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Socio economic factors and anthropometry between Shia and Sunni Muslim obese women

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Abstract

The present study was done to compare socio-economic factors and anthropometric measurements between Shia and Sunni Muslim obese women in the age group of 31-40 years. In this 68 subjects were screened based on body mass index greater than 23. The subjects were selected from two areas namely Mint and Mannady in Chennai. Among them 38 were from Shia Muslim community, in this agakhanis were selected and 30 were from Sunni Muslim community, in this hanafi and shafi were selected. Interview Schedule was used to collect information on socio-economic status. Height was measured using stadiometer, weight was measured using portable weighing machine, waist and hip circumference was measured using measuring tape. Body mass index and waist-hip ratio was calculated using the above measurements. The study was carried out for 3 months. The data obtained was subjected to statistical analysis in order to draw inference. The statistical measures used include mean, standard deviation and t-test. The results of this study found that socio-economic factors such as age, religion, education level, marital status, anthropometric measurements like body mass index and waist hip ratio significantly associated with obesity among Shia and Sunni Muslim obese women.

Keywords: economic factors, measurements, information

Introduction

Overweight and obesity have been considered a serious health problem worldwide since 1997. Both developed and developing countries are experiencing increasing rates of overweight and obesity. The new WHO report indicated that 1.6 billion adults were overweight and more than 400 million adults were obese, and at least 20 million children under 5 years were overweight (World Health Organization, 2000). In the European Union between 1970 and 2000, rates of obesity have increased. During the 1990 and 2000, the reports say that rate of obesity has increased from 10 percent to 27 percent in men and from 10 percent to 38 percent in women (Lobstein T *et al*, 2005) [17]. The United States has the highest obesity rates in the developed world. As of 2007, 33 percent of men and 35 percent of women were obese (Bessesen D.H 2008) [3]. According to National Health and Nutrition Examination Study collected between 1970 and 2004, overweight and obesity prevalence have increased steadily among all groups over the past three decades (Ogden C.L 2006) [22].

The percentage of fat in the body is as important as body weight. Women are designed to carry a higher proportion of fat tissue in their bodies that men do. For healthy women, fat can account for as much as 25 percent of body weight; 17 percent is a healthy percentage for men. Obesity puts undue stress on the back, legs, and internal organs, which can eventually aggravate physical problems and compromise health. Obesity increases the body's resistance to insulin and susceptibility to infection, and causes a higher risk for developing diabetes, high blood pressure, stroke, coronary artery disease and other serious health problems. Obese people often suffer physically as well as psychologically (James F *et al*, 2006) [12].

It has been estimated by International Institute for Population Science (2006), the percentage of females (24.4 percent) who are overweight or obese is more than that of males (19.8 percent) in Tamilnadu. Socio-economic class also has an effect on the rate of obesity. Women of high socio-economic group have increased risk than that of low socio-economic group.

Hence the present study is aimed to compare the effect of socio economic factors and anthropometry between two Muslim community (women) namely Shia and Sunni Muslim obese women in the age group of 31-40 years. The Shia Muslims belong to northern part of

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India (especially Mumbai and Gujarat). Among them the Agakhani's (sub caste of Shia Muslim) who have migrated to Tamilnadu were selected for the study. In the Sunni a sub caste called hanafi and shafi Muslim were selected from Tamilnadu. These two Muslim communities were taken for the study as they form the major part of the Muslim community.

Obesity has reached epidemic proportions globally, with more than 1 billion adults overweight at least 300 million of them clinically obese and is a major contributor to the global burden of chronic disease and disability (W.H.O, 2003). The generally accepted view is that being overweight cases health problems as obesity just to a lesser degree. A study found that being overweight at age 40 reduced your life expectancy by three years (Peeter A, 2003) [26].

Obesity is an excess of body fat that frequently results in a significant impairment of health. Obesity results when the size or number of fat cells in a person's body increases. A normal-sized person has between 30 and 35 billion fat cells. When a person gains weight, these fat cells first increase in size and later in number. One pound of body fat represents about 3500 calories. When a person starts losing weight, the cells decrease in size, but the number of fat cells generally stays the same. This is part of the reason that once you gain a significant amount of weight, it is more difficult to lose it (Michael D. M 2004) [20].

