5] As a result, the WHO officially identified obesity as a global epidemic in 1997. As of 2005, the World Health Organization (WHO) estimated that 9.8% of adults worldwide were obese, with women having higher rates than males.[7] One of the most important public health issues of the twenty-first century, according to authorities, is obesity.[8] Additionally, the prevalence of obesity rises with age, at least until the age of 50 or 60.[9]

Obesity rates, which were formerly thought to be exclusive to high-income nations, are on the rise globally. The most noticeable effects of these increases have been observed in metropolitan areas.[7] When compared to lower age groups.[10] the BMI values of older age groups for both genders were greater. Smokers, both men and women, have considerably lower BMIs than the non-smoking and ex-smoking groups.[11,12] The muscular tube of 25 centimeters that joins the throat and stomach is known as the esophagus.[13] The individual's height affects the length of their esophagus.[14]

The esophagus has three constrictions along its vertical course: the first is at the cricopharyngeal sphincter, 15 cm from the upper incisor teeth; this is the narrowest part of the esophagus and roughly corresponds to the sixth cervical vertebra; the second is at the aortic arch and left main bronchus, 23 cm from the upper incisor teeth; the third is at 40 cm from the upper incisor teeth, where it pierces the diaphragm; the lower esophageal sphincter (LES) is located at this level.[13,15,l6] Histologically the esophagus has the following 4 concentric layers.[l6]
1. Mucosal layer 2. Submucosal layer 3. Muscular layer 4. Adventitial layer

A non-keratinizing stratified squamous epithelium that is continuous with the throat's epithelium forms the mucosa, the innermost layer. At the gastro-esophageal junction, mucosal epithelium transforms from squamous cell epithelium to columnar cell epithelium. The name "Z line" or "squamocolumnar junction" has been applied to this intersection.[15,16]

Depending on the patient's position, breathing, and stomach distension, the exact connection between the Z-line and the diaphragmatic hiatus varies slightly in every patient during an endoscopy.[17]

The stomach mucosa is frequently visible in healthy individuals up to one centimeter above the diaphragm. If the Z-line stays more than 2 cm above the hiatus, a hiatus hernia is diagnosed.[17]

The Z-line's endoscopic appearance varies greatly, and its normal range of fluctuation is wide. Usually, it is symmetrical and has an angular or flowing shape. The pale pink or gray esophageal epithelium contrasts with the redder, fresher, and somewhat elevated appearance of the gastric mucosa. The border may be quite erratic; the esophagus may receive "flames" from the stomach mucosa, and the esophageal epithelium may extend its tongues downward. These extensions could have an entirely asymmetrical look or they could be mostly homogeneous and symmetrical. The epithelial barrier is often well defined, though it can occasionally appear blurry or fuzzy. The line might exhibit hypertrophic thickening or perhaps develop into a ring that functions.[18]

Objective: To find relation of ODJ-OGJ length's difference with body mass index, diseases of the foregut, age, gender, smoking status and alcoholic status.

PATIENTS AND METHODS

This is a prospective cross sectional study, which include 520 patient for whom Oesophago-gastro-deudenoscopy (OGD) done in Endoscopy Department of Teaching Hospital in Sulaimani Governorate in Kurdistan Region-Iraq. In a period from November 2011 to May 2013. The questionnaire paper prepared for this study, Verbal consent was taken and data were collected after reporting demographic data, age, gender, smoking state and alcoholic state. and all patients were prepared for OGD, the procedure was carried under local anesthesia (xylocaine 10% oral spray).

Every patient had an endoscopic evaluation to look for a variety of normal and atypical findings that might help to explain their problems. The patients were examined by the same Endoscopist. Olympus CLV-Q160V The OGD examination was conducted using endoscopic equipment. The esophageal-gastric junction (OGJ) distance was measured in centimeters, measuring from the incisor to the Z-line. As the patient is asked to sniff or inhale quickly, the gastric folds can be seen running proximally over the hiatus margin. This measurement of the length of the Oesophago-diaphragmatic junction (ODJ) was made from the incisor to the Oesophago-diaphragmatic junction (diaphragmatic hiatus) in centimeters. The difference between ODJ distance and OGJ distance were calculated.

