

Late-onset hypogonadism (LOH), masculinity and relationship and sexual satisfaction: are sexual symptoms of LOH mediators of traditional masculinity on relationship and sexual satisfaction?

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Abstract. *Background:* Late-onset hypogonadism (LOH) is characterised by significant changes in the male life cycle, and may increase the likelihood of experiencing sexual difficulties. Further, it is assumed that traditional gender roles (masculinity) can affect the experience of sexual difficulties. The aim of this study was to evaluate the effect of masculinity on sexual symptoms of LOH, as well as on sexual and relational satisfaction. *Methods:* A community sample of 460 Portuguese men aged between 40 and 91 years (mean (\pm s.d.) 51.64 \pm 8.03 years) was collected. Correlation and moderation analyses were conducted to investigate relationships among the variables being studied. *Results:* There was an association between the sexual symptoms of LOH, masculinity and sexual and relationship satisfaction. Moderation analysis revealed direct relationships between masculinity and sexual and relationship satisfaction, as well as direct relationships between sexual symptoms of LOH and sexual and relationship satisfaction. However, sexual symptoms of LOH did not significantly moderate the relationships between masculinity and sexual and relationship satisfaction. *Conclusions:* These findings indicate the existence of a direct effect of both masculinity and sexual symptoms of LOH on sexual and relational satisfaction, although masculinity did not have an effect on sexual symptoms of LOH. The implications of these findings are discussed. Instrumentality as an indicator of masculinity was associated with relational and sexual satisfaction, suggesting the importance of involving a man's partner in sexual dysfunction interventions.

Additional keywords: agency, dyadic adjustment, erectile dysfunction, instrumentality, sexual functioning.

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Introduction

Androgen deficiency, or late-onset hypogonadism (LOH), has gained growing attention^{1,2} in recent years. For example, the European Male Aging Study (EMAS),^{3,4} Massachusetts Male Aging Study⁵ and the Baltimore Longitudinal Study of Aging⁶ have reported endocrine, physical, psychological and sexual function changes associated with the aging process in men. LOH occurs due to a slow, gradual decline in testicular testosterone production in middle-aged to older men (i.e. those >40 years of age).^{1,7} The decrease in testosterone is associated with diffuse symptoms of androgen deficiency, such as sexual difficulties or dysfunction, muscle weakness, obesity, osteoporosis, insomnia, fatigue and depression, among others.^{1,8–10} For a diagnosis of LOH, three sexual symptoms associated with low testosterone levels must be present (i.e. decreased frequency of morning erections, decreased sexual desire and erectile dysfunction) in combination with total testosterone concentrations <11 nM and free testosterone

concentrations <220 pM.⁴ This is in line with a similar proposal that the criteria for LOH are the presence of at least two sexual symptoms along with the testosterone concentrations <10.4 nM or calculated free testosterone <225 pM.¹¹ These studies also provide evidence that psychological and physical symptoms are less informative than sexual symptoms associated with decreased testosterone concentrations for a diagnosis of LOH^{3,4,11}.

Nevertheless, it is also crucial to evaluate how the physical and emotional changes consequent to LOH may affect men's sexual health and intimate relationships.^{12,13} Some studies have assessed masculinity as a moderator of the relationship between sexual function and the quality of life and other psychosocial outcomes and found that men with poor sexual functioning had poorer social functioning and mental health (including depression) and endorsed more traditional forms of masculinity.^{14,15} However, the effects that gender roles may have on sexual symptoms of LOH, and on sexual and relational

satisfaction are unknown. This study intended to fill this gap in the literature by investigating the potential effect of masculinity on sexual symptoms of LOH, sexual satisfaction and relational satisfaction.

Methods

Participants and procedures

This study was part of the ongoing EVISA – Life Experiences | Health in Adult Life project, investigating perceived health in middle-aged and older men and women. Participants were invited to complete an online questionnaire or a pencil-and-paper questionnaire. All participants were asked to read and sign a written consent form, as per the Declaration of Helsinki, that explained the aims of the study and was accompanied by the contact details for P. A. Costa and F. Pimenta. A sample of 616 Portuguese men who fulfilled the eligibility criteria (i.e. male sex, age ≥ 40 years and Portuguese nationality) was collected. From this sample, only participants who fulfilled an additional two key variables (i.e. being in a relationship and having an active sex life) were retained for the present study, resulting in a final sample of 460 men. Sexual symptoms of LOH were measured using psychosocial measures, namely the three sexual symptoms that are indicative of LOH. No hormone or physiological data were collected at this phase of the study. The primary demographic data and self-reported health information are presented in Table 1.

Instruments

Andropause Symptoms Severity Inventory

The Andropause Symptoms Severity Inventory (ASSI) was developed by the EVISA team (P. A. Costa, R. Rosas, P. Mangia, F. Pimenta, J. Marôco and I. Leal, unpubl. data).¹⁶ The ASSI includes 40 items measured on a five-point Likert scale divided into eight dimensions of

psychological and physical symptoms associated with LOH, including sexual symptoms. For the present study, only the three sexual symptoms used to diagnose LOH were used (i.e. decreased frequency of morning erections, decreased sexual desire and difficulties maintaining an erection during sexual intercourse).^{3,4} The mean of these three items was calculated to create the variable ‘LOH sexual symptoms’, with values ranging from 1 to 4.50 (mean (\pm s.d.) 1.57 ± 0.73 ; $\alpha = 0.84$). Higher scores reflect higher levels of sexual symptoms associated with LOH.