People, who have always been obese since childhood, have 3-4 times more fat cells than people who became obese as adults. Obesity prevalence is generally higher in women than in men and there is also a sex difference in body fat distribution. Sex differences in obesity can be explained in part by the influence of gonadal steroids on body composition and appetite; however, behavioural, socio-cultural and chromosomal factors may also play a role (Lovejoy J.C et al, 2009) [18]. Gender and ethnicity related differences in the prevalence of obesity, differences are probably a result of cultural, socio-economic and genetic factors which also underlie the worldwide obesity epidemic (Puoane T et al, 2002) [27]. The current epidemic of obesity suggests that environmental factors play a dominant role. Obesity may be viewed as a consequence of deprived environment with its attendant unhealthy lifestyle and psychological stress (Gortmaker S.L 2003) [9]. Obesity is a common feature in migrants, where a population with common genetic heritage live under new socio-economic and cultural conditions (Esparza J et al, 2000) [6]. Females have a higher prevalence of obesity than males and it has been suggested that this may be related to gender differences in the brain's response to hunger and satiety (Del Parigi A, 2002) [5]. A review done by Patterson M.L (2003) [24] show that there is a positive correlation between maternal age at birth and body mass index of the resulting offspring and shown that for every five year increase in maternal age, the risk of obesity in the offspring increase by 14.4%

Obese women are also at increased risk of dying from breast cancer after menopause compared with lean women. The distribution of body fat may also affect breast cancer risk. Women with a large amount of abdominal fat have a greater breast cancer risk than those whose fat is distributed over the hips, buttocks, and lower extremities (Friedenreich C.M, 2001) [8]. The risk for sleep apnea is higher for people who are overweight. A person who is overweight may have more fat stored around his or her neck. This may make the airway smaller. A smaller airway can make breathing difficult, loud (snoring), or stop altogether. In addition, fat stored in the neck and throughout the body may produce substances that cause inflammation. Inflammation in the neck is a risk factor for sleep apnea (White D.P, 2006) [32].

People who are overweight have a higher risk for developing gallbladder disease. They may produce more cholesterol (a fat-like substance found in the body), a risk factor for gallstones. Also, people who are overweight may have an enlarged gallbladder, which may not work properly. Studies indicate that the risk of gallbladder cancer increases with increasing body mass index. Results showed that gallbladder cancer risk was 15 and 66 percent higher among those who were overweight and obese, respectively, as compared with those of normal weight. The association between obesity and gallbladder cancer risk was stronger in women than in men (Kuriyama S et al, 2005) [15]. Obesity is harmful and excessive weight can provoke serious disorders and obese people have from double to triple the probability of dying prematurely, compared to people with normal weight. A person is called obese when the Body Mass Index greater than 30. When the BMI is greater than 40 it is known as grave obesity, which implies a serious risk for the person's health (Fabio P and Jungian 2008) [8].

Although obesity beginning early in life is becoming more common, its implications for coronary heart disease risk in later life remain uncertain. Body mass index is positively related to coronary heart disease risk from childhood onwards; the associations in young adults are consistent with those observed in middle age. Long-term control of body mass index from childhood may be important to reduce the risk of coronary heart disease (Owen C.G et al, 2009) [23]. Anthropometric measurements, such as body weight, are good markers of the nutritional status of individuals and communities. The body mass index (BMI), defined as the weight in kilograms divided by the square of the height in metres, is a simple and useful index of relative weight, applied to assess obesity or chronic energy deficiency (Bailey K.V and Ferro Luzzi A 2005) [2].

The prevalence of overweight and obesity is commonly assessed by using body mass index. Adult mean body mass index levels of 22-23 kg/m^2 are found in Africa and Asia, while levels of 25 to 27 kg/m^2 are prevalent across North America, Europe, and in some Latin America, North Africa and Pacific Island countries. The World Health Organization designates whites, Hispanics and blacks with a body mass index of 25 or more as overweight. For Asians, overweight is a body mass index between 23 and 29.9 and obesity for all groups is a body mass index of 30 or more (WHO, 2000). Excess waist circumference is a frequently used indicator of abdominal obesity and/or cardiovascular disease risk (Sone Hirohito et al, 2008).

