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Correspondence concerning this article should be addressed to Cornelia Rada, „Francisc I. Rainer" Anthropological Institute, Blv. Eroii Sanitari no. 8, Sector 5, Bucharest, Romania; Tel: 021.317.50.72; 0728824852/ Email: corneliarada@yahoo.com

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Correlation between Body Mass Index and Sexual Dynamics

Cornelia Rada (1) *, Ileana Prejbeanu (2), Adriana Albu (3), Suzana Manolescu (1)

(1) ,,Francisc I. Rainer" Anthropological Institute, Bucharest, Romanian Academy, Romania
(2) University of Medicine and Pharmacy Craiova, Romania
(3) Adriana Albu University of Medicine and Pharmacy Iasi, Romania

** Corresponding author; Email: corneliarada@yahoo.com*

ABSTRACT

Background: The limited number of studies on sexual quality of life in obesity suggests that this is an area in need of further study.

Objectives: We intended to identify how the BMI (Body Mass Index) affects the subjects' sexual dynamics.

Methods: A questionnaire with items regarding the sexual life and BMI measurements was used in a sample of 1493 subjects, aged 18-90, randomly selected from urban Romanian areas.

Results: The sample was characterized by average: weight of 72.11 kilograms, height of 1.71 m and a BMI of 24.30. The incidence of cases diagnosed with arterial hypertension is higher in overweight (51.3%) or obese (19.7%) subjects ($p<0.001$). In the overweight category the men's proportion was twice higher ($p<0.001$). As the age increased the proportion of the overweight persons increased ($p<0.001$). In the entire sample the weekly sexual contacts prevailed (49.1%), most of the subjects reported an average duration of sexual contacts in the last year (without prelude and postlude) of 5-15 minutes (39.1%). The latent class analysis indicated that sexual life quality decrease with age and BMI. The univariate binary logistical regression showed a fragile association between high BMI values and sexual insatisfaction. With no doubt the most influencing variable over BMI and sexual satisfaction is the age, followed by marital status. Although the BMI increases by age yet at adult age (40-50 years) the overweightness and obesity are less frequent to the persons who do not share the household environment.

Conclusion: For the obese people the benefits of weight loss to improve sexual life may be a way to motivate them to start and continue a special nutritional and physical activity program.

Keywords: Body Mass Index, Sexual life, Obesity

Background

The relation between sexual fulfillment and obesity, especially the morbid one, highlighted a wide range of psychic effects like: low energy, depression, diminished self esteem and sexual problems.

A study of 40,086 African American and White participants suggested an association between BMI and major depression, suicide ideation, and suicide attempts diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. [1]

A study conducted on 82 female patients preoperatively and at least 1 year

postoperatively (gastric bypass surgery) suggested that sexual problems of the obese are related to lack of self-esteem, unsatisfactory relationships, or collective stigmatization of obese individuals. [2]

Diabetes, hypertension and elevated cholesterol are clearly linked to erectile dysfunction. The gastric bypass surgery showed that the weight loss can help resolve erectile dysfunction in some men with morbid obesity. [3, 4]

The studies have found that the relation between lower sperm count and infertility is correlated with obesity and associated with an unsatisfying sex life. The men who lost weight through Roux-en-Y gastric bypass surgery experienced a reduction in estradiol levels, an increase in testosterone levels and an increase in ratings of sexual quality of life. [5]

A Taiwanese study on 772 young men subjects found a significant correlation between waist circumference and the International Index of Erectile Function–5. [6]

An American study, that investigated the association between the quality of sexual life and BMI class, sex, and obesity treatment-seeking status, found that higher BMI was associated with greater impairments in sexual quality of life. Obesity was associated with lack of enjoyment of sexual activity, lack of sexual desire, difficulties with sexual performance, and avoidance of sexual encounters. Sexual quality of life is most impaired for women, individuals with class III obesity, and patients seeking gastric bypass surgery. [7]

Another study in Sweden of 2,810 men and women found no significant differences in terms of satisfaction with sex life between the overweight and obese people and normal-weight people. This is not a contradiction with the other study, because the expectations of what is that needed for satisfaction is lower among overweight and obese persons compared with subjects of normal weight. Critical attitudes toward obese people are prevalent. Some obese people internalize the negative social messages. This may be the cause of self-imposed restrictions on important aspects of life, such as enjoying a sexual relationship. [8]

The limited number of studies on sexual quality of life in obesity suggests that this is an area in need of further study. We intend to identify how the BMI (Body Mass Index) is related and affects the subjects' sexual dynamics and sexual desire.

