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The Impact of Biomedical Indicators on Sexual Functioning of Portuguese Adults

Dalila Oliveiros da Silva Nunes

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Orientador: Prof. Doutor Henrique Marques Pereira

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Abstract

Introduction: The purpose of this research is to investigate the impact of biomedical indicators on sexual functioning of Portuguese adults. This includes the following parameters; body mass index, glycemia, total cholesterol, triglycerides, total testosterone, systolic blood pressure, diastolic blood pressure, and pulse.

Methods: This is a cross-sectional study with a sample size of 963 individuals, 606 women (63.3%), 348 men (34.6%), and three gender non-conforming (0.3%), aged between 18-89 (mean=34.9). Measurement instruments were used for the biomedical indicators, along with the Massachusetts General Hospital Sexual Functioning Questionnaire adapted to the Portuguese version, a sociodemographic questionnaire complemented with health-related questions and the biomedical indicator questionnaire.

Results: Overall sexual functioning levels were lower than predicted for 50.2% (n=428) of the participants. Women's overall sexual functioning scores were significantly lower than men's. Greater overall sexual functioning was associated with absence of disease, taking no medication and an active lifestyle. Comorbidities presented lower scores for overall sexual functioning. Significant correlations were obtained between overall sexual functioning and age (r_s=-0.276, p=0.000), body mass index (r_s=-0.168, p<0.01), glycemia (r_s=-0.121, p<0.05), total cholesterol (r_s=-0.132, p<0.01), medication quantity (r_s=-0.191, p<0.01), and disease quantity (r_s=-0.179, p<0.01). The biomedical indicators had predictive power on sexual function, as found by the linear regression, which explained 25.7% of the variance in the model (R^2=0.257, p<0.001).

Conclusion: The research conducted emphasizes on how biomedical indicators influence sexual function and how it may be useful for both healthcare professionals and field experts.

Keywords

Sexual Functioning;Biomedical Indicators;Portuguese Adults;Comorbidities;Portugal

Resumo

Introdução: O objetivo deste trabalho de investigação é averiguar o impacto que os indicadores biomédicos têm na função sexual de adultos da população portuguesa. Nestes parâmetros, inclui-se o Índice de Massa Corporal, glicémia, colesterol total, triglicéridos, testosterona total, pressão sistólica, e diastólica e pulsação arterial.

Métodos: Este estudo compreende uma amostra de 963 indivíduos, nomeadamente 606 mulheres (63.3%), 348 homens (34.6%), e três variações de género (0.3%), entre os 18 e 89 anos de idade e uma média de 34.9 anos. Recorreram-se a dispositivos médicos para a medição dos indicadores biomédicos, bem como ao questionário do "Massachusetts General Hospital" sobre o funcionamento sexual adaptado à população portuguesa, um questionário sócio-demográfico sendo este ainda complementado com algumas questões de saúde e o questionário dos indicadores biomédicos.

Resultados: Os níveis de funcionamento sexual global foram inferiores ao esperado em 50.2% (n=428) dos participantes. As mulheres demonstraram pontuações de funcionamento sexual significativamente menores comparativamente aos homens. A ausência de doenças, a não utilização de medicamentos e atividade física apresentaram melhores pontuações no funcionamento sexual. Verificaram-se, ainda, pontuações inferiores de funcionamento sexual nos participantes com comorbidades e presença simultânea de doenças crónicas e psiquiátricas. Foram obtidas correlações significativas entre funcionamento sexual e idade (r_s=-0.276, p<0.01), índice de massa corporal (r_s=-0.168, p<0.01), glicémia (r_s=-0.121, p<0.05), colesterol total (r_s=-0.132, p<0.01), quantidade de medicação (r_s=-0.191, p<0.01), e quantidade de doenças (r_s=-0.179, p<0.01). As variáveis biomédicas demonstraram efeito preditivo no funcionamento sexual, revelado pela regressão linear, o que explica 27.1% do modelo (R^2=0.257, p<0.001).

Conclusões: Esta investigação realizada torna evidente a influência dos indicadores biomédicos no funcionamento sexual, demonstrando a sua utilidade para todos os profissionais de saúde e não apenas os que detêm especialização nestas áreas.

Palavras-chave

Funcionamento Sexual;Indicadores Biomédicos;Adultos Portugueses;Comorbidade;Portugal

Resumo Alargado

Introdução: A sexualidade está intrinsecamente ligada à condição humana, associando-se ao desenvolvimento de relações saudáveis e ao bem-estar individual. Com o aumento da esperança média de vida, o foco na saúde sexual pode desempenhar um papel fundamental na qualidade de vida, com a premissa de que a sua promoção tem potencialidade para complementar a prevenção e o combate de doenças relevantes na prática clínica, como é o caso da dislipidemia ou da hipertensão arterial. O objetivo deste trabalho de investigação é averiguar o impacto que os indicadores biomédicos têm no funcionamento sexual de adultos da população portuguesa. Nestes parâmetros, inclui-se o Índice de Massa Corporal, glicémia, colesterol total, triglicéridos, testosterona total, pressão sistólica, e diastólica bem como pulsação cardíaca. Também foram incluídas questões relacionadas com saúde como o impacto da comorbidade e a toma de medicação no funcionamento sexual.

Métodos: Este estudo, levado a cabo nas instalações da Universidade da Beira Interior, compreende uma amostra de 963 indivíduos, nomeadamente 606 mulheres (63.3%), 348 homens (34.6%), e três variações de género (0.3%), entre os 18 e 89 anos de idade e uma média de 34.9 anos. Foi aplicado o questionário "Massachusetts General Hospital" sobre o funcionamento sexual adaptado à população portuguesa, o questionário sociodemográfico, sendo este complementado com algumas questões de saúde e o questionário dos indicadores biomédicos. Recorreram-se a dispositivos médicos para a medição dos indicadores biomédicos, nomeadamente o OneTouch® Verio®IQ para a glicémia capilar, o Accutrend® Plus para colesterol total e triglicerídeos e o BMG 5610 AEG® para pressão arterial e pulso. Para a análise estatística foi utilizado o SPSS versão 24.0 com recurso a testes não paramétricos.

Resultados: O funcionamento sexual global obteve valores abaixo do ponto de corte em 50.2% (n=428) dos participantes. No que toca às mulheres, os níveis de funcionamento sexual são significativamente mais baixos do que nos homens apesar de apresentarem perfis de saúde melhores que os homens. Ausência de doenças, não utilização de medicamentos e atividade física apresentaram melhor pontuação no funcionamento sexual global, tendo estes participantes demonstrado melhores perfis de saúde. A toma da pílula contraceptiva também apresentou impacto positivo no funcionamento sexual global. Verificaram-se pontuações inferiores de funcionamento sexual global nos participantes com comorbidades e presença simultânea de doenças crónicas e

psiquiátricas. Os participantes com IMC, glicémia e colesterol total elevados obtiveram pontuações de funcionamento sexual inferiores aos participantes com valores normais. Foram obtidas ainda correlações significativas entre funcionamento sexual global e idade (r_s=-0.276, p<0.01), Índice de Massa Corporal (r_s=-0.168, p<0.01), glicémia (r_s=-0.121, p<0.05), colesterol total (r_s=-0.132, p<0.01), quantidade de medicação (r_s=-0.191, p<0.01), e quantidade de patologias (r_s=-0.179, p<0.01). Também se verificou a influência das variáveis biomédicas no funcionamento sexual da população, como pode ser visto pela regressão linear, a qual explica 27.1% do modelo (R^2=0.271; p<0.001), sendo as variáveis mais preditivas a idade (β=-0.289, p<0.05), género (β=-0.135, p<0.05), IMC (β=-0.184, p<0.05), e colesterol total (β=.167, p<0.05).

Conclusões: O trabalho de pesquisa realizado destacou a influência que os indicadores biomédicos têm no funcionamento sexual, e ainda a sua utilidade, não apenas para profissionais com a área de especialização ligada à sexualidade, mas para todos os profissionais de saúde. Devido à importância que a saúde sexual tem nos pacientes, é vital que os profissionais de saúde sejam capazes de abordar o tema regularmente com os seus doentes. Desta forma será possível escrever detalhadamente as histórias clínicas sexuais, educar e promover a saúde sexual. Além disso, permitirá avaliar o estado de saúde, identificar e gerir potenciais comorbidades, bem como revisão de medicações, e ainda promover modificações de estilo de vida e de fatores de risco.