Revised Dyadic Adjustment Scale

The Revised Dyadic Adjustment Scale (RDAS)¹⁷ is a shorter form of the Dyadic Adjustment Scale to evaluate dyadic adjustment, and comprises three dimensions, measured on a six-point Likert scale.^{17,18} Mean (\pm s.d.) scores for Consensus (2.71 ± 1.44 ; $\alpha = 0.94$) and Satisfaction (2.79 ± 1.50 ; $\alpha = 0.94$) showed high reliability, whereas Cohesion ($M = 3.91 \pm 1.20$; $\alpha = 0.76$) showed moderate reliability. Higher scores reflect higher dyadic adjustment.

New Sexual Satisfaction Scale – Short Form

The New Sexual Satisfaction Scale – Short Form (NSSS-S) is the short version of the New Sexual Satisfaction Scale,¹⁹ and comprises 12 items measured on a five-point Likert scale (mean (\pm s.d.) 3.97 ± 0.64 ; $\alpha = 0.93$). Higher scores reflect higher levels of sexual satisfaction.²⁰

Bem Sex-Role Inventory

The Bem Sex-Role Inventory (BSRI)²¹ comprises 20 descriptive adjectives, distributed in two gender dimensions, namely Masculinity (Agency/Instrumentality) and Femininity (Expressiveness/Communication), measured on a five-point Likert scale. For the present study, only the dimension Agency/Instrumentality was used (mean (\pm s.d.) 3.69 ± 0.57 ; $\alpha = 0.84$). Higher scores reflect higher self-perceived masculinity.

Statistical analysis

Statistical analyses were conducted using SPSS v.25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics for sociodemographic variables were calculated. No violations to normality were found for any of the variables (Skewness < 3 ; Kurtosis < 7).²² Reliability was determined by Cronbach’s α .²³ Pearson’s correlation coefficients (r) were calculated to analyse associations among variables. The structural equation model (SEM) with moderation analysis was performed using SPSS AMOS v.25.0 (IBM SPSS, Chicago, IL, USA). The quality of the fit estimation for the structural model was assessed based on the guidelines of Hu and Bentler²⁴ and Kline.²⁵ The ratio of χ^2 to the degrees of freedom (d.f.) was computed, with values < 3 considered indicators of a good fit of the model. The comparative fit index (CFI) and Tucker–Lewis coefficient (TLI) were calculated, with values > 0.90 indicating an acceptable fit, and the root mean square error of approximation (RMSEA) was also calculated, with values < 0.08 indicating an acceptable fit.^{24,25}

Table 1. Main sociodemographic data ($n = 460$)

Data are given as the mean \pm s.d. or as n (%)

Age (years)	51.64 \pm 8.03
Marital status	
Single	24 (5.2)
Married or living with partner	390 (84.8)
Divorced	42 (9.1)
Widowed	4 (0.9)
Education	
Less than high school	30 (6.5)
High school	235 (51.1)
University degree	195 (42.4)
Professional employment	
Active	378 (82.2)
Inactive	65 (14.1)
Other	17 (3.7)
Comorbidities	
Heart disease	92 (20.8)
Cancer	79 (17.5)
Neurological disease ^A	77 (17.1)
Hormone imbalance	71 (15.8)
Diabetes	108 (23.8)
High blood pressure	131 (28.7)

^AParkinson’s disease, epilepsy or other neurological disease.

Results

To investigate whether stereotypical masculinity was associated with LOH sexual symptoms, sexual satisfaction and relational satisfaction, a correlation matrix was calculated (Table 2). Significant associations among LOH sexual symptoms, dyadic cohesion, sexual satisfaction and masculinity were found ($P < 0.01$ for all). However, no significant correlations between LOH sexual symptoms and dyadic consensus or dyadic satisfaction were found, and these two dyadic dimensions were not used in further analyses.

Based on the significant associations found, an SEM was developed. The baseline model without constraints, between masculinity, sexual satisfaction and dyadic cohesion, revealed an acceptable fit ($\chi^2/d.f. = 4.159, P < 0.001, CFI = 0.909, TLI = 0.895, RMSEA = 0.083, 90\%$ confidence interval (CI) 0.075–0.091). To evaluate whether LOH sexual symptoms would moderate the effects of masculinity on sexual satisfaction and dyadic cohesion, an SEM with moderation analyses was developed. To reduce potential problems with

multicollinearity, the variables were centred through mean centring, and an interaction term between masculinity and LOH sexual symptoms was computed. The moderation model (Fig. 1) exhibited an acceptable fit ($\chi^2/d.f. = 3.791,$

Table 2. Correlations among late-onset hypogonadism (LOH) sexual symptoms, relational satisfaction, sexual satisfaction and masculinity
 Relational satisfaction was evaluated using the Revised Dyadic Adjustment Scale (RDAS), sexual satisfaction was evaluated using the New Sexual Satisfaction Scale (NSSS-S) and masculinity (Agency/Instrumentality) was evaluated using the Bem Sex-Role Inventory (BSRI). * $P < 0.01$

	1	2	3	4	5	6
1. LOH sexual symptoms	–	0.01	0.02	–0.27*	–0.37*	–0.17*
2. RDAS – Consensus		–	0.90*	0.08	–0.09	–0.04
3. RDAS – Satisfaction			–	0.02	–0.08	–0.02
4. RDAS – Cohesion				–	0.27*	0.21*
5. NSSS-S					–	0.26*
6. BSRI						–