Objectives

The gender, age and marital status are socio demographic characteristics that may influence BMI and sexual dynamic and consequently we analyzed several interactions and correlations, taking the variables two by two. Further we investigated, using correspondence analysis, latent class analysis and logistic regression statistical models that underlined the relation between BMI and sexual life quality. [9, 10]

Methods

The data have been collected using a questionnaire in the period 2005-2007 from 1902 men and women, randomly selected, aged between 18 and 90 years, 1493 of them being sexually active. The studied sample of sexually active subjects had a homogenous structure by gender, age group, place of residence (8 big cities zone covering the seven representative geographical and historical Romanian regions), instruction level and socioeconomic status (low, medium, and high). None of interviewed woman was pregnant or in postpartum period.

The persons attended voluntarily to the study, have been assured about confidentiality of their answers and received from the interview

assistances information regarding the research objectives. During the process of research arguments highlighted the accent targeted the improvement of the relations within the couple and between generations of the family members, of the life quality, with the aim to prevent prestige reaction or any potential influence of the taboos related to sex. The eight survey assistants, having expertise in the field of sociology, psychology and medicine, received training regarding the questionnaire use and interview conducting in order to obtain fair answers. The interview assistants had the same gender as the respondents and have been assigned in such manner to be closer by age to the subjects to ensure the best possibility that the respondents to feel comfortable and safe to describe themselves as much accurate.

The sexual life quality was measured based on 3 items regarding: sexual contacts frequency in the last year, average duration of sexual contact in the last year (not including sexual prelude and postlude), and the pleasure to receive sex when initiated by the partner. For BMI determination the subjects were height and weight measured. The diagnosed diseases by doctor and other disordered in the last three years that affected the sexual life were identified based on respondents self response and in cooperation with family doctor of the subject.

Results

The sample characteristics regarding BMI by gender, age group and marital status

The analyzed sample was characterized by an average weight of 72.11 kilograms, an average height of 1.71 m and a BMI average of 24.30. The distributions of these three anthropometrical characteristics were relatively normal ones.

The distribution of the subjects by BMI class [11, 12] was as follows: 5.1%-Underweight, 53%-Normal, 34.6%, - Overweight and 7.3%-Obese.

Most of them (70.3%) declared that they were in perfect health. Still, 8.0% have been diagnosed with coronary diseases, 4.2% with endocrine problems, 3.4% with digestive diseases and 3.3% with respiratory affections. The structure of diagnosed diseases relatively reflects the main mortality causes on national level. In Romania, cardiovascular diseases remaining for many years the main mortality cause.

The incidence of cases diagnosed with arterial hypertension is higher in overweight (51.3%) or obese (19.7%) subjects. The χ^2 Pearson test χ^2 (15, N = 1484) =148.54, $p<0.001$ indicated that the correlation between the BMI and some diseases' incidence was significant. There was also a significant relation between age groups and the incidence of diagnosed diseases χ^2 (15, N = 1484) =384.976, $p<0.001$). Thus, subjects in superior age categories, aged over 50 years, reported more frequently diagnosed diseases, especially hypertension and diabetes. Respiratory and digestive affections are less related to the subject's age.

Significant differences between BMI classification were identified by sexes ($p<0.001$). Normal weight and obese subjects are relatively homogeneously distributed, obvious differences by sex were noticed in the underweight category – the women were 6 times more numerous than men in this category. In the overweight category the men's proportion was twice higher (Table 1).

In each gender group significant differences regarding BMI distributions by on age groups ($p<0.001$) were founded. As the age increased the proportion of the underweight and normal persons decreased, while the proportion of the overweight persons increased (Table 2).

According to the Kruskal-Wallis test H (3, N= 1484) = 421.646, $p<0.001$), BMI means differences found in age groups were

significant. The BMI mean was higher in the higher age groups.
BMI class distributions by marital status were also significant different ($p<0.001$). Within married persons or living in consensual couple the proportion of the overweight individuals was by 1.59 greater and the proportion obese ones was four times greater comparative with the unmarried, divorced or widowers subjects (Figure 1).