Materials and methods
The present study was done to compare social economic factors and anthropometric measurements between Shia and Sunni Muslim obese women in the age group of 31-40 years.

Objectives
- To determine the anthropometric measurements such as height and weight, in order to screen the subjects based on body mass index (greater than 23).
- To collect and compare information on socio economic factors and anthropometric measurement such as height, weight, waist circumference, hip circumference, BMI (body Mass Index) and WHR (Waist Hip Ratio) of Shia and Sunni obese Muslim women.

Hypothesis

Based on the objectives the following hypothesis was formulated:

- There was no significant in the anthropometric measurements such as body mass index and waist-hip ratio between both the Shia and Sunni Muslim obese women.
- There was no significant difference in socio economic factors between the Shia and Sunni Muslim obese women.

Study methodology

Study design

A research design is the arrangement of condition for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 2004) [14]. The present study is a descriptive cross-sectional survey design. A descriptive cross-sectional survey design is a research study which is concerned with describing the characteristics of a particular individual, or of a group of narration of facts and characteristics concerning individuals, group or situation. Survey refers to the method of securing information concerning phenomena under study from all or a selected number of respondents of the concerned universe (Kothari C.R, 2004) [14]. The present study is descriptive in nature and of survey type.

Sampling design

Sampling is a process, which helps to identify the characteristic of the universe of population or population by studying only a part of it (Gupta S.P, 2005) [10]. The process of selecting the samples or respondents is called sampling techniques. The selected respondents should be as representatives as possible of the total population in order to produce a miniature cross-section (Kothari C.R, 2004) [14].

Sampling technique

In the present study, a purposive sampling technique was adopted. In this method of sampling, the investigator purposively chooses the particular units of the universe for constituting the sample on the basis that one will be typical or representative of the whole (Kothari C.R, 2004) [14].

Samples size

A total number of 68 subjects (Shia and Sunni Muslim obese women) were selected from two areas namely Mint and Mannady in Chennai. Among them 38 were from Shia Muslim community and 30 were from Sunni Muslim community.

Criteria for selecting subjects

Inclusion Criteria

1. Women belonging to the Muslim community in the age group between 31 t 40 years.
2. Among Sunni Muslims, hanifi and shafi were selected and in Shia Muslim agakhanis community were selected.
3. Subjects who have body mass index above 23 were selected.
4. Women who were willing to participate in the study.

Exclusion Criteria

1. Women below 31 years and above 40 years were excluded.
2. Women who were not willing to participate in the study.

Duration and place of the study

The duration of the study was for a period of 3 months. The study was carried out in two areas namely Mint and Mannady in Chennai.

Tools of data collection

1. Interview schedule.
2. Anthropometric measurements.

Interview schedule

This is the method of data collection through personal interview in a structured way. It involved the use of predetermined questions and the interview followed a rigid procedure laid down asking questions in a form and order prescribed (Kothari C.R, 2004) [14].

Anthropometric measurements

Anthropometric measurements like height and weight were measured in order to calculate the body mass index and waist and hip circumference were measured in order to calculate the waist-hip ratio.

Body Height

A vertical measuring scale fixed to a wall was used. The height was measured without shoes and the subjects were made to stand on the flat floor by the scale. Her foot was parallel with the heels, buttocks, shoulders and back of the head touching the upright position of the scale. The head was comfortably held erect. The arm was relaxed and held in a motural manner. The head piece was lowered slowly so as to touch the hair and make contact with the top of the head (Norgan N.G 1994) [21].

Body weight

The weight of subjects was measured using portable weighing scale. Weighing scale was set to 0 reading and on firm surface preferably uncarpeted floor. Subject should remove shoes. Subject should step on platform with both feet on weighing scale platform and stay still. The weight values read to nearest kilogram (Staveren W.A.V Deurenberg P 2001) [29].

Body mass index

Body mass index or Quetelet's index is the ratio of weight in kilogram to height in meter square.

Body mass index = Wt in Kgs/Ht in m^2.