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Table List

List of Abbreviations

AAO	Ability to achieve an orgasm
ACA	Absent cardiac arrhythmia
AGMEL	Ability to obtain and maintain erection for men or lubrication for women
AGSA	Ability to get sexually aroused
BMI	Body mass index
CAD	Cardiac arrhythmia diagnosed
CBG	Capillary blood glycemia
dl	Decilitre
DP	Diastolic pressure
ED	Erectile dysfunction
FSD	Female sexual dysfunction
FTT	Female total testosterone
GDH-FAD	Glucose dehydrogenase with flavin adenine dinucleotide
GRP	Gabinete de relações públicas
HP	Healthcare professionals
M	Mean
mg	Milligram
MR	Mean rank
MTT	Male total testosterone
ND	Number of diseases
NM	Number of medications
OSF	Overall sexual functioning
SD	Sexual dysfunction
SI	Sexual interest
SP	Systolic pressure
SS	Sexual satisfaction
TC	Total cholesterol
TG	Triglycerides
UBI	Universidade da Beira Interior
WHO	World Health Organization

Chapter 1

Introduction

Sexuality and the human condition are inextricably intertwined on a physical and socio-cultural dimension, which transcends to its association with the development of healthy relationships, individual wellbeing and quality of life.[1] This continues to be relevant later in life, as empirical research has shown the benefits of maintaining lifelong sexual activity, and further studies have found that sexual health satisfaction could predict life satisfaction.[2]

Globally, life expectancy has been increasing, yet the overall health and quality of life have not followed at an equal pace.[3] For this reason, the concept of sexual health is of particular interest with the premise that its promotion has the potential to not only improve sexual wellbeing but also complement the screening, prevention and treatment of relevant illnesses in clinical practice.[1,4]

The sexual response cycle is divided into four stages: desire, arousal, plateau, orgasm and resolution, therefore sexual impairment occurs when the individual or couple experience a struggle during any of these phases.[5,6] Sexual dysfunction can be diagnosed if it has manifested for at least six months and has consequently caused significant distress to the individual.[7]

There are four distinct categories of sexual dysfunctions: hypoactive sexual desire dysfunction, sexual arousal dysfunctions, orgasmic dysfunctions and sexual pain disorders.[7] These dysfunctions are exceedingly under-recognized and prevalent[8] even in today's society, where gender plays an important role, affecting 31% of men and 43% of women[9,10], and are especially common with the anatomic and physiological process of ageing.[9]

There are multiple other physical, environmental, social or psychological risks and predictors responsible for sexual dysfunction disorders. Health conditions such as neurological disorders, cardiovascular diseases, or hormonal imbalances, such as low testosterone are examples of concrete predictors.[11–13] These conditions include hypercholesterolemia[11,14], hypertriglyceridemia[11,15], arterial hypertension[11,16], and arrhythmia.[12] They can also be present in patients suffering from endocrinological diseases, such as diabetes mellitus.[11,17] Furthermore, lower resting heart rate[18], the

prevailing sedentary lifestyle[11] and being overweight[19,20] have also been found to be related to sexual dysfunction.

Comorbidity is often defined by researchers as when an individual possesses two or more health conditions.[21] Comorbidity, iatrogenesis and overmedication are also linked to the development of sexual dysfunctions due to the combination of the cumulative effects from multiple cardiometabolic and mental health conditions, or the effects of antihypertensive medication like b-blockers, clonidine, and psychotropic medication.[22,23]

In regard to psychological factors, there is evidence of the negative effects of past sexual trauma, depression and anxiety on sexual function. Other factors include psychotropic medication use, concern about sexual performance, relationship problems, or poor body image.[11,19]

The following overarching research objectives were posed:

1. Analyse the impact of biomedical indicators on sexual functioning. The biomedical indicators included in the study were body mass index, glycemia, total cholesterol, triglycerides, total testosterone, pulse, arrhythmia, systolic, and diastolic arterial pressure.
2. Investigate the influence of gender on sexual functioning.
3. Investigate the relationship between comorbidities, medication intake, and sexual functioning.

Based on the established objectives and the bibliographic research, the following hypotheses are formulated:

1. Altered levels of biomedical indicators impact negatively on sexual functioning.
2. Women will present higher prevalence of sexual impairments.
3. Sexual functioning is compromised by comorbidities, and being medicated.

Chapter 2

Methods

2.1 Bibliographic Research

The bibliographic research was conducted to provide a fundamental knowledge about how biomedical parameters and health conditions contribute to sexual impairment. Various sources of information were consulted in preparation for the research analysed, mostly from international organizations and entities, that already studied the influence of specific biomedical indicators on sexual function. The majority of the publications analysed were from Pubmed, which included review articles, cross-sectional studies and control trials. The terms used in this research were centred around sexual functioning conjugated with terms such as cholesterol, triglycerides, diabetes mellitus, comorbidity, among others that comprise the various biomedical parameters.

2.2 Type of Study

This is a cross-sectional study and also of descriptive, comparative, inferential, and predictive. The researcher and other elements did not intervene in the self-administered questionnaire.

2.3 Participants

The sample consists of 963 individuals. Individuals under 18 years old were excluded.

2.4 Data Collection

2.4.1 Questionnaires

To obtain a broader understanding of the findings in this research, a sociodemographic questionnaire was distributed to collect basic and health-related information about the participants. The information collected included; age, gender, marital status, type of residence settlement, level of education, professional situation, socioeconomic status, smoking, and drinking habits, presence of disease, name of disease(s), diagnosed cardiac arrhythmia, medication intake, name of medication(s), physical activity, and contraceptive pill intake.

In order to evaluate the sexual function, the Massachusetts General Hospital sex functioning questionnaire (MGH-SFQ) was used. The Guided Interview Questionnaire and the Arizona Sexual Experience scale were combined to create the MGH-SFQ which

consists of five components that evaluate: sexual interest, the ability to get sexually aroused, the ability to achieve orgasms, the ability to get and maintain an erection for men or lubrication for women, and finally sexual satisfaction.[24]

MGH-SFQ allows healthcare professionals an efficient assessment of sexual dysfunctions for both men and women and potentially their etiologies. It is constructed so that higher scores indicate greater sexual functioning and lower scores mean that there is worse sexual functioning. Several validations for this questionnaire have been conducted in different countries, including Portugal, in which an alpha Cronbach of 0.91 was obtained, demonstrating the questionnaire's consistency is excellent and proving its reliability as an instrument.[25]

2.4.2 Biomedical Indicator Measurements

Regarding the biomedical parameters, Body Mass Index (BMI) was obtained by the formula: BMI = weight(kg)/height^2(m), kg=kilograms and m=meters. BMI values between 18.5-24.9 were considered normal. Normal Total testosterone levels: 8-60 ng/dl (females), 240-950 ng/dl (males), ng=nanograms and dl=decilitre.

Total cholesterol (TC) and triglyceride (TG) levels were obtained by applying the capillary test Accutrend® Plus (Roche Diagnostics GmbH from Mannheim, Germany), a portable device used for diagnosing hyperlipidemia. It is used by pricking the finger with a fleam, to collect 15-40µL of capillary blood. According to the manufacturer, the internal trial's precision measurements are 3.7% for TC, and 3.4% for TG, although the control trials precision measurements were 5.0% for TC and 2.4% for TG.[26] It has been demonstrated that the concentration measurements obtained with this instrument are closely related to those obtained in a laboratory, indicating that this device is accurate and valid.[26] TC levels under 200 mg/dl and TG levels under 150 mg/dl were considered normal, mg=milligram.

The glycemic index measurements were collected from capillary blood samples using the OneTouch® Verio®IQ (LifeScan® Johnson and Johnson, USA). This instrument uses a finger droplet of blood of 0.4µL obtained with a fleam. The device is regulated by international legislation which is certified by the International Organization for Standardization, via the ISO15197, making it a viable instrument to measure the glycemic blood levels.[27] Glycemia values between 76 and 110 mg/dl were considered normal.

The measurements of systolic (SBP) and diastolic blood pressure (DBP), pulse, were performed by using the BMG 5610 AEG®. The calibration follows the World Health

Organization (WHO) standard measurements. The device measures SBP in the range of 60-260mmHg (millimeters of Mercury); 40-199mmHg for DBP; and 40-180 beats per minute for pulse (bpm). SBP levels between 90 and 129mmHg, DBP levels between 60 and 84mmHg, and pulse between 60 and 100 bpm were considered normal.

2.5 Procedure

The data collection took place between October of 2016 and January of 2017. The questionnaires were answered in a designated room across the University, mainly in the facilities of Faculdade de Ciências Sociais e Humanas. It required the cooperation of a university professor and a fully qualified nurse. The professor monitored the questionnaire answering while the nurse performed physiological testing.

The participants were informed to do an eight hour fast before the blood test was conducted, in order to obtain more accurate results. Their fingers were pricked to collect the blood samples which were then parameterized using the instruments described previously. Afterwards, participants would follow the protocol by answering the questionnaires. Their involvement lasted between 30 to 45 minutes per individual and was conducted only once per person. The participants were given the choice of being notified of the investigation's findings and outcomes.