Characteristics regarding the frequency, duration and pleasure of sexual contacts in the sample

In the entire sample the weekly sexual contacts prevailed (49.1%), most of the subjects reported an average duration of sexual contacts in the last year (without prelude and postlude) of 5-15 minutes (39.1%) followed by those reporting a 15-30 minutes duration.
A proportion of 79, 2% in the sample agreed with pleasure, often or very often the sexual contacts when they were initiated by the partner. The Pearson χ^2 test didn't indicate a direct statistically significant relationship between subjects' rating by BMI and the frequency of sexual intercourse. However, as shown in contingency Table 3, in the daily sexual activity group the proportion of the obese persons was lower (4.4%).
As the Pearson's χ^2 test didn't indicate, statistically speaking, a direct significant correlation between subjects' BMI classification and the frequency of sexual intercourses, we employed a qualitative approach using the correspondence analysis technique The correspondence analysis of variables *BMI Category* and *frequency of sexual intercourse*, allowed us to better understand how the two variables were related and interacted each other by exploring the data in a bi dimensional space (Figure 2).
In the common space of sexual dynamics and body weight rating related to normality we could notice that obese individuals are situated in quadrant III, as opposed to normal rated individuals situated in the first quadrant. Due to the sharp angle created by the vectors Normal and Daily and Weekly we concluded that normoponderal persons usually have a more intense sexual life. Likewise, reduced sexual activity, that is Once in two months or more rarely (2 Months +) and Monthly, was related to subjects considered Obese. Overweight subjects in quadrant IV were characterized by monthly or weekly sexual intercourses. From the sexual intercourse point of view, Normal subjects were closer to Overweigh. Obese were opposed to Normal and Overweight were in contrast with Underweight.

Sexual life quality

The latent class model analysis was used to classify cases into a set of latent classes, representing the sexual life quality, based on categorical indicator (or manifest) variables such as survey items describing sexual life activity: Frequency (frequency of sexual contacts), Duration (average intercourse duration) and Pleasure (frequency of sexual attraction pleasure). Latent classes are the dimensions which structure the cases in respect with the observed (or manifest) variables set. After cases were classified into latent sexual life quality classes, then in regression type manner, latent class analysis with covariates was used with one additional variable, Category (classification according BMI), to predict or explain class membership.
All the models with up to 5 latent classes have been analyzed with Latent Gold software and in accordance with the minimum BIC (BIC=9280.10) value criteria, the model with two classes was selected "as the best fit". Due to the high bivariate residual values (values grater than 2 indicated a local independence assumption violation) the interaction effects of the indicator variables have been added to the model. In the final model all the parameters are significant according to the Wald test.

Using the software all the individuals (cases) in the sample have been assigned to the latent class with the highest latent classification probability. This method of assignment is sometimes referred to empirical Bayes modal or modal a posteriori estimation.

The inspection of the resulted class profiles indicated that the first class (cluster 1 - Satisfactory sexual life) was characterized by individuals reporting more frequent sexual contacts, with longer duration and more frequent accompanied by sexual attraction pleasure while the second class (cluster 2 - Not satisfactory sexual life) was characterized by individuals that reported a lower sexual dynamic and rare emotional pleasure. The assignment to the classes was indicated by the variable named Cluster with 2 values (1 or 2) showing that individuals belong to the cluster 1 (78.9%) or to the cluster 2 (21.1%).

The independent samples t-test indicated significant differences between the two clusters by age t (1418) = - 11.50, $p<0.001$ and BMI value t (1409) = - 2.04, p =0.049. The average age in the cluster 1 was 34.52 years while in the cluster 2 the average age was 43,78 years. The difference between BMI value was only 0.51 (24.20 in cluster 1 versus 24.71 in cluster 2). This gave us indications that increase in age and BMI value was associated with the sexual life quality deterioration.

The cross tabulation of the classification according BMI values and variable Cluster indicated an increased proportion of obese and overweight people in the cluster 2 but the distributions by BMI categories in the clusters did not significant differ, $\chi^2(3, N=1484) = 4.95$, $p=0.175>0.05$. The univariate binary logistical regression of the variable Cluster with the variable BMI indicated a significant Wald = 4.16, $p=0.041<0.05$ but fragile (only 3.4%) increase in odds that a person belongs to cluster 2 (not satisfactory sexual life quality), when BMI value increase with one unit. The percentage of the model correct prediction was 78.8%. No significant differences regarding sexual life quality were found by gender, both men and women having similar distributions.