Range	*Values
Normal Range	18.5 – 22.9
Mild Overweight	23 – 24.9
Pre-obese Class I	25 – 27.4
Pre-obese Class II	27.5 -29.9
Obese Class I a	30 – 32.4
Obese Class I b	32.5 – 34.9
Obese Class II	35 and over

*"WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies" (2004) [33]

Waist hip ratio

The Waist and hip circumference of the subject were measured using the flexible inch tape. The waist hip ratio calculated by waist circumference (cm) / hip circumference (cm) (Aekplakorn W, 2004) [1].

Procedure

- The subjects were screened based on the BMI (Greater than 23)
- The interview schedule was administered for the collection of information on socio economic details among Shia and Sunni Muslim obese women.

Statistical analysis

The following methods were used for statistical analysis;
Percentage
Arithmetic Mean.
Standard Deviation.
t-test

Results and discussion

The present study was done to find out and compare the information on socio economic status and anthropometric measurements between Shia and Sunni Muslim obese women. A total of 68 women subjects were selected consisting of 38 Shia Muslim and 30 Sunni Muslim for the study. The information from the interview schedule and the results obtained from the anthropometric assessment were processed, tabulated and subjected to statistical analyses. The results are discussed under the following headings.

1. Socio economic status
2. Anthropometric assessment
3. Mean and t values depicting anthropometric measurements in both Muslim community.

Socio economic status

The information regarding general information such as age, marital status, socio-economic status details such as type of family, number of family members, educational qualification, employment status, monthly income and number of earning members were collected using interview schedule and tabulated below.

1.1. Age and marital status of the subjects

Table 1.1: Age and marital status of the subjects belonging to Shia and Sunni Muslim obese women.

Age (Years)	Shia Muslim obese women N=38		Sunni Muslim obese women N=30	
	N	Percentage	N	Percentage
31-35	16	42	15	50
36-40	22	58	15	50

The subjects selected for the present study were obese Muslim women between the age group of 31-40 years. It is evident from the table 1.1 that among Shia Muslim women, majority (58 percent) of the subjects were in age group of 36 to 40 years and 42 percent in age group of 31-35 years. In Sunni Muslim women 50 percent of the subjects were distributed equally among both age groups.

Body adiposity increases with age. This is because as people grow older their metabolic rate falls and energy expenditure decreases.

Older women displayed a higher probability of being overweight or obese compared with younger women, with the probability increasing for each 5-year age group. Age was a significant predictor of body mass index, with older women more likely to be overweight or obese (Paula L.G and Margaret E.B, 2001) [25].

It was also found that almost all the women subjects who were selected for the study were married. Studies show that increased age with high body mass index is an uncontrollable risk factor for the various metabolic syndrome such as diabetes, cardio vascular disease and cancers.

1.2 Family details of the subjects
1.2 Type of family and number of family members.

Table 1.2: Type of family and number of family members of the subjects belonging to Shia and Sunni Muslim obese women

	Shia Muslim obese owmen N=38		Sunni Muslim obese women N=30	
	N	Percentage	N	Percentage
Type of family				
Nuclear family joint	25	65.8	12	40
family	13	34.2	18	60
Number of family members				
3	7	18.4	4	13.3
4	19	50	6	20
>4	12	31.6	20	66.7

It can be inferred from the above table 1.2 that among Shia Muslim women, majority (65.8 percent) of the subjects were in nuclear family and only 34.2 percent of the subjects were in joint family, while among Sunni Muslim women majority 60 percent of the subjects were in joint family and 40 percent in nuclear family.

Hence, it is evident that mostly Shia Muslim women live in nuclear type of family while Sunni Muslim women live in joint families. It is also evident from the above table 1.2 that majority 66 percent of the subjects among Shia Muslim and Sunni Muslim women had either four members or more than four family members in their families.

1.3 Education qualification of the subjects

Table 1.3: Educational qualification of the subjects belonging to Shia and Sunni Muslim obese women

Educational qualification	Shia Muslim obese women N=38		Sunni Muslim obese women N=30	
	n	Percentage	n	Percentage
Illiterate	-	-	-	-
Primary School	-	-	3	10
High School	5	13.2	12	40
Higher Secondary	20	52.6	5	16.7
Under Graduate	9	23.7	7	23.3
Post Graduate	4	10.5	3	10

It was clear from the table 1.3. That 52.6 percent of Shia Muslim women had completed higher secondary education while among Sunni Muslim majority 40 percent among the selected subjects had finished only till high school and none of them were found to be illiterate. It can also be seen that among Shia Muslim women 13.2 percent, 23.7 percent and 10.5 percent had completed high school education, under graduation and post-graduation respectively, whereas among Sunni Muslim 16.7 percent, 23.3 percent and 10 percent respectively had done higher secondary, under graduation and post-graduation and 10 percent had finished only primary schooling.