2.6 Data Analysis

Since this was a convenience sample, the frequency values (N), used in Chapter 3, are subject to variance due to missing values. The data was analysed using SPSS® - version 24.0. A wide range of methods were performed including descriptive statistics, Cronbach's Alpha (test score reliability coefficient), Test of Homogeneity of Variance, multiple linear regression, tests of normality (Shapiro-Wilk and Kolmogorov-Smirnova tests in Attachment III) in which assumption of normality was not verified. Therefore, non-parametric tests were used: Kruskal Wallis and Mann-Whitney U tests, and Spearman correlation. *P*-values lower than 0.05 were considered statistically significant, assuming a confidence interval of 95%.

2.7 Ethical Considerations

The study was conducted according to the guidelines of the Declaration of Helsinki, and was approved by the Ethics Commission of Faculdade de Ciências da Saúde of Universidade da Beira Interior (Attachment I), following strict anonymity and confidentiality .

Chapter 3

Results

3.1 Sociodemographic Characteristics

This research comprised 606 women (63.3%), 348 men (36.4%), and three gender non-conforming (0.3%). Being their mean age 34.9, and standard deviation (SD) of 15.859 (M=34.9, SD=15.859). Further information can be seen in Table 1, where most of the participants were single (40.1%), lived in a small rural area (56.3%), had a bachelor's degree (40.4%), were students (33%), and had medium socioeconomic status (42.4%).

Table 1. Sociodemographic characterization of the sample data.

		N	%	Mean	SD
Age		869		34.9	15.859
Gender		957			
	Women	606	63.3		
	Men	348	36.4		
	Gender non-conforming	3	0.3		
Marital Status		964			
	Committed Relationship	203	21.3		
	Domestic Partnership	67	7		
	Married	220	23.1		
	Non-Committal Relationship	3	0.3		
	Separated or Divorced	57	6		
	Single	383	40.1		
	Widowed	21	2.2		
Place of Residence		955			
	Big Rural Area	68	7.1		
	Small Rural Area	160	16.8		
	Big City	189	19.8		
	Small City	538	56.3		
Education Attainment		945			
	1st Cycle of Basic Education	1	0.1		
	3rd Cycle of Basic Education	72	7.6		
	Secondary Education	307	32.5		
	Bachelor's Degree	381	40.3		

	Masters or Doctorate Degree	181	19.2
	Vocational Program	3	0.3
Professional Status		954	
	Employees	305	32,9
	Self-Employed	91	9.5
	Student	315	33
	Retired	58	6.1
	Unemployed	106	11.1
	Working Students	79	8.3
Socioeconomic Status		956	
	High	9	0.9
	Medium-High	122	12.8
	Medium	405	42.4
	Medium-Low	340	35.6
	Low	80	8.4
Medication Intake		912	
	No	569	62.4
	Yes	343	37.6
Presence of Disease		924	
	No	596	64.5
	Yes	328	35.5
Smoking Habits		944	
	No	667	70.7
	Yes	277	29.3
Drinking Habits		944	
	No	460	48.7
	Yes	484	51.3
Contraceptive Pill Intake		603	
	No	379	62.9
	Yes	224	37.1
Physically Active		933	
	No	568	60.9
	Yes	365	39.1
Cardiac Arrhythmia		705	
	No	668	94.8
	Yes	37	5.2

3.2 Sexual Functioning Analysis

Regarding sexual interest (SI), the mean of 3.45 (SD=1.259) corresponded to a minimally diminished SI. Moreover, 450 participants (46.8%) considered their SI normal, 177 (18.4%) answered markedly diminished, 139 (14.4%) minimally diminished, 79 (8.2%) greater than normal, 72 (7.5%) totally absent, 33 (3.4%) markedly greater than normal, and 12 (1.2%) totally greater than normal.

Table 2. Results for sexual interest among the sample.

Sexual Interest	N	Valid Percent	Mean	SD
Totally Absent	72	7.5		
Markedly Diminished	177	18.4		
Minimally Diminished	139	14.4		
Normal	450	46.8		
Greater Than Normal	79	8.2		
Markedly Greater Than Normal	33	3.4		
Totally Greater Than Normal	12	1.2		
Total	962	100	3.45	1.259

The ability to get sexually aroused (AGSA) presented a mean of 3.46 (SD=1.21), which corresponded to a minimally diminished AGSA. 490 (51%) of the participants classified it as normal, 150 (15.6%) answered markedly diminished, 147 (15.3%) minimally diminished, 73 (7.6%) totally absent, 59 (6.1%) greater than normal, 30 (3.1%) markedly greater than normal, and 11 (1.1%) totally greater than normal.

Table 3. Results for ability to get sexually aroused among the sample.

Ability to Get Sexually Aroused	N	Valid Percent	Mean	SD
Totally Absent	73	7.6		
Markedly Diminished	150	15.6		
Minimally Diminished	147	15.3		
Normal	490	51		
Greater Than Normal	59	6.1		
Markedly Greater Than Normal	30	3.1		
Totally Greater Than Normal	11	1.1		
Total	960	100	3.46	1.211

For the ability to achieve orgasm (AAO), the mean of 3.45 (SD=1.22) corresponded to a minimally diminished AAO. 468 (54.8%) considered it to be normal, 120 (14.1%)

answered minimally diminished, 108 (12.6%) markedly diminished, 84 (9.8%) totally absent, 42 (4.9%) greater than normal, 21 (2.5%) markedly greater than normal, and 11 (1.3%) totally greater than normal.

Table 4. Results for the ability to achieve orgasm among the sample.

Ability to Achieve Orgasm	N	Valid Percent	Mean	SD
Totally Absent	84	9.8		
Markedly Diminished	108	12.6		
Minimally Diminished	120	14.1		
Normal	468	54.8		
Greater Than Normal	42	4.9		
Markedly Greater Than Normal	21	2.5		
Totally Greater Than Normal	11	1.3		
Total	854	100	3.45	1.222

The ability of men to get and maintain an erection or women to lubricate (AGMEL) had a mean of 3.53 (SD=1.23), which indicates it is minimally diminished. 516 (53.8%) participants considered it to be normal, 135 (14.1%) answered minimally diminished, 119 (12.4%) markedly diminished, 82 (8.5%) totally absent, 67 (7%) greater than normal, 24 (2.5%) markedly greater than normal, and 17 (1.8%) totally greater than normal.

Table 5. Results for the ability of men to achieve erection and women to lubricate among the sample.

Ability of men to achieve erection and women to lubricate	N	Valid Percent	Mean	SD
Totally Absent	82	8.5		
Markedly Diminished	119	12.4		
Minimally Diminished	135	14.1		
Normal	516	53.8		
Greater Than Normal	67	7		
Markedly Greater Than Normal	24	2.5		
Totally Greater Than Normal	17	1.8		
Total	960	100	3.53	1.23

Sexual satisfaction (SS) had a mean of 3.54 (SD=1.42), indicating a minimally diminished SA. 374 (39%) considered it to be normal, while 165 (17.2%) minimally diminished, 158 (16.5%) answered markedly diminished, 95 (9.9%) greater than

normal, 84 (8.8%) totally absent, 56 (5.8%) markedly greater than normal, and 28 (2.9%) totally greater than normal.

Table 6. Results for sexual satisfaction in the analysed sample data.

Sexual Satisfaction	N	Valid Percent	Mean	SD
Totally Absent	84	8.8		
Markedly Diminished	158	16.5		
Minimally Diminished	165	17.2		
Normal	374	39		
Greater Than Normal	95	9.9		
Markedly Greater Than Normal	56	5.8		
Totally Greater Than Normal	28	2.9		
Total	960	100	3.54	1.415

Overall sexual functioning variable

A new variable named overall sexual functioning (OSF) was created with the combination of weighted averages from the previous five main sexual functioning variables. The consistency of the "overall sexual functioning" index is excellent, as it results in a Cronbach's Alpha of 0.914 (Attachment II).

OSF had a mean of 17.6 (SD=5.43) and the cut-off point established was 20, indicating that the OSF of 428 (50.2%) participants had values lower than expected. 185 (21,7%) participants scored greater than 20 and 239 (28.1 %) had values exactly at the cut-off point of 20.

Table 7. Results for overall sexual functioning in the analysed sample data.

OSF	N	%	Mean	SD
5-19	428	50.2		
20	239	28.1		
21-35	185	21.7		
Total	852	100	17.603	5.428

In Table 8, the results of the performed Mann-Whitney test are shown. By analysing gender, the presented p-value (p) was under 0.05, therefore there were significant differences between men and women for the variables of sexual functioning, hence women scored lower than men in terms of SI ($p=0.000$, $p<0.05$), AGSA ($p=0.000$,

p<0.05), the AAO (p=0.000, p<0.05), AGMEL (p=0.006, p<0.05), and OSF (p=0.000, p<0.05).

When comparing genders based on biomedical indicators, statistically significant differences were found. Men had a worse health profile, with higher mean rank levels for BMI (p=0.000, p<0.05), glycemia (p=0.000, p<0.05), triglycerides (p=0.002, p<0.05), systolic pressure (p=0.000, p<0.05), and diastolic pressure (p=0.000, p<0.05).

Table 8. Comparison of women and men in terms of sexual functioning and biomedical indicators.