The marriage (or living in consensual union) is a major life event that brings the modification of the life style with a lot of consequences to the sexual satisfaction. In the Romanian space tradition, statistically the age of 35 year is the maximum one for the marriage and in this respect we can define two important age groups: <35 years (50.1% of the sample) and >=35 (49.9% of the sample). The sexual insatisfaction was significant different ($p<0.001$) between the two age groups. In the unsatisfactory sexual life segment, the proportion of the persons aged 35 years and over was 3 times greater (74.0%).

The sexual rhythm was better for married people. The lowest proportion of those who reported sexual insatisfaction was found in unmarried (18.9%) and living in cohabitation person (34.5%) groups. For the Romanian population the long term cohabitation is not indicative, as living in consensual union, is just a maximum 2 years stage of passage to the legal marriage. The married persons, separated, divorced were approximately equally distributed in respect with the sexual life satisfaction. The widows had the larger proportion in the unsatisfactory sexual life quality segment (72.2%), but in this case the age has an important impact.

When we extend the previous univariate binary logistical regression to multivariate by adding more factors such as: age, gender and marital status, the BMI effect was no more significant. The all other three factor age, gender and marital status were statistical significant. The percentage of the model correct prediction was 80.7%. Distributions of the individuals by gender in the two clusters were significant different $\chi^2(1, N=1484) = 11.92$, $p=0.001$. In the cluster 1 of the individuals with satisfactory sexual life there were 42.5 % females while in the cluster 2 the

proportion of the females was 53.7%, probably due to the more sensitive thresholds regarding sexual life quality or due to the more honesty in reporting.

Discussion

As many other authors, we identified a significant association between the overweightness, obesity and the high blood pressure. [13, 14]

The persons with coronary artery disease should be considered a target population for keeping the weight within the normal limits as the disease medication treatment has as also a side effect the libido decrease.

As other researcher we found that the obese persons comparative with normal weight ones reported the lack of desire and sexual pleasure, abstention and difficulties in sexual contact accomplishment. A study from Duke University Medical Center highlights the fact that in some circumstances the risk of such problems is increased by a factor of 25 for the obese persons. [15]

The article shows that the duration since the persons are in a couple influences the BMI value. In the married persons or in the persons cohabitating for more than two years, we find a behavior that may lead to obesity comparative with the couple being in romantic relation. To share the household environment may increase the likelihood of becoming obese and this people could be a target population especially for obesity prevention. [16]

In our sample, taking into consideration only the analyzed variables, we can affirm the following issues. The marital status, duration of the relation appears as and intervening variable between the BMI and sexual satisfaction. Usually a nonsexual and sexual relation debut is "in force", then has an inertial trend sometimes becoming the expression of sexual interest lack without a sexual dysfunction existence. Also, at the beginning of relation the interest for physical aspect is more active and so, the desire not to be obese or overweight, makes the couple partners to be more carefully with maintaining of a normal weight. Later the partner sharing the same household environment acquires a specific attitude and behavior pattern. She cooks, prepares the meals to show him her abilities and how devoted is to him. He eats everything to express his full gratitude and recognition of her qualities. All this issues have a sense if we think that in prevention is very important to identify the target, to which we address to be heard.

After several years of marriage the risk of overweight, obesity and sexual insatisfaction increases and from this moment, in this circumstances the relation between them may become a strong and biunivoque one disregard the age. We think how many couples visit the therapist for sexual problems such as infidelity, lack of sexual attraction due to a partner who became overweight or obese, that can presented in the Diagram 1.

The fact that the overweight men are twice numerous as the women, showed that the husbands should be considered as another special target public. In this respect the wife have an important role because the domestic duties entitle her to have some authority regarding cooking, meals schedule.

At least at a first glance the myth of "gaining weight after marriage" is a real one. A critical moment is the one when over the daily comfort, the change of the life style imposed by the a marriage, the age increase is added with hormonal modifications that involve gaining the weight, change of the body shape and on the other hand the sexual dysfunctions. Especially to the couples established since many years, with women at menopause onset and men experiencing the pre-andropause symptoms should be advised to change their life style to prevent the weight excess.