Because the equipment is more erect during endoscopic withdrawal than after insertion, distance measurements were taken during that process. If an OGD test revealed an abnormal finding (ODJ-OGJ difference greater than 2 cm), esophagitis, gastritis, duodenitis, gastric erosions, gastric ulcers, and duodenal ulcers, the patient was deemed to have positive OGD. In accordance with WHO formula.[4] BMI was computed using the nearest cm and kg for each measurement of height and weight, respectively. The International Classification of Diseases, Revision 9, was used to categorize smokers (1CD-9). Individuals were divided into three categories: never, never smoked, and currently. The number of cigarettes smoked per day (<20, 20, >20) was used to identify current smokers.[19]

Alcohol consumption classified according to National Center for Health Statistics in to[20]

Adults who have not consumed a drink in the previous year are considered nondrinkers (including lifetime abstainers and former drinkers).

1. Adults who have consumed 12 or more drinks in their lives and 1–11 drinks in the previous year are considered current infrequent drinkers.
2. Adults who, on average, drank three or less drinks per week over the previous year are considered light drinkers.
3. People who, on average, had more than three drinks and up to and including seven drinks per week for women or more than three drinks and up to and including fourteen drinks per week for males during the previous year are considered moderate drinkers.
4. Alcoholics Individuals that are considered heavier are those who have consumed 12 or more drinks during their lifetime and have averaged over 7 drinks per week (for women) or over 14 drinks per week (for males) in the previous year.

Statistical analysis

Statistically analysis was done using SPSS (Statistical Package for the Social Sciences-version (26.0) package software program for statistical analysis. Descriptive statistics as means, numbers and percentages were calculated for all variables, as well as analytical statistics were done to find the relations between variables. Chi square test, t test, and one way ANOVA were used for calculating P-value. A p-value ≤0.05 was considered as statistically significant.

RESULTS

This study included a total number of 520 patients for whom OGD were performed. There were 315 females and 205 males with female to male ratio of 1.53:1. The age was ranged from 14 to 83 years with a mean age of 37.75 years. The majority of studied groups was non-smokers (91.7%). Non-alcoholic (97.7%) and abnormal positive OGD finding of (84.2%) as shown in table (1).

Table (1): The distribution of studied sample according to patients characteristics.

Patients characteristics		Frequencies	%
Gender	**Males**	205	39.4
	Females	315	60.6
Smoking status	**Non-smoker**	477	91.7
	Smoker	43	8.3
Alcoholic status	**Not alcoholic**	508	97.7
	Alcoholic	12	2.3
OGD finding	**Normal OGD**	82	15.8
	Abnormal OGD	438	84.2

This study showed that the highest mean length of OGJ-ODJ differences was reported among obese and overweight (2.14, 1.96) cm respectively, this association was of highly significance (p=0.001), as shown in table (2). The same table showed that the highest mean length of OGJ-ODJ differences was reported among the patients with abnormal OGD finding (1.95) cm, while the patients with normal OGD finding had lower mean difference (1.73) cm, this association was statistically significant (p=0.002).

Table (2): The mean length of OGJ-ODJ differences.

Variables		Mean	SD	95% CI		p-value
				Lower	Upper	
Gender	**Males**	1.98	0.891	1.86	2.10	0.071*
	Females	1.84	0.843	1.75	1.94	
Smoking status	**Non-smoker**	1.88	0.869	1.80	1.95	0.051*
	Smoker	2.14	0.774	1.90	2.38	
Alcoholic status	**Not alcoholic**	1.89	0.870	1.81	1.97	0.154*
	Alcoholic	2.25	0.452	1.96	2.54	
BMI	**Underweight**	1.68	0.568	1.43	1.93	0.001**
	Normal	1.72	0.784	1.61	1.82	
	Overweight	1.96	0.821	1.84	2.08	
	Obese	2.14	0.955	1.96	2.33	
OGD finding	**Normal OGD**	1.62	0.513	1.51	1.73	0.002*
	Abnormal OGD	1.95	0.906	1.86	2.03	
**t-test for independent two means; **One way ANOVA*						

This study showed that the length of OGJ-ODJ differences was increased with the mean ages of the patients with statistically significant association as shown in figure (1).

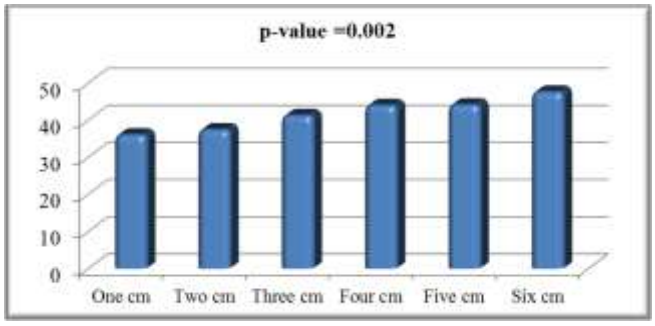

Figure (1): The association between length of OGJ-ODJ differences increased with the mean ages of the patients.