	Gender	N	Mean Rank	Mann-Whitney U	Z	p - value
SI	Men	347	534.46	85201.500	-5.175	0.000*
	Women	606	444.10			
AGSA	Men	348	526.55	85201.500	-4.649	0.000*
	Women	603	446.83			
AAO	Men	294	467.49	67917.000	-4.244	0.000*
	Women	551	399.26			
AGMEL	Men	347	505.65	94506.000	-2.754	0.006*
	Women	604	458.97			
SS	Men	346	485.34	101434.000	-0.822	0.411
	Women	605	470.66			
OSF	Men	294	464.91	68088.5	-3.789	0.000*
	Women	549	399.02			
BMI	Men	345	531	80386.5	-5.404	0.000*
	Women	591	432.02			
Glycemia	Men	160	223.99	13042	-4.609	0.000*
	Women	225	170.96			
Cholesterol	Men	211	236.34	27501	-1.689	0.091
	Women	286	258.34			
Triglycerides	Men	193	242.39	19803.5	-3.11	0.002*
	Women	248	204.35			
Systolic Pressure	Men	224	337.33	24455	-6.946	0.000*
	Women	334	240.72			
Diastolic Pressure	Men	224	314.1	28536.5	-4.512	0.000*
	Women	329	251.74			
Pulse	Men	221	250.55	30839.5	-1.844	0.065
	Women	308	275.37			

Note: The total N was excluded from this table to facilitate interpretation.

*. Significance (p<0.05)

The Mann-Whitney test results, presented in Table 9, are related with medication intake. On analysis, the p-value for all sexual functioning and biomedical variables were lower than 0.05, indicating that there are statistically significant differences between the groups that take medication and those who do not. The mean ranks revealed that the medication intake group has lower overall scores of SI ($p=0.000$, $p<0.05$), AGSA ($p=0.000$, $p<0.05$), the AAO ($p=0.000$, $p<0.05$), AGMEL ($p=0.000$, $p<0.05$), SS ($p=0.000$, $p<0.05$), and OSF ($p=0.000$, $p<0.05$).

As for the biomedical indicators, the medicated group has higher mean rank scores for BMI ($p=0.000$, $p<0.05$), glycemia ($p=0.000$, $p<0.05$), cholesterol ($p=0.000$, $p<0.05$), triglycerides ($p=0.000$, $p<0.05$), systolic pressure ($p=0.113$, $p>0.05$), diastolic pressure ($p=0.002$, $p<0.05$), and pulse ($p=0.037$, $p<0.05$).

Table 9. Comparison of medicated and non-medicated participants in terms of sexual functioning and biomedical indicators.

	Medication Intake	N	Mean Rank	Mann-Whitney U	Z	p - value
SI	No	569	493.41	76580	-5.781	0.000*
	Yes	343	395.27			
AGSA	No	567	489.04	77658	-5.423	0.000*
	Yes	342	398.57			
AAO	No	513	441.1	60994	-5.634	0.000*
	Yes	303	353.3			
AGMEL	No	567	489.73	77831.5	-5.5	0.000*
	Yes	343	398.91			
SS	No	566	480.47	82654	-3.893	0.000*
	Yes	343	412.97			
OSF	No	512	443.05	59110.5	-5.682	0.000*
	Yes	302	347.23			
BMI	No	561	409.28	71965	-5.933	0.000*
	Yes	336	515.32			
Glycemia	No	210	166.37	12783.5	-4.76	0.000*
	Yes	170	220.3			
Cholesterol	No	270	212.76	20861	-5.939	0.000*
	Yes	224	289.37			
Triglycerides	No	237	198.11	18749	-3.916	0.000*
	Yes	202	245.68			
Systolic Pressure	No	320	269.71	34947.5	-1.585	0.113
	Yes	237	291.54			
Diastolic Pressure	No	318	258.9	31610.5	-3.026	0.002*

	Yes	234	300.41			
Pulse	No	304	253.1	30582.5	-2.083	0.037*
	Yes	225	281.08			

Note: The total N was excluded from this table to facilitate interpretation.

*. Significance (p<0.05)

In Table 10, when comparing the presence of disease to the absence of disease, the results revealed statistically significant differences, indicating worse mean ranks results in all sexual functioning variables for those with diseases. They presented lower mean ranks for SI (p=0.000, p<0.05), AGSA (p=0.000, p<0.05), AAO (p=0.000, p<0.05), SS (p=0.000, p<0.05), and OSF (p=0.000, p<0.05).

The biomedical indicators all present statistically significant differences between the two groups, with higher mean ranks for the presence of disease group: BMI (p=0.000, p<0.05), glycemia (p=0.000, p<0.05), cholesterol (p=0.000, p<0.05), triglycerides (p=0.000, p<0.05), systolic pressure (p=0.023, p<0.05), diastolic pressure (p=0.005, p<0.05), and pulse (p=0.001, p<0.05).

Table 10. Comparison between participants with presence and absence of diseases in terms of sexual functioning and biomedical indicators.

	Presence of Disease	N	Mean Rank	Mann-Whitney U	Z	p - value
SI	No	596	496.58	77430	-5.549	0.000*
	Yes	328	400.57			
AGSA	No	595	495.96	76186	-5.803	0.000*
	Yes	326	397.2			
AAO	No	551	438.71	62974.5	-4.499	0.000*
	Yes	277	366.34			
AGMEL	No	596	492.32	78778	-5.175	0.000*
	Yes	326	405.15			
SS	No	596	495.47	76303	-5.515	0.000*
	Yes	325	397.78			
OSF	No	550	443.55	59370	-5.168	0.000*
	Yes	276	353.61			
BMI	No	586	407.54	66826	-7.403	0.000*
	Yes	324	542.25			
Glycemia	No	219	166.99	12481	-4.867	0.000*
	Yes	161	222.48			
Cholesterol	No	269	207.98	19632	-6.792	0.000*
	Yes	226	295.63			
Triglycerides	No	231	194.85	18215	-4.448	0.000*

	Yes	209	248.85			
Systolic Pressure	No	315	264.54	33561	-2.267	0.023*
	Yes	240	295.66			
Diastolic Pressure	No	310	258.8	32023	-2.805	0.005*
	Yes	240	297.07			
Pulse	No	300	244.61	28231.5	-3.364	0.001*
	Yes	227	289.63			

Note: The total N was excluded from this table to facilitate interpretation.

*. Significance (p<0.05)

In Table 11, when it came to exercising, a Mann-Whitney test was conducted to compare those who were physically active to those who were sedentary. The physically active group demonstrated statistically significant higher mean rank scores for all sexual functioning and biomedical variables, due to the p-value being under 0.05. In detail, they showed better results for SI (p=0.012, p<0.05), AGSA (p=0.000, p<0.05), AAO (p=0.002, p<0.05), AGMEL (p=0.001, p<0.05), SS (p=0.01, p<0.05), and finally lower OSF (p=0.005, p<0.05).

Regarding the differences based on the biomedical indicators, the physically active group presented lower mean rank scores for BMI (p=0.02, p<0.05), glycemia (p=0.001, p<0.05), cholesterol (p=0.000, p<0.05), triglycerides (p=0.007, p<0.05), diastolic pressure (p=0.003, p<0.05), and pulse (p= 0.000, p<0.05).

Table 11. Comparison of physically active and sedentary participants in terms of sexual functioning and biomedical indicators.

	Physically Active	N	Mean Rank	Mann-Whitney U	Z	p-value
SI	No	568	450.17	94098	-2.527	0.012*
	Yes	365	493.2			
AGSA	No	566	442.56	90030	-3.504	0.000*
	Yes	364	501.16			
AAO	No	506	399.79	74022	-3.046	0.002*
	Yes	330	447.19			
AGMEL	No	568	444.84	91071	-3.277	0.001*
	Yes	363	499.12			
SS	No	566	447.86	93029.5	-2.589	0.01*
	Yes	364	492.92			
OSF	No	504	398.66	73666	-2.824	0.005*
	Yes	330	446.27			
BMI	No	560	476.3	91394.5	-2.325	0.02*

	Yes	359	434.58			
Glycemia	No	223	202.64	13237.5	-3.417	0.001*
	Yes	150	163.75			
Cholesterol	No	286	264.81	22219.5	-4.109	0.000*
	Yes	199	211.66			
Triglycerides	No	254	228.4	18821.5	-2.697	0.007*
	Yes	175	195.55			
Systolic Pressure	No	328	279.34	34491	-0.876	0.381
	Yes	220	267.28			
Diastolic Pressure	No	324	288.34	30183.5	-2.956	0.003*
	Yes	219	247.82			
Pulse	No	306	291.75	22872.5	-5.786	0.000*
	Yes	213	214.38			

Note: The total N was excluded from this table to facilitate interpretation.

*. Significance (p<0.05)

The contraceptive pill was used by 37.1% of women, and as depicted in Table 12, the contraceptive pill intake group has statistically significant differences (p<0.05), with higher mean values for OSF (p=0.001, p<0.05).