An American study, demonstrated an improvement of sexual dynamic following the weight loss by 18.8%, comparing with the previous sexual life status. Specially, the females that avoided the sexual relations, because they felt themselves physical unattractive, but also the males, reported an improvement of sexual life quality by 3 times and a real participation to the sexual act.[17]

A study of obese persons, having erectile dysfunction, without diabetes, hypertension, or hyperlipidemia, showed that the lifestyle changes are associated with improvement in sexual function in about one third of obese men with erectile dysfunction at baseline.[18]

It is clear how much important is the erection for the man; it is the basis of his identity, meaning the masculinity, power. Therefore beginning with the intrinsic male desire to achieve sexual potency we can easier convince the obese or overweight ones to obtain a weight loss, which could have other benefits also such as improvement of heart functionality, cholesterol level decrease, self-esteem increase.

The society has it own stereotypes regarding the obesity relating it to pejorative terms like lack of will and control, overindulgence etc. The marginalization feeling and social exclusion due to the stereotypes linked to fat as well as the disease fear affect the couple relation.

In the street the obese feels real or not that the people turn their heads after him and partners is embraced in his company. The sexual activity of the obese is low, seems to be tiresome and the sex interest decrease seems to increase the food intake desire. The communication between the obese partners is bad because the feeling of non sexual attractive person is expressed with fear of not offending. Part of the males considers more attractive and sensual the women with rounded shapes. The obesity means another dimension. A partner with normal weight or overweight should support with honesty the obese partner to ask for medical qualified help. [19]

Our body, with all its organs and of course our brain, is programmed by the genetic code transmitted from generation to generation. Due to this the feelings and actions related to sex are the result of some millenary evolutions which are manifested in us through attraction, desire, jealousy and competitiveness. This makes, in spite of the fact that great cultural differences are in men, the sexual behavior to be similar, the basic elements being: looking, conversation, contact (coupling) and the "clink" (the spark, agreement, concordance, harmony).

The eyes are looking 2-3 seconds, the most primitive part of the brain is activated and results the interest or rejection. For the most people of the western population, the body of an obese person or of excessive slim one, at a first glance may be unattractive. Because the body, the appearance has an important place in the modern society, for the obese this may be a drawback. The next sequence, the communication is in risk not to take place. May be after the first glance the attractiveness is in decrease, not necessary being a rejection, that stuck the question which could bring the revelation of a special qualities person. [20]

Sometimes a huge psychological pressure is created related to the silhouette, physical appearance, that does not solve the problem, rather brings the stigmatization. The obese person is discriminated in employment, in medical care, in school, and this a fact we must fight against, if necessary by legislative measures. [21]

It is not sufficient to look at obesity as a social problem or a cosmetically one. Obesity became a serious disease, responsible for the premature death and morbidity. Awareness of the socioeconomic and psychological costs of the obesity could be another way to reduce it. [22]

A study over persons aged 45-74 years finds that the frequency of intercourse and desire do

not correlate with the BMI, the duration of the present relationship and other social and sexual factors (education, income, frequency of exercise, stress symptoms etc.). [23] Also, even in our sample, when in the regressive model of the dependent variable that describe the sexual life quality (contact frequency, pleasure, sexual fit) all the interest independent variables have been added (gender, marital status, health status, age and BMI) then the BMI is no more a statistical significant factor influencing the sexual life.

Thus latent class analysis we shows how the sexual life quality decreases by age and BMI value. Yet, the univariate binary logistical regression shows only a fragile association between high BMI values and the sexual insatisfaction. Checking the amount of unindependence, using Pearson χ^2 test and by addition of another variables into the analysis the perspective changes.

In these circumstances, in spite of the fact that the proportion of the obese and overweight persons is higher in the unsatisfactory sexual life segment than in the satisfactory sexual life segment, the difference is not significant. And more, in the case into the regression analysis we add more factors the BMI effects on sexual satisfaction vanish.

The fight against obesity must start from all the possible intrinsic motivations with honesty and care. Our study highlights the fact that for an obese or overweight male the motivation for the weight loss is the improvement of his sexual activity, and then this may be one of importance. Also, if the obese or overweight female is not too much aware that her health status is not good but feels herself unattractive because of this, then it could be a good reason to lose weight.