Hence, it was clear that, basic education was given for all the subjects in both Muslim community but the percentage of graduation was less. Lacks of education were also the cause of obesity among both the Muslim.

1.4 Employment status of the subjects.

Table 1.4: Employment status of the subjects belonging to Shia and Sunni Muslim obese women

Employment Status	Shia Muslim obese women N=38		Sunni Muslim obese women N=30	
	N	Percentage	N	Percentage
Yes	8	21.1	4	17.6
No	30	78.95	26	82.4

It was found from the table 1.4 that majority 78.95 percent of the Shia Muslim obese women and 82.4 percent of the Sunni Muslim obese women were house wives and not employed. Only 21.1 percent among Shia Muslim and 17.6 percent among Sunni Muslim had reported to be working. It could be inferred from the table that majority of Shia Muslim women and Sunni Muslim women were not employed because of educational qualification.

Studies show the unemployment rate for Muslim women is high about four times the rate for Christian and Jewish women (Labour Market Glossary, 2000).

1.5 Monthly income of the earning members

Table 1.5: Monthly income of the subjects belonging to Shia and Sunni Muslim obese women

*Monthly income	Range	Shia Muslim obese women N=38		Sunni Muslim obese women N=30	
		N	Percentage	n	Percentage
Higher income	17,916	5	14	2	7
Upper Middle income	3750-17,916	33	86	28	93
Middle income	1833-3750	-	-	-	-
Lower Middle	1333-1833	-	-	-	-
Lower	Below 1333	-	-	-	-
Number of earning Members		N	Percentage	n	Percentage
1		18	47.4	7	36.85
2		13	34.2	19	47.1
3		7	18.4	4	16.2

*According to National council of applied economic research (2007)

Majority of the subjects were in higher income and upper middle income class, it shows that high economic level of the subjects leads to obesity. This clearly states the high economic level of the subjects and had at least one earning member in the family.

It is evident from the table 1.5 that majority of the (47.4 percent), Shia Muslim women had at least one earning member. While, in Sunni Muslim women (47.1 percent) had two family earning members.

So, it so concluded, that all the subjects are economically stable in both the Shia and Sunni Muslim obese women to maintain their needs.

Thus it can be concluded that majority of Shia Muslim obese women were married belonged to nuclear family, classified under high income had atleast one earning member in the family and studied till higher secondary.

Whereas Sunni Muslim obese women were married, belonged to joint families, classified under upper middle income group, had two members earning in the family and had studied till high school.

Women who lived in households with a high standard of living index had a significantly higher probability of being overweight or obese (Martorell R, 2000) [19]. When the weight of the females were higher than the risk factors for diabetes heart disease, high blood pressure and other health problems occurs (Kosulwat V, 2002) [13].

2 Anthropometric Assessment
2.1 Mean values of the subjects.

Table 2.1: Mean values of height and body weight of the subjects belonging to Shia and Sunni Muslim obese women.

Mean Values	Shia Muslim obese women N=38	Sunni Muslim obese women N=30
Height	150.1	155.3
Weight	70.36	73.23

Anthropemotric measurements, such as body weight, are good markers of the nutritional status of individuals and communities. The mean body weight of the subjects among Shia Muslim is 150.1, while in Sunni Muslim slightly higher. The mean body weight of Shia and Sunni Muslim obese women were 70.36 and 73.23, this shows the incidence of obesity were higher in both the Muslim community women.

In women, obesity is a result of decreased metabolic rate and alterations in ovarian hormones, which accelerates the age-related increase in body fatness and decreases energy expenditure. Thus, women have a higher body weight than men, especially after the age of 50 years (Brown A et al, 2007) [4].