Table 12. Comparison between women who take the contraceptive pill and women who do not in terms of sexual functioning and biomedical indicators.

	Contraceptive pill	N	Mean Rank	Mann-Whitney U	Z	p - value
OSF	No	333	258.25	30386.000	-3.271	0.001*
	Yes	218	303.11			
	Total	551				

*. Significance (p<0.05)

Because this research aims to address cardiovascular health, arrhythmia was the disease specifically picked when looking further into OSF. Table 13 presents the differences between the cardiac arrhythmia diagnosed (CAD) group and absent cardiac arrhythmia (ACA) group. The CAD group presented statistically significant lower mean rank scores of sexual interest (p=0.044, p< 0.05), sexual arousal (p=0.017, p<0.05).

Table 13. Comparison between participants with and without arrhythmia in terms of overall sexual functioning.

	Arrhythmia	N	Mean Rank	Mann-Whitney U	Z	p-value
Sexual Interest	No	678	361.43	10218	-2.015	0.044*
	Yes	37	295.16			
	Total	715				
Ability to Get Sexually Aroused	No	676	361.02	9786	-2.39	0.017*
	Yes	37	283.49			
	Total	713				
Ability to Achieve Orgasm	No	587	314.7	8979	-1.654	0.098
	Yes	36	267.92			
	Total	623				
Ability to Maintain Erection or Lubrication	No	676	359.31	10947.5	-1.374	0.169
	Yes	37	314.88			
	Total	713				
Sexual Satisfaction	No	675	358.7	11003.5	-1.265	0.206
	Yes	37	316.39			
	Total	712				

*. Significance ($p<0.05$)

To analyse how total cholesterol and triglycerides influence OSF, the Mann-Whitney test was also used to compare those with normal and high levels of total cholesterol and triglycerides. In Table 14, OSF presented statistically significant differences between participants with normal cholesterol and high levels of cholesterol, showing that hypercholesterolemia had lower mean rank scores for OSF.

Table 14. Comparison of OSF between participants with normal and high cholesterol and triglycerides.

		Range Interval	N	Mean Rank	Mann-Whitney U	Z	p-value
OSF	Total Cholesterol	Normal	300	223.69	13143	-4.038	0.000*
		High	117	171.33			
		Total	417				
	Triglycerides	Normal	246	187.47	13044.5	-1.461	0.144
		High	117	170.49			
		Total					

*. Significance ($p<0.05$)

A Kruskal-Wallis test was carried out, for the purpose of comparing OSF between individuals with low, normal, and high glycemia, BMI, systolic pressure, diastolic pressure, pulse, and total testosterone, shown in Table 15.

The test showed that there were differences between the three groups of glycemia (p=0.001, p<0.05) and BMI (p=0.000, p<0.05). By analysing the mean rank, the high glycemia group and high BMI group presented the lowest scores for OSF.

Table 15. Comparison of overall sexual functioning between individuals with low, normal, and high glycemia, systolic pressure, diastolic pressure, pulse, and total testosterone.

	Ranged Variables	Range Intervals	N	Mean Rank	Chi-Square	df	p-value
Overall Sexual Functioning	Glycemia	Low	29	181.57			
		Normal	244	207.71			
		High	111	161.92			
		Total	384		13.65	2	0.001*
	BMI	Low	36	414.69			
		Normal	498	455.84			
		High	304	360.53			
		Total	838		29.987	2	0.000*
	Systolic Pressure	Low	3	354.5			
		Normal	301	230.15			
		High	166	243.04			
		Total	470		3.376	2	0.185
	Diastolic Pressure	Low	39	236.12			
		Normal	353	238.05			
		High	73	206.94			
		Total	465		3.358	2	0.187
	Pulse	Low	26	260.15			
		Normal	402	220.92			
		High	16	201.06			
		Total	444		5.975	2	0.224
	Male Total Testosterone	Low	19	16.97			
		Normal	10	14.9			
		High	4	22.38			
		Total	33		1.797	2	0.407
	Female Total Testosterone	Low	1	7.5			
		Normal	13	8.15			
		High	3	13.17			
		Total	17		2.536	2	0.281

*. Significance (p<0.05)

In Table 16, to assess the impact of comorbidity on OSF, the Kruskal-Wallis test was also used, where the participants were divided into three groups, according to the number of diseases each one reported; zero, one, and two or more. The participants

were also divided into groups by type of condition: chronic, psychiatric, both, and others.

Regarding the disease quantity, there were statistically significant differences between the three groups (p=0.000, p<0.05). The group with two or more diseases showed the worst values for OSF.

The type of disease revealed statistically significant differences in mean rank (p=0.000, p<0.05) between the groups. OSF scores were lowest for the group with both chronic and psychiatric diseases.

Table 16. Comparison of overall sexual functioning between disease types and disease quantity.

	Ranged Variables	Range Intervals	N	Mean Rank	Chi-Square	df	p - value
Overall Sexual Functioning	Pathology Quantity	Zero Pathologies	550	437.61			
		One Pathology	206	360.76			
		Two or more Pathologies	61	313.96			
		Total	817		27.179	2	0
	Type of Pathology	Chronic	171	132.59			
		Chronic and Psychiatric	14	91.54			
		Psychiatric	40	120.25			
		Other	47	177.95			
		Total	272		19.975	3	0

*. Significance (p<0.05)

Another focus of this study was to look for significant correlations between the different variables of sexual functioning, biomedical indicators and health parameters (number of diseases and medication), using Spearman's correlation, as seen in Table 17.

The Spearman correlation analysis showed statistically significant results, with a negative relationship between age (r_s=-0.276, p<0.01), BMI (r_s=-0.168, p<0.01), glycemia (r_s=-0.121, p<0.05), total cholesterol (r_s=-0.132, p<0.01), and OSF. Indicating that increases in age, BMI, glycemia and cholesterol will decline overall sexual functioning. No correlations were obtained between female (FTT) and male (MTT) total testosterone.

Increased age had a statistically significant correlation with declined SI (r_s=-0.312, p<0.01), lower AGSA (r_s=-0.292, p<0.01), declined AAO (r_s=-0.200, p<0.01), declined AGMEL (r_s=-0.300, p<0.01), and declined SS (r_s=-0.275, p<0.01).

Increases in BMI were correlated with decline in SI (r_s=-0.178, p<0.01), AGSA (r_s=-0.149, p<0.01), AAO (r_s=-0.123, p<0.01), AGMEL (r_s=-0.193, p<0.01), and SS (r_s=-0.174, p<0.01).

Higher glycemic levels were not found to have a significant correlation with declined SI (r_s=-0.090, p>0.05), in contrast, it did have a significant correlation with lower AGSA (r_s=-0.104, p<0.05), declined AAO (r_s=-0.109, p<0.05), declined AGMEL (r_s=-0.159, p<0.01), and declined SS (r_s=-0.120, p< 0.05).

Increased total cholesterol had a significant correlation with declined SI (r_s=-0.139, p<0.01), AGSA (r_s=-0.164, p<0.01), declined AGMEL (r_s=-0.164, p<0.01), and declined SS (r_s=-0.163, p<0.01).

The higher levels of systolic pressure were correlated with declined SI (r_s=-0.093, p<0.05), AGSA (r_s=-0.122, p<0.05), AGMEL (r_s=-0.150, p<0.01), and SS (r_s=-0.095, p<0.05).

The higher levels of diastolic pressure were correlated with declined SI (r_s=-0.096, p<0.05) and declined AGMEL (r_s=-0.095, p<0.05).

The higher number of diseases (ND) was significantly correlated with lower SI (r_s=-0.197, p<0.01), AGSA (r_s=-0.203, p<0.01), AAO (r_s=-0.160, p<0.01), AGMEL (r_s=-0.179, p<0.01), SS (r_s=-0.193, p<0.01), and OSF (r_s=-0.179, p<0.01).

The higher number of medications (NM) was significantly correlated with decreased SI (r_s=-0.180, p<0.01), AGSA (r_s=-0.181, p<0.01), AAO (r_s=-0.197, p<0.01) AGMEL (r_s=-0.184, p<0.01), SS (r_s=-0.132, p<0.01), and OSF (r_s=-0.191, p<0.01).

Table 17. Spearman's correlation results between sexual functioning variables and biomedical indicators.