To become a normal weight person for the benefits brought to the sexual activity up to elder age may be a good enough reason. The tenderness, the erotism and sexuality are eustres factors. Sexual relations 2-3 times per week with a constant partner constantly up to elder ages increase the immunity. Also, the males with constant regular sexual activity have important chances to be a person enjoying the longevity. [24]

Conclusion

Obvious, the BMI influences sexual dynamics but the length, frequency and the quality of sexual intercourse requires multifactor evaluations and determinations, and variables like age, marital status, health status, the time since the couple was established, the partners fit, the quality of non sexual relation, life style, temperament etc, should be considered in this equation.

Despite the fact no significant correlation between BMI high values and the frequency of sexual contacts, nevertheless we found a tendency, a specific pattern by weight groups of sexual contacts frequency decrease in the case of overweight and obese people. Subjects with a normal weight are closer to a more intense sexual activity. From the normal sexual activity point of view, normal subjects are closer to overweighed ones.

With no doubt the most influencing variable over BMI and sexual satisfaction is the age followed by marital status. Although the BMI increases by age yet at adult age (40-50 years) the overweightness and obesity are less frequent to the persons who do not share the household environment. The same occurs with the sexual satisfaction that despite its decrease with the age increase, those who are in a romantic relation or are at the beginning of the marriage, although are aged 40-50 years declare a satisfactory sexual life similar to the younger respondents.

For the obese people the benefits of weight loss to improve sexual life may be a way to motivate them to start and continue a special nutritional and physical activity program.

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Table 1: BMI variability by sexes

BMI Class	Sex		Total
	Feminine	Masculine	
Underweight	**85.2**	**14.8**	100
Normal	54.6	45.4	100
Overweight	**36.9**	**63.1**	100
Obese	54.3	45.7	100
Total	50.6	49.4	100

Table 2: BMI variability by age groups and gender

Gender	BMI Classification	Age groups				Total
		18-24	25-34	35-49	> 50	
Feminine	Underweight	20.1	14.6	5.5	0.9	10.3
	Normal	72.3	67.6	53.0	31.4	56.3
	Overweight	7.1	13.8	32.8	43.4	24.3
	Obese	0.4	4.0	8.7	24.3	9.2
	Total	100	100	100	100	100
Masculine	Underweight	4.8	0.8	0	1.7	1.8
	Normal	70.6	51.3	40.5	29.4	47.9
	Overweight	24.2	45.8	47.7	51.5	42.4
	Obese	0.4	2.1	11.8	17.3	7.9
	Total	100	100	100	100	100