Among the studied groups; 39.81% had normal BMI while overweight and obesity represented 56.35% and the underweight represented only 3.84% as shown in figure (2).

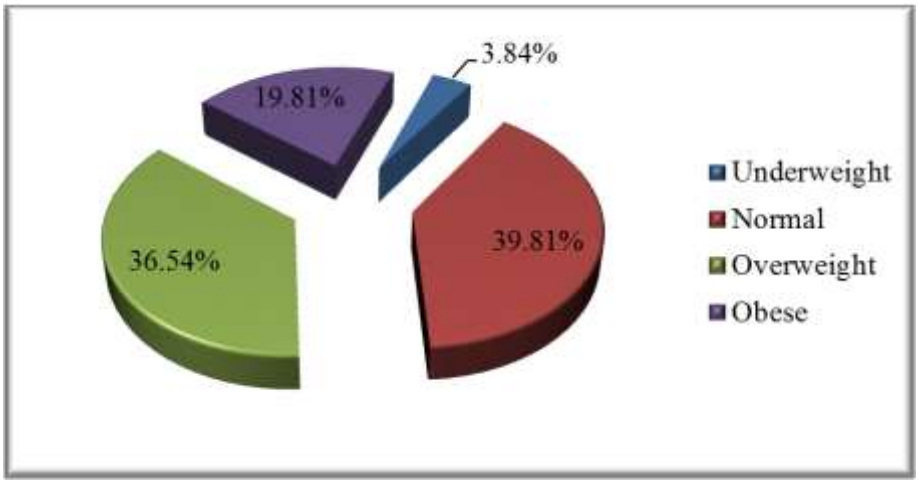

Figure (2): BMI among the studied groups.

The BMI was associated in an increasing pattern with the age with a statistically significant difference (p=0.001) as shown in figure (3).

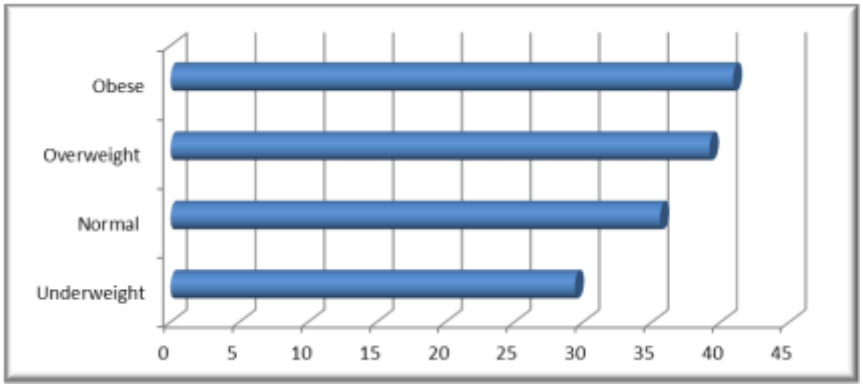

Figure (3): Association of BMI with age of patients.

The highest percentage of obesity and overweight was in female (58.4%) while this percentage in male (47.5%), this association was statistically significant (p=0.017), as shown in table (3). Additionally, among the 520 patients there were 12(2.3%) drinkers; 10 men and 2 women and 10 of the studied patients were heavy drinkers and 2 light drinkers, those whom heavy drinkers (83.3%) they had high BMI while those whom light drinkers (16.7%) had normal and low BMI.

Table (3): Association between BMI in relation to gender, smoking, and alcoholic status).

		BMI groups				p-value*
		Under weight	Normal weight	Over weight	Obese	
		No.(%)	No.(%)	No.(%)	No.(%)	
Gender	**Male**	8(3.9)	99(48.5)	68(33.3)	29(14.2)	**0.017**
	Female	14(4.5)	116(37.3)	106(34.0)	76(24.4)	
Smoking status	**Non-smoker**	21(4.4)	198(41.9)	155(32.8)	99(20.9)	0.402
	Smoker	1(2.3)	17(39.5)	19(44.2)	6(14.0)	
Alcoholic status	**Non-alcoholic**	21(4.2)	214(42.5)	167(33.3)	102(20.2)	0.107
	Alcoholic	1(8.3)	1(8.3)	7(58.3)	3(25.0)	
**Chi square test*						

DISCUSSION

In this study it's found that among 520 patients, 82 (15.8%) of them have normal OGD findings, while 438 (84.2°%) of them have abnormal OGD findings.