2.2 Body mass index of the subjects

Table 2.2: Body mass index of the subjects belonging to Shia and Sunni Muslim obese women

Grades of obesity	*Values	Shia Muslim obese women N=38		Sunni Muslim obese women N=30	
		n	Percentage	n	Percentage
Normal Range	18.5-22.9	-	-	-	-
Mild Overweight	23-24.9	3	7.9	3	10
Pre-obese Class I	25-27.4	9	23.6	7	23.33
Pre-obese Class II	27.5-29.9	6	15.8	5	16.66
Obese Class I a	30-.32.4	10	26.38	7	23.33
Obese Class I b	32.5-34.9	6	15.8	4	13.34
Obese Class II	35 and over	4	10.52	4	13.34

*"WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies" (2004) [33].

It is evident from the table 2.2 that among Shia Muslim majority (26.38 percent) of the subjects were in obese class 1(a) and 23.6 percent of the subjects in pre obese class I, while among Sunni Muslim obese women majority were equally distributed, 23.33 percent of the Sunni Muslim obese subject were in obese class 1(a) and pre-obese class 1 respectively.

In both the Muslim community the body mass index of the subjects were equally in the high risk of various metabolic syndrome such as diabetes, cancer, osteoarthritis, osteoporosis.

The body mass index (BMI), defined as the weight in kilograms divided by the square of the height in metres, is a simple and useful index of relative weight, applied to assess obesity or chronic energy deficiency (Bailey K.V and Ferro Luzzi A 2005) [2].

2.3 Waist-hip ratio of the subjects

Table 2.3: Waist Hip ratio of the subjects belonging to Shia and Sunni Muslim obese women

Waist Hip ratio		Shia Muslim obese women N=38		Sunni Muslim obese women N=30	
		n	Percentage	n	Percentage
Normal	<0.85	-	-	-	-
Low risk	0.85 – 0.90	-	-	-	-
High risk	0.90-1	38	100	30	100

The above table 2.3 depicts the increased waist hip ratio among the selected Muslim obese women subjects. It can be seen that all the subjects (100 percent) in both the categories, (Shia and Sunni) are in the range of 0.90-1 confirming to be in the high risk range of obesity.

High waist-hip ratio indicating that fat was largely in the abdominal cavity had a greater risk of heart disease and diabetes (Kosulwat V, 2002) [13].

So it can be concluded from the table that both the Muslim community obese women equally have the risk of many degenerative diseases. There are the indications of metabolic syndrome which occur later in life.

3. Mean and t values depicting anthropometric measurements in both shia and sunni muslim obese women.

Table 3

Anthropometric Measurements	Shia N=38	Sunni N=30	't' Value	Level of Significance
	Mean±Standard deviation	Mean±Standard deviation		
Body Mass Index	29.7±4.478	30.41±4.045	.664	NS
Waist to hip ratio	.9666±01805	.9617±.01949	1.076	NS

N.S.- Not Significant

The results from the above table showed that there was no difference in body mass index, Waist to hip ratio of both the Shia and Sunni Muslim obese women but the incidence of were higher for body mass index (29.71±4.478 and 30.41±4.045) and waist hip ratio (.9666±01805 and .9617±.01949).

Summary and conclusion

It was concluded that, all the subjects were economically stable in both the Shia and Sunni Muslim obese women. Majority of Shia Muslim obese women were married belonged to nuclear family, classified under high income, had atleast one earning member in the family and studied till higher secondary education. Whereas Sunni Muslim obese women were married belonged to joint families, classified under upper middle income group, had two members earning in the family and had studied till high school. The mean body weight of Shia and Sunni Muslim obese women were 70.36 and 73.23, this shows the incidence of obesity were higher in both the Muslim community women. In both the Muslim community the body mass index of the subjects were equally in the high risk of various metabolic syndrome such as diabetes, cancer, osteoarthritis, osteoporosis. It can be seen that all the subjects (100 percent) in both the categories, (Shia and Sunni) had waist hip ratio in the range of 0.90-1, confirming to be in the high risk range of obesity.

The results of this study found that socio-economic factors such as age, religion, education level, marital status, anthropometric measurements like body mass index and waist hip ratio significantly associated with obesity among Shia and Sunni Muslim obese women aged 31-40 years old.

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