	SI	AGSA	AAO	AGMEL	SS	OSF	Age	BMI	CBG	TC	TG	SP	DP	Pulse	FTT	MTT	NM	ND
SI	1	.820**	.691**	.668**	.549**	.835**	-.312**	-.178**	-0.09	-.139**	-0.016	-.093*	-.096*	-.091*	0.096	0.09	-.180**	-.197**
	.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.078	0.002	0.73	0.028	0.023	0.035	0.473	0.484	0.000	0.000
AGSA		1	.792**	.770**	.614**	.877**	-.292**	-.149**	-.104*	-.164**	-0.036	-.122**	-0.077	-0.055	0.182	0.055	-.181**	-.203**
		.	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.000	0.456	0.004	0.07	0.203	0.175	0.666	0.000	0.000
AAO			1	.734**	.588**	.841**	-.200**	-.123**	-.109*	-0.078	-0.035	-0.079	-0.055	-0.018	0.011	0.082	-.197**	-.160**
			.	0.000	0.000	0.000	0.000	0.000	0.033	0.112	0.502	0.087	0.24	0.708	0.965	0.65	0.000	0.000
AGMEL				1	.600**	.822**	-.300**	-.193**	-.159**	-.164**	-0.074	-.150**	-.095*	-0.06	0.221	0.053	-.184**	-.179**
				.	0.000	0.000	0.000	0.000	0.002	0.000	0.118	0.000	0.025	0.168	0.098	0.683	0.000	0.000
SS					1	.796**	-.275**	-.174**	-.120*	-.163**	-0.057	-.095*	-0.07	-0.076	0.189	-0.035	-.132**	-.193**
					.	0.000	0.000	0.000	0.018	0.000	0.237	0.025	0.1	0.082	0.159	0.786	0.000	0.000
OSF						1	-.276**	-.168**	-.121*	-.132**	-0.042	-0.046	-0.055	-0.032	0.103	0.073	-.191**	-.179**
						.	0.000	0.000	0.018	0.007	0.423	0.319	0.236	0.506	0.694	0.686	0.000	0.000
Age							1	.441**	.144**	.434**	.161**	.198**	.168**	-0.047	-0.25	-0.063	.281**	.367**
							.	0.000	0.006	0.000	0.001	0.000	0.000	0.295	0.06	0.622	0.000	0.000
BMI								1	.351**	.317**	.361**	.425**	.414**	.092*	-0.175	-0.122	.169**	.252**
								.	0.000	0.000	0.000	0.000	0.000	0.035	0.202	0.347	0.000	0.000
CBG									1	.260**	.419**	.390**	.387**	.173**	0.091	-.667**	.232**	.248**
									.	0.000	0.000	0.000	0.000	0.001	0.73	0.005	0.000	0.000
TC										1	.354**	.118*	.221**	.253**	-0.067	-0.216	.251**	.317**
										.	0.000	0.012	0.000	0.000	0.62	0.092	0.000	0.000
TG											1	.315**	.390**	.161**	0.026	-.300*	.192**	.199**
											.	0.000	0.000	0.001	0.852	0.02	0.000	0.000
SP												1	.631**	.098*	0.026	-0.025	.087*	.139**
												.	0.000	0.025	0.851	0.853	0.041	0.001
DP													1	.255**	0.21	-0.034	.144**	.145**
													.	0.000	0.121	0.799	0.001	0.001
Pulse														1	0.226	0.084	.130**	.174**
														.	0.107	0.531	0.003	0.000

FTT	1	.	0.068	-0.012
	.	.	0.614	0.928
MTT		1	0.11	0.12
		.	0.395	0.367
NM			1	.567**
			.	0.000
ND				1
				.

**. Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

A multiple linear regression test (Table 18) was carried out to determine the modulation and the mediating effect of the biomedical variables, showing that model reached significance, indicating that it successfully predicted OSF scores ($F=7.006$, $p<0.001$). The model explained 25.7% of the variance in OSF scores ($r^2=0.251$, $p<0.001$).

The most significant predictor was age ($\beta=-0.289$, $p<0.05$), which indicated that with increased age, the OSF declines. Other variables that proved to have explanatory and predictive power were gender ($\beta=-0.135$, $p<0.05$) and BMI ($B=-0.184$, $p<0.05$). Therefore, being a woman with higher BMI and medication intake would display declined sexual functioning levels.

Table 18. Multiple linear regression results showing the prediction variables' influence on overall sexual functioning.

Predictors	R2	Durbin-Watson	β	F	p-value
	0.257	1.797		7.006	0.000*
Age			-0.289		0.000*
Gender			-0.135		0.024*
BMI			-0.184		0.02*
Glycemia			-0.018		0.812
Total Cholesterol			0.068		0.384
Triglycerides			0.047		0.498
Systolic Pressure			-0.017		0.824
Diastolic Pressure			0.102		0.207
Pulse			-0.055		0.374
Medication Intake			-0.14		0.124
Presence of Disease			-0.069		0.452
Physically active			0.036		0.557

*. Significance ($p<0.05$)

Chapter 4

Discussion

Sexual functioning is an important element of the developing individual and it can also be impaired by physiological and pathological changes. In order to attain all the objectives of this research, a set of methods were developed and scientific evidence-based associations between the variables were proposed. Overall, the findings of this investigation proved to be successful, yielding reliable conclusions on the impact of several biomedical indicators and health parameters on sexual functioning.

1. The impact of biomedical indicators and health parameters on sexual function.

The model's descriptive, comparative, and predictive power for sexual functioning was improved by incorporating sociodemographic, biomedical and health parameters, thus supporting some of the results.

Among the first observed aspects was that the majority of the sample presented levels of sexual functioning below the theoretical cut-off point. This finding is relevant since recent scientific evidence is reporting increases in sexual dysfunction, particularly in younger individuals.[28,29] The reason for this is unclear, though it may be a result of social changes such as the decline in value for partnered activities or the increase in solo leisure activities such as social media usage.[29,30] Another explanation could be that 264 participants used medication, being antidiabetic, and psychotropic the most used drugs, which are associated with sexual dysfunction.[31]

In the present study, biomedical indicators and sexual functioning were correlated. Specifically, lower overall sexual functioning was correlated with increased age, higher BMI, higher levels of glycemia, and total cholesterol. Higher systolic pressure was correlated with lower levels of sexual interest, arousal, satisfaction, and lower ability to achieve and maintain erection/lubrication. Elevated diastolic pressure and pulse were found to be correlated with lower sexual interest. Low and high levels of BMI and glycemia showed lower scores of OSF. Participants with arrhythmia showed lower levels of sexual interest and arousal. These results support empirical evidence already performed, for obesity, diabetes, cardiovascular disease, and pulse variance which are associated with sexual dysfunctions and will be discussed below.[11,17,32]

Ageing is one of the most consistent predictors of sexual dysfunction, and its aetiology may be multifactorial, including androgen/estrogen declines, impairment of neurohumoral pathways, decreased genital blood flow due to atherosclerotic vascular changes, endothelial dysfunction caused by cardiovascular disease progression, and other comorbidities.[33]

Higher BMI levels are associated with diabetes, cardiovascular diseases, increased inflammation, and decreased testosterone, which are known to cause SD.[19] Moreover, poorer mental wellbeing, self-esteem, and body image related to obesity may also contribute to SD.[19]

Diabetes, which is characterized by hyperglycemia, causes autonomic neuropathy and arteriosclerosis that can lead to arterial insufficiency and consequently decreased blood flow to the genitalia, resulting in sexual dysfunction.[11,17,22,32]

The association between cardiovascular diseases and sexual function impairment is potentially due to psychological and physiopathological factors.[12] Arteriosclerosis of important blood vessels could also be behind sexual dysfunction in individuals with hypercholesterolemia.[32] The incidence of sexual dysfunction in patients with arterial hypertension is potentially due to the imbalance of vascular regulatory tone and diminished vasodilation capacity.[32] Additionally, some antihypertensive drugs, such as beta-blockers, may also be responsible for sexual impairment in patients with hypertension and arrhythmia.[12,32]

According to the reviewed literature, a higher pulse rate is linked to greater sexual functioning and that hypothesis was evaluated[18]; however, our research found a negative relationship between these variables. The sympathetic nervous system (SNS) is responsible for the increase in heart rate; therefore our findings can be explained by the SNS's anti-erection or detumescence role, consequently impairing sexual functioning.[34]

As for the contraceptive pill intake, it was associated with better overall sexual functioning. Research in this field seems to present mixed results, however, a recent study showed positive effects of hormonal contraceptive in different areas of female sexual function, such as improved confidence in body image, relief of gynecologic pain, and discomfort, less menstrual bleeding and overall better psychological health.[35] They have also been found to produce positive effects in female sexuality such as sexual desire, arousal, satisfaction, and ability to achieve orgasm.[35] Moreover, having stable hormone levels during the cycle may be beneficial since fluctuations are associated with

genital and systemic symptoms, which ultimately contributes to the women's wellbeing and possibly the improvement of their sexual functioning.[35]

Our findings also support scientific research regarding physical activity, which was associated with enhanced sexual functioning scores and better overall health. This factor promotes overall health, especially vascular health therefore protecting against sexual dysfunction.[11,19,28,32]

2. The impact of gender on sexual functioning.

When comparing between men and women this was also observed, since women scored on average lower than men in all variables of sexual functioning, particularly sexual interest and ability to achieve orgasm. The linear regression also revealed that being a woman is associated with lower overall sexual functioning, corroborating previous investigation that suggested that women have a higher prevalence of sexual dysfunctions.[8,9]