The mean of length ODJ-OGJ difference in normal OGD finding patients was (1.62) cm while this mean is less than the mean length of patients with abnormal OGD findings which was (1.95) cm this result was statistically highly significant (P=0.002). On literature review no previous study or data regarding this subject only, study that total esophageal length is affected by various disease states of the upper gastrointestinal tract in UK by Marshal *et al.,* (1999)[21] and in Kenya by Kaisha *et al.,* (2011).[22]

In present study, the mean length of ODJ-OGJ difference was increased with increasing BMI and this was significant with (P=0.001). This data was recorded for 1 time as there was no previous reading on this subject, in literature review there was only relation between BMI and hiatus hernia which was partly related to our subject, there was significantly association with the presence of hiatus hernia and excessive body weight, the probability of hiatus hernia increasing with each level of BMI and this study done in USA by Wilson *et al.,* (1999).[23] and in Athena by Karamanolis *et al.,* (2013).[24]

Our study show length of ODJ-OGJ difference was increased with age and the result statistically significant (P-0.002), there was no previous reading on this subject. In literature review there was only relation between hiatus hernia with age which was partly related to our subject, that patient with hiatus hernia significantly older (55.8 years, P-0.002) in Athena by Karamanolis *et al.,* (2013).[24]

Although mean length of ODJ-OGJ difference was different in male and female, where it more in male than female (1.98, 1.84) cm respectively, but this result statistically not significant (P=0.071). And this goes with other study in Kenya by Kaisha *et al.,* (2011).[22] of total esophageal length was increased in male more than female statistical not significance (p= 0.076). Although mean length of ODJ-OGJ difference found in smokers and nonsmokers where it more in smokers than nonsmokers (2.14, 1.88) cm respectively, but this result statistically not significant (P=0.051). There was no literature on this subject. This study show the mean length of ODJ-OGJ difference more in alcoholic than non-alcoholic (2.25, 1.89) cm respectively, but this result statistically not significant (P=0.154). There was no previous reading on this subject. This study show that the BMI increased with the age and the result statistically significant (P=0.001), and this agreement with Anuurad *et al.,* in japan 2003.[10] In current study we found that the BMI affected by gender, where in female overweight and obese represented (58.4%), while in males represented (47.5%), and the result statistically significant (P=0.01), and this agree with Paeratakul *et al.,* in USA (2002).[25] but disagree with Anuurad *et al.,* in japan 2003.[10] In this study although the smokers had relatively increased BMI (58.2%), in nonsmoker, the overweight and obese represented (53.7%); this finding was statistically not significant (P=0.40), this might be due to the fact that many of those smoking while drinking that counteract the appetite-reducing power of nicotine.[26] This agree with Malik study in USA in Kentucky (2010).[26] While disagree with Rasky *et al.,* in Styria.[11] Kaufman. *et al.,* in USA.[12] and Chhabra study in India.[27] There is high difference in BMI between alcoholic and nonalcoholic drinker, drinkers have high BMI (83.3%) (overweight and obese), while overweight and obese represented (53.3%) in nondrinkers but this difference statistically not significant (P= 0.10), this agree with Breslow and Smothers in USA.[28]

CONCLUSION

Length of ODJ-OGJ differences increased with increase BMI, diseases of foregut and with ages of the patients. Length of ODJ-OGI difference not affected by gender, smoking status and alcoholic status. BMI is increase with the age. BMI affected by gender (more in female). While BMI not affected by smoking status and alcoholic status.

REFERENCES

1. World Health Organization/NUTNCD. Obesity: preventing and managing the global epidemic. Report of a WHO consultation on obesity. Geneva: WHO, 1998.
2. Eknoyan G. Adolphe Quetelet (1796-1874) the average man and indices of obesity. *Nephrology Dialysis Transplantation.* 2007; 23(1): 47-51.
3. NHLBI Obesity Education Initiative Expert Panel on the Identification, Evaluation, and Treatment of Obesity in Adults (US). Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report. Bethesda (MD): National Heart, Lung, and Blood Institute; 1998 Sep. Available from: https://www.ncbi.nlm.nih.gov/books/NBK2003/
4. World Health Organization Expert Consultation. Appropriate body mass index for Asian populations and its implication for policy and intervention strategies. *Lancet*, 2004; 363: 157-163.
5. Haslam D. Obesity: a medical history. *Obes. Rev*., 2007; (1l): 6-31.
6. Caballero B. The global epidemic of obesity: An overview. *Epidemiol. Rev*., 2007; (29): 1-5.
7. WHO. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. World Health Organ Tech Rep Ser, 2000; 894: i-xii, 1-253. PMID: 11234459.
8. Barness LA, Optiz JM, and Gilbert-Barness E. Obesity: genetic, molecular, and environmental aspect. *Am. J. Med. Genet*, 2007; A 143A(24): 3016-3034.
9. Peter GK, lan DC, Michacl JS, William HD. Clinical Obesity in Adults and Children: n Adults and Children. Blackwell Publishing, 2005; 493.
10. Anuurad KS, Akiko N, Keiko K., Byambaa E, Kumiko S, Yosuke Y. The new BMI criteria for Asians by the regional office for the western pacific region of WHO are suitable for screening of overweight to prevent metabolic syndrome in elder