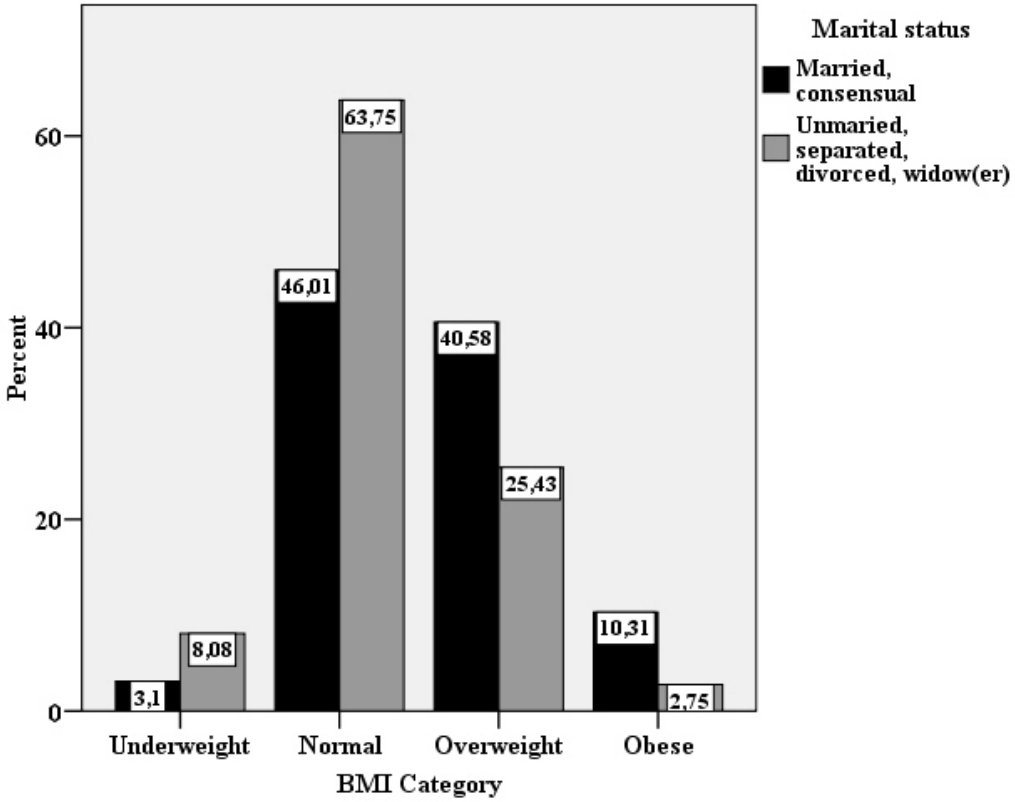

Figure 1: BMI Class Variability by marital status

Table 3: The frequency of sexual intercourse and BMI category

BMI Category	Sexual contacts frequency %				Total
	Daily	Weekly	Monthly	Rarely[(a)]	
Underweight	6	4,2	3.3	7.2	4.5
Normal	54.9	55.1	50.0	46.8	53.7
Overweight	34.6	33.9	38.6	33.3	34.6
Obese	4.4	6.9	8.1	12.6	7.2

[(a)] Once in 2 months or more rarely

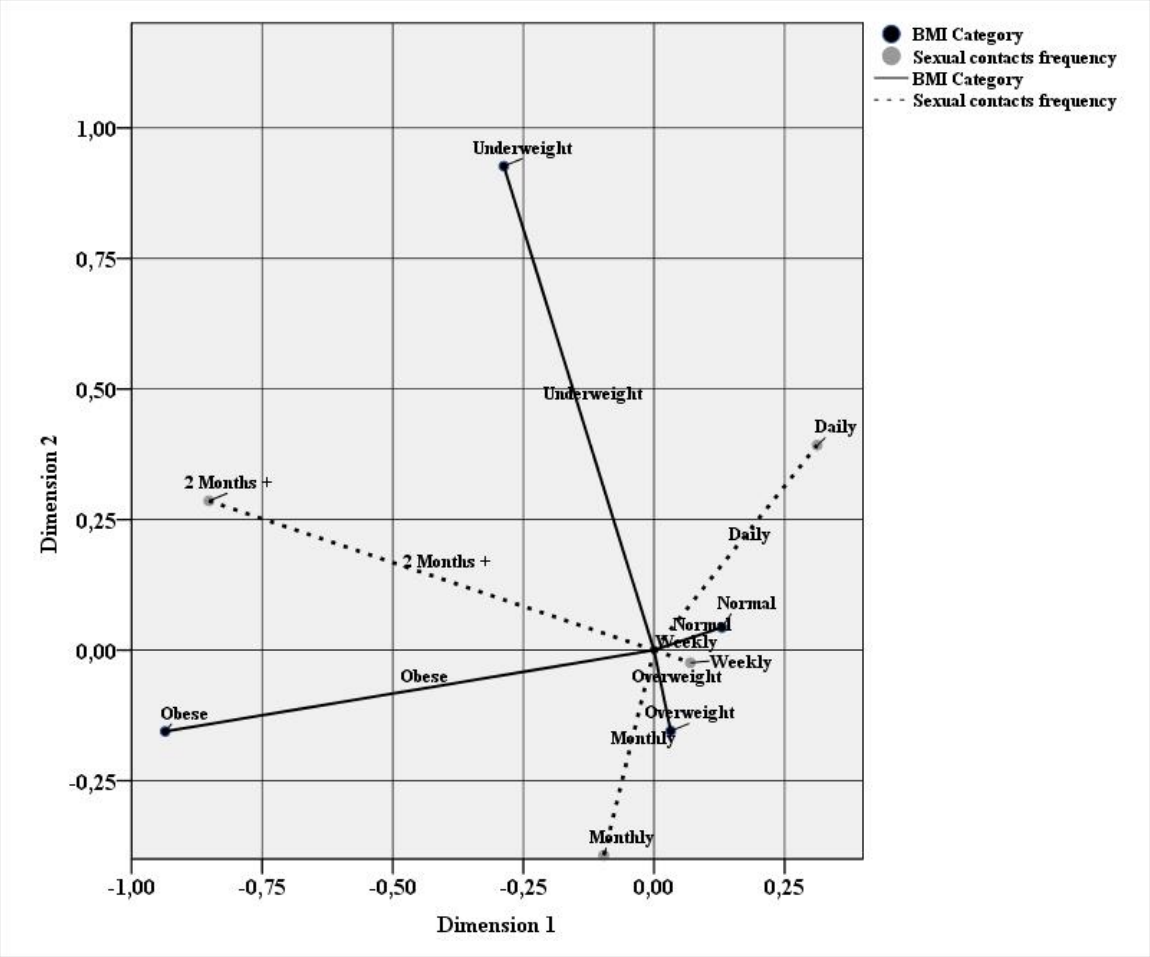

Figure 2: Correspondence analysis of BMI category and frequency of sexual intercourse (symmetric normalization)

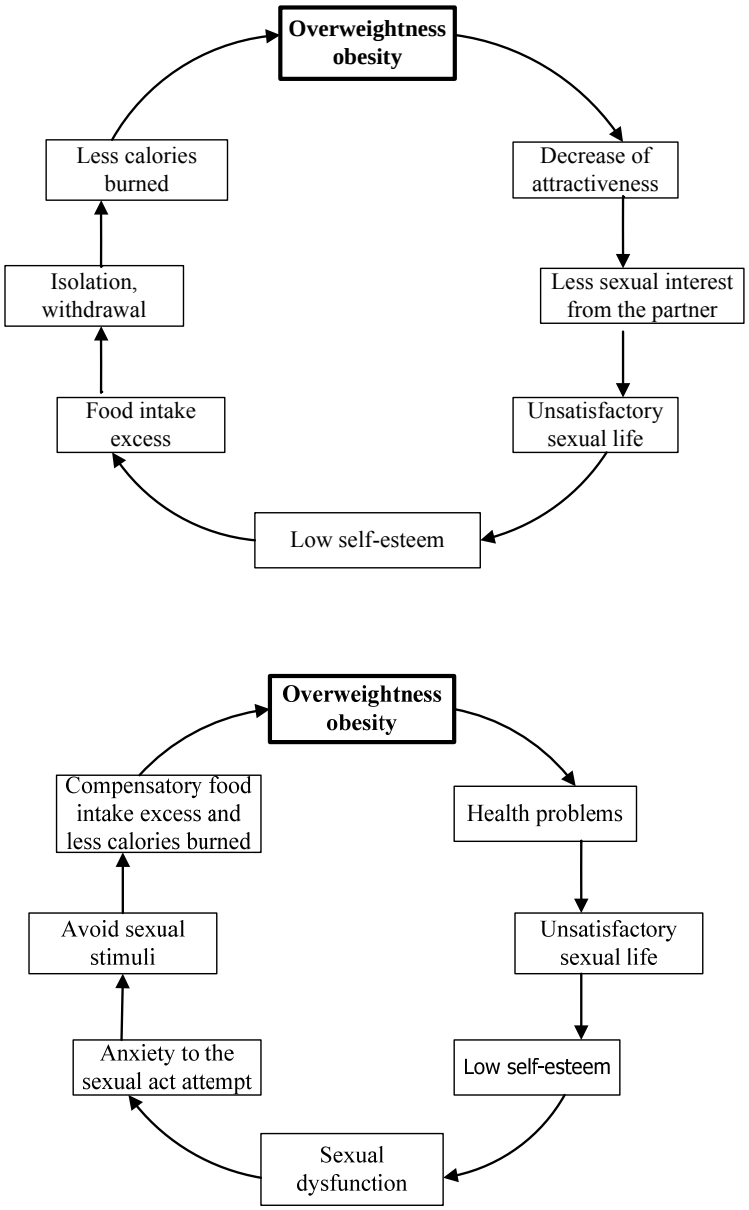
Overweightness obesity
Decrease of attractiveness
Less sexual interest from the partner
Unsatisfactory sexual life
Low self-esteem
Food intake excess
Isolation, withdrawal
Less calories burned
Overweightness obesity
Health problems
Unsatisfactory sexual life
Low self-esteem
Sexual dysfunction
Anxiety to the sexual act attempt
Avoid sexual stimuli
Compensatory food intake excess and less calories burned

Diagram 1