Interestingly, men participants presented greater sexual functioning scores while simultaneously displaying worse results for BMI, glycemia, triglycerides, systolic, and diastolic pressure. Despite this apparent paradox, these results were in line with the scientific evidence regarding men's health paradigm, stating that men have a higher incidence and morbidity of cardiovascular and metabolic disease than women.[36] These gender health-differences are explained by scholars from a biological viewpoint, for example, the compensatory effects of the second X chromosome in women, and socio-cultural perspectives, such as under-usage of primary care services by men or gender-based policies to promote health concentrated mainly on women and children.[36]

This paradox can be attributed to the fact that women's sexuality is more complex and highly dependent on multiple factors beyond the biomedical aspects.[37] The causes for this sexual functioning discrepancy can be attributed to a rising concern with self-image and the usage of psychotropic medication, endometriosis, psychosexual trauma, menopausal endocrinological changes, relationship dissatisfaction, and psychological stress.[37] Factors related to increased stress levels and gender inequality are related, for example, to women actively participating in the workforce, while maintaining their stereotypical roles such as primary household and family caretaker. Women made up most of the participants with psychiatric and chronic diseases and evidence as shown that women have a higher prevalence of these conditions, all of which are associated with sexual dysfunction.[22,37]

Furthermore, men are more exposed to media coverage of male sexual dysfunction and the growing number of treatments, resulting in diminished stigma.[38] For this reason, men are more likely to pursue medical help for its treatment.[38] Women, on the other hand, still face society's double standards of stigma around their sexuality and its concerns.[38]

3. The impact of comorbidities and medication intake on sexual function.

This study found that participants who take at least one medication and have at least one diagnosed disease scored lower on all variables of sexual functioning and presented, simultaneously, worse health profiles when compared to those who do not take any medication or suffer from any pathology. This was expected since impaired health and various treatments can affect negatively sexual functioning.[1,11] Diabetes was the most reported disease and psychotropic drugs were the most widely used drug by the participants. Psychotropic drugs are linked with negative impact on sexual functioning due to their neurobiological action mechanism.[22,31,37]

Participants with comorbidities had substantially worse sexual functioning scores, backing up previous studies.[22] Our results also revealed that participants with chronic, psychiatric diseases, or both showed much worse levels of overall sexual functioning than other diseases. Another finding suggested that as the number of diseases increases, the overall sexual functioning declines, further enhancing the role of comorbidities and possibly multimorbidities. There are not many studies discussing how these variables cause sexual impairment, yet it is thought to be related to the synergistic effects of psychiatric conditions and the vascular dysfunction of cardiometabolic conditions.[10,22]

The presented research study showed that the medication usage and a higher number of medication intake is linked to higher sexual dysfunction scores, owing to overlapping drug interactions and the increased risk of adverse effects as the number and dosage of medications increases, demonstrating the role of iatrogenesis and polypharmacy.[21,23,31]

This research provided evidence for the influence of biomedical indicators on sexual functioning. This has implications for healthcare professionals because to maximize the wellbeing of patients, regular and non-judgemental dialogue regarding sexuality in all ages is vital. Physicians may benefit from training programs related to how to address sexual functioning in order to facilitate doctor-patient relationships and build trust. As a result, it is important to continue and expand policies that ensure the protection,

provision and promotion of sexual health information and services. Future studies are recommended to provide deeper insight into the temporal and causal relationships between sexual dysfunctions and gender discrepancies, medication usage, medical conditions, and the potential interaction of these factors.

The empirical results in this study must be seen in light of some limitations. One of these implications is related to the construction of the questionnaire, which allowed questions to be left unanswered by the participant. Another limitation was the fact that the collection of data regarding biomedical indicators with the nurse was not compulsory for the participants, more information on all fields would contribute to study the hypothesis. Furthermore, the results cannot be generalized since it was collected by convenience and this type of research did not allow for the inference of causality or the measurement of the long-term effects of biomedical indicators on sexual functioning. Finally, given the questionnaires were self-reported, they were subject to errors and bias, such as social desirability.

Chapter 5

Conclusion

Given the relevance of sexual health to patients, healthcare professionals should routinely address it with their patients, especially those with comorbidities. By doing so, it will give the opportunity to evaluate their general health profile, diagnose and write detailed clinical sexual histories, screen for, and manage potential comorbidities, review medication that needs to be discontinued or changed, educate the patients about the normal sexual response and finally provide counselling focused on lifestyle changes, and risk factor modifications. Accordingly, the research conducted emphasizes on how biomedical indicators influence sexual function and the usefulness of this knowledge not only to professionals working in this area of expertise, but also to healthcare professionals in general.

For this reason, it is critical that sexuality be conveyed and dealt with responsibly in order to create a safer environment for the improvement and understanding of human lives.

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Attachments

Appendix l - Questionnaire

Investigação em Comportamento Humano e Biomedicina

O objetivo desta investigação é avaliar aspetos de natureza psicológica e biomédica, nomeadamente a associação entre saúde mental, personalidade, etc. e níveis de glicose, colesterol ou outros indicadores físicos. Este estudo foi aprovado pela Comissão de Ética da Faculdade de Ciências da Saúde - UBI.

Para tal, contamos com a sua colaboração através do preenchimento do questionário que aqui se apresenta (que é anónimo e confidencial) e a disponibilização de medidas fisiológicas.

A sua participação é muito importante.
Este inquérito está dirigido apenas a pessoas com 18 ou mais anos de idade.

Desde já muito obrigado pela sua colaboração!
...

Universidade da Beira Interior - Portugal
Departamento de Psicologia e Educação & Centro de Investigação em Ciências da Saúde (CICS)
Prof. Doutor Henrique Pereira

E-mail: hpereira@ubi.pt

Para iniciar o preenchimento, carregue no botão "Seguinte".

No final do inquérito, encontrará uma parte em que lhe serão solicitadas informações acerca de resultados de análises biomédicas (glicémia, colesterol total, triglicéridos, etc.). Se as tiver disponíveis, pedimos que as forneça; caso não tenha, não faz mal, pode preencher todas as partes anteriores. Obrigado.

Ao iniciar, está ciente dos objetivos desta pesquisa e aceita disponibilizar as suas respostas unicamente para tratamento estatístico. Garantimos que os seus dados apenas serão utilizados para este fim.

Para iniciar o preenchimento, carregue no botão "Seguinte".

Parte 1 - Dados Sócio-demográficos

1. A sua idade?

_____

2. O seu género sexual?

Marcar apenas uma oval.

- ◯ Homem
- ◯ Mulher
- ◯ Outra: _____

3. O seu estado marital atual?

Indique o que melhor descreve o seu estado atual.

Marcar apenas uma oval.

- ◯ Casado(a)
- ◯ Solteiro(a)
- ◯ Divorciado(a)/Separado(a)
- ◯ Viúvo(a)
- ◯ Unido(a) de facto
- ◯ Tenho um namoro/compromisso afetivo
- ◯ Outra: _____

4. Qual é o seu local de residência?

Marcar apenas uma oval.

- ◯ Uma pequena cidade
- ◯ Uma grande cidade
- ◯ Um pequeno meio rural
- ◯ Um grande meio rural

5. Qual é o seu nível de escolaridade?

Marcar apenas uma oval.

- ◯ Até 9 anos de escolaridade
- ◯ Até 12 anos de escolaridade
- ◯ Formação universitária (Licenciatura/Bacharelato)
- ◯ Formação universitária (Mestrado/Doutoramento)
- ◯ Outra: _____

6. Qual é a sua situação profissional?

Marcar apenas uma oval.

- ◯ Desempregado(a)
- ◯ Estudante
- ◯ Trabalhador(a)-estudante
- ◯ Trabalhador(a) por conta de outrem
- ◯ Trabalhador(a) por conta própria
- ◯ Reformado(a)
- ◯ Outra: _____

7. Qual é o seu estatuto sócio-económico?

Marcar apenas uma oval.

- ◯ Baixo
- ◯ Baixo-médio
- ◯ Médio
- ◯ Médio-alto
- ◯ Alto

8. Como se identifica relativamente à sua orientação sexual?

Marcar apenas uma oval.

- ◯ Heterossexual
- ◯ Bissexual
- ◯ Homossexual

Parte 2 - Funcionamento sexual (MGH)

Por favor, responda a todas as perguntas assinalando a resposta correta ou a resposta que lhe parece mais adequada no seu caso (Considere como "normal" o periodo da sua vida, quando esteve mais satisfeito com o seu funcionamento sexual).

9. No último mês...

Marcar apenas uma oval por linha.