Japanese Workers. *J. Occup. Health*, 2003; (45): 335-343.
11. Rasky E, Stronegger WJ, Fried W. The relationship between body weight and patterns of smoking in men and women. *International Journal of Epidemiology*, 1996; (25): 1208-1212.
12. Kaufman A, Augustson EM, Patrick H. Unraveling the Relationship between Smoking and Weight: The Role of Sedentary Behavior. *J Obes*, 2012; 2012: 735465. doi: 10.1155/2012/735465.
13. Standring S. Gray's Anatomy: The Anatomical Basis of Clinical Practice. 40th Edition, Churchill Livingstone Elsevier, London, 2008.
14. Brunicardi FC, Andersen Dk, Billiar TR, Dunn DL, Hunter JG, Pollock RE. Schwartzs Manual of Surgery. 8th ed. McGRAU-HILL, 2006; 573.
15. Beasley P. Anatomy of the pharynx and esophagus. In: Kerr AG, Gleeson M, eds. Scott-Brown's s Otolaryngology. 6th ed. Oxford, UK: Butterworth-Heinemann, 1997.
16. Postma GN, Seybt NMW, Rees CJ. Esophagology. In: Snow JB, Wackym PA, eds. Ballinger's otolaryngology Head & neck surgery. 17th ed. Shelton, Conn: BC Decker Inc, 2009: 95.
17. Peter B, Cotton PB, Willians CB, Hawes RH, Saunders BP. Practical Gastrointestinal Endoscopy. 6th ed. Wiley-Black well, A John Wiley and Sons, Ltd., Singapore, 2008; 33-36.
18. Block B, Schachschal G, Schmidt H. Endoscopy of the Upper Tract. Examination technique and normal findings by Georg Thieme Verlag, Stuttgart, Germany, 2004; 34-35.
19. Breitling LP, Arndt V, Drath C, Rothenbacher D, Brenner H. Smoking and Y-glutamyltransferase: Opposite interaction with alcohol consumption and body mass index. *PLoS ONE*, 2010; 5(9): 13116.
20. Schoenborn CA and Adams PE. Health behaviors of adults: United States, 2005-2007. *Vital Health Stat*, 2010; 10(245): 1-132.
21. Marshall RE, Anggiansah A, Anggiansah CL, Owen WA, Ovwen WJ. sophageal body length, loweresophageal sphincter length, position and pressure in health and disease. *Dis. Esophagus*, 1999; 12(4): 297-302.
22. Kaisha OW, Mutie T, Kioko HM. The correlation of Esophageal body length with measure of external body parameters. *Int. J. Morphol*, 2011; 29(3): 895-898.
23. Wilson LJ, Ma W, Hirschowitz BI. Association of obesity with hiatal hernia and esophagitis. *Am. J. Gastroenterol.* 1999; 94(10): 2840-2844.
24. Karamanolis G, Polymeros D, Triantafyllou K, Adamopoulos A, Barbatzas C, Vafiadis I, Ladas SD. Hiatal hernia predisposes to nocturnal gastro-esophageal reflux. *United European Gastroenterology Journal*, 2013; 1(3): 169-174.
25. Paeratakul S, Whit MA, Williamson DA, Ryan DH Bray GA. Sex, Race/Ethnicity, Socioeconomic Status, and BMI in Relation to Self-Perception of Overweight. *Obesity Research*, 2002; (10): 345-350.
26. Malik A. Effects of smoking on the body mass. *School of Human Environmental Sciences.* UK Ag HES, March 13 2013; 14; 51: 04.
27. Chhabra P and Chhabra SK. Effect Of Smoking on Body Mass Index: A Community-Based Study. *Natl J Community Med*, 2011 Dec. 31; 2(03): 325-30. Available from: https://njcmindia.com/index.php /file/ article/view/1915.
28. Breslow RA and Smothers BA. Drinking patterns and body mass index in never smokers: National Health Interview Survey, 1997-2001. *Am J Epidemiol*, 2005 Feb 15; 161(4): 368-376. doi: 10.1093/aje/kwi061. PMID: 15692081.