	Totalmente ausente	Marcadamente diminuída	Quase normal	Normal	Algo acima do normal	Marcadamente acima do normal	Com a
Como esteve o seu interesse sexual?	◯	◯	◯	◯	◯	◯	
Como esteve a sua capacidade para obter estimulação ou excitação sexual?	◯	◯	◯	◯	◯	◯	
Como esteve a sua capacidade para obter orgasmos?	◯	◯	◯	◯	◯	◯	
Como foi a sua capacidade para atingir e manter uma ereção (se for homem) ou uma lubrificação (se for mulher)?	◯	◯	◯	◯	◯	◯	
Em geral, como é a sua satisfação com a sua vida sexual?	◯	◯	◯	◯	◯	◯	

Parte 3 - Indicadores biomédicos

10. Indique o seu peso atual:
Em kg

11. Indique a sua altura atual:
Ex: 174cm ou 1,74m

12. No caso de ter realizado alguma análise recente aos níveis de GLICÉMIA no seu sangue, qual foi o valor obtido?
No caso de nunca ter realizado este tipo de análise, passe à frente.

13. No caso de ter realizado alguma análise recente aos níveis de COLESTEROL TOTAL no seu sangue, qual foi o valor?
No caso de nunca ter realizado este tipo de análise, passe à frente.

14. No caso de ter realizado alguma análise recente aos níveis de TRIGLICERIDOS no seu sangue, qual foi o valor?
No caso de nunca ter realizado este tipo de análise, passe à frente.

15. No caso de ter realizado alguma análise recente aos níveis de TESTOSTERONA TOTAL na sua saliva ou no seu sangue, qual foi o valor?
No caso de nunca ter realizado este tipo de análise, passe à frente.

16. No caso de ter realizado alguma avaliação recente aos níveis de PRESSÃO ARTERIAL, qual foi o valor da PRESSÃO SISTÓLICA?

Ex: 127. No caso de nunca ter realizado este tipo de avaliação, passe à frente.

17. No caso de ter realizado alguma avaliação recente aos níveis de PRESSÃO ARTERIAL, qual foi o valor da PRESSÃO DIASTÓLICA?

Ex: 78. No caso de nunca ter realizado este tipo de avaliação, passe à frente.

18. No caso de ter realizado alguma avaliação recente aos níveis de PRESSÃO ARTERIAL, qual foi o valor da PULSAÇÃO?

Ex: 100 batidas/minuto. No caso de nunca ter realizado este tipo de avaliação, passe à frente.

19. No caso de ter realizado alguma avaliação recente aos níveis de PRESSÃO ARTERIAL, foi detetada ARRITMIA?

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

20. Neste momento está a tomar alguma medicação?

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

21. Se está a tomar alguma medicação neste momento, por favor, indique qual:

Se não está a tomar nenhuma medicação, passe à frente.

22. Tem alguma doença diagnosticada?

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

23. Se tiver alguma doença diagnosticada, por favor, indique qual:

Se não tem nenhuma doença diagnosticada, passe à frente.

_____

24. Fuma?

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

25. Se fuma, indique (em média) quantos cigarros fuma por dia?

_____

26. Bebe bebidas alcoólicas?

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

27. Se bebe bebidas alcoólicas, indique (em média) quantas medidas por semana bebe.

1 medida = 1 copo de vinho, 1 lata ou garrafa de cerveja, 1 cálice/shot de bebida branca

_____

28. Pratica algum tipo de atividade física de forma sistemática e frequente neste momento?

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

29. No caso de ser mulher, está a tomar a pílula contracetiva?

Marcar apenas uma oval.

- ◯ Sim
- ◯ Não

30. Se desejar, deixe aqui o seu comentário:

E é tudo! Muito obrigado pela sua colaboração

Para enviar as suas respostas, carregue no botão "Submeter"

Attachment l - Parecer da Comissão de Ética

FACULDADE CIÊNCIAS DA SAÚDE

PARECER

Processo: CE-FCS-2016-022

Tema Projecto/Proponente: "Investigação em Comportamento Humano e Biomedicina - CHB" – Exmo. Senhor Prof. Doutor Henrique Pereira

Exmo. Sr. Presidente da Faculdade de Ciências da Saúde

Apreciado o pedido referente ao processo acima mencionado esta Comissão não detectou matéria que ofenda os princípios éticos.

Covilhã, 29 de Junho de 2016

O Presidente da Comissão de Ética
Prof. Doutor José Martinez de Oliveira

Faculdade de Ciências da Saúde
Universidade da Beira Interior
Covilhã

Universidade da Beira Interior | Faculdade de Ciências da Saúde
Avenida Infante D. Henrique
6200-506 Covilhã | PORTUGAL
Tel.: +351 275 329 700 | E-mail: pcabral@ubi.pt
www.ubi.pt

Attachment II - Cronbach Alpha

Table A1. Internal consistency of total sexual functioning index.

Reliability Statistics	
Cronbach's Alpha	No. of Items
0.914	5

Attachment III - Parametric Assumptions

Table AA1. Glycemic levels.

Glycemia	Tests of Normality	Levene Statistic
Low	0.017[a]	0.143
Normal	0.000[b]	
High	0.000[b]	

a. Shapiro-Wilk.

b. Kolmogorov-Smirnova.

When looking at Table AA1, it can be observed that normality is not verified for all levels of Glycemia (p-value < 0.05), and the homogeneity of the variances is verified (0.143 > 0.05).

Table AA2. Disease types.

Disease Type	Tests of Normality	Levene Statistic
Chronic	0.000[b]	0.418
Chronic and Psychiatric	0.609[a]	
Psychiatric	0.145[a]	
Others	0.066[a]	

a. Shapiro-Wilk.

b. Kolmogorov-Smirnova.

By analysing Table AA2, the normality was not verified only for Chronic Diseases (p-value < 0.05) and verified for all the other categories. As for the homogeneity of variances it is verified (0.418 > 0.05).

Table AA3. Male testosterone levels.

Male Testosterone	Tests of Normality	Levene Statistic
Low	0.009[a]	0.204
Normal	0.004[a]	
High	0.857[a]	

a. Shapiro-Wilk.

b. Kolmogorov-Smirnova.

After analysing Table AA3, the normality was only verified for the High Testosterone group (p-value > 0.05). The homogeneity of the variances can be said to be verified (0.204 > 0.05).

Table AA4. Diastolic pressure levels.

DBP	Tests of Normality	Levene Statistic
Low	0.003[a]	0.62
Normal	0.000[b]	
High	0.002[b]	

a. Shapiro-Wilk.

b. Kolmogorov-Smirnova.

When analysing Table AA4, the normality of all diastolic pressure groups is not verified (p-values < 0.05). As for the homogeneity of variance it is verified (0.62 > 0.05).

Table AA5. Systolic pressure levels.

SBP	Tests of Normality
Low	0.000[a]
Normal	0.000[b]
High	0.000[a]

a. Shapiro-Wilk.

b. Kolmogorov-Smirnova.

By analysing Table AA6, the normality for all systolic pressure groups is not verified (p-value < 0.05), furthermore the homogeneity of variances calculation was not possible.

Table AA6. Pulse levels.

Pulse	Tests of Normality	Levene Statistic
Low	0.046[a]	0.427
Normal	0.000[b]	
High	0.037[a]	

a. Shapiro-Wilk.

b. Kolmogorov-Smirnova.

After analysis of Table AA7, the normality for all Pulse levels is not verified (p-value < 0.05). However, the homogeneity of variances is verified (0.425 > 0.05).

Table AA7. Triglyceride levels.

Triglyceride	Tests of Normality	Levene Statistic
Normal	0.000[b]	0.849
High	0.000[b]	

a. Shapiro-Wilk.

b. Kolmogorov-Smirnova.

When analysing Table AA8, the normality for all triglyceride levels is not verified (p-value < 0.05). However, the homogeneity of variances is verified (0.849 > 0.05).

Attachment IV - Permission to exceed references and word limit

FACULDADE CIÊNCIAS DA SAÚDE

Dalila Nunes <a35473@fcsaude.ubi.pt>

Informação Importante sobre ultrapassagem dos limites estabelecidos para a dissertação

1 message

gem <gab.gem@fcsaude.ubi.pt> 28 April 2021 at 16:29
To: Dalila Nunes <a35473@fcsaude.ubi.pt>

Caro(a) aluno(a)

na sequência da mensagem que enviou, com informação sobre a necessidade de ultrapassagem do limite de palavras fixado para elaboração da Dissertação informo que, a título excecional no presente ano letivo, e tendo em conta a proximidade da data de entrega do trabalho, não será aplicada penalização específica sobre este aspecto na secção Documentação da Grelha de Classificação que será utilizada pelo Júri no dia da Prova Pública.

Realço, no entanto, a importância da capacidade de síntese e a delimitação do campo de investigação de um determinado tema, pois será uma situação com a qual poderá vir a ser confrontado no futuro, quer em trabalhos no âmbito da realização do internato médico, quer em Comunicações Científicas em congressos ou até mesmo na realização de Doutoramento.

Melhores cumprimentos

O Diretor de Curso e
Responsável pela UC Dissertação
Miguel Castelo-Branco Sousa
MD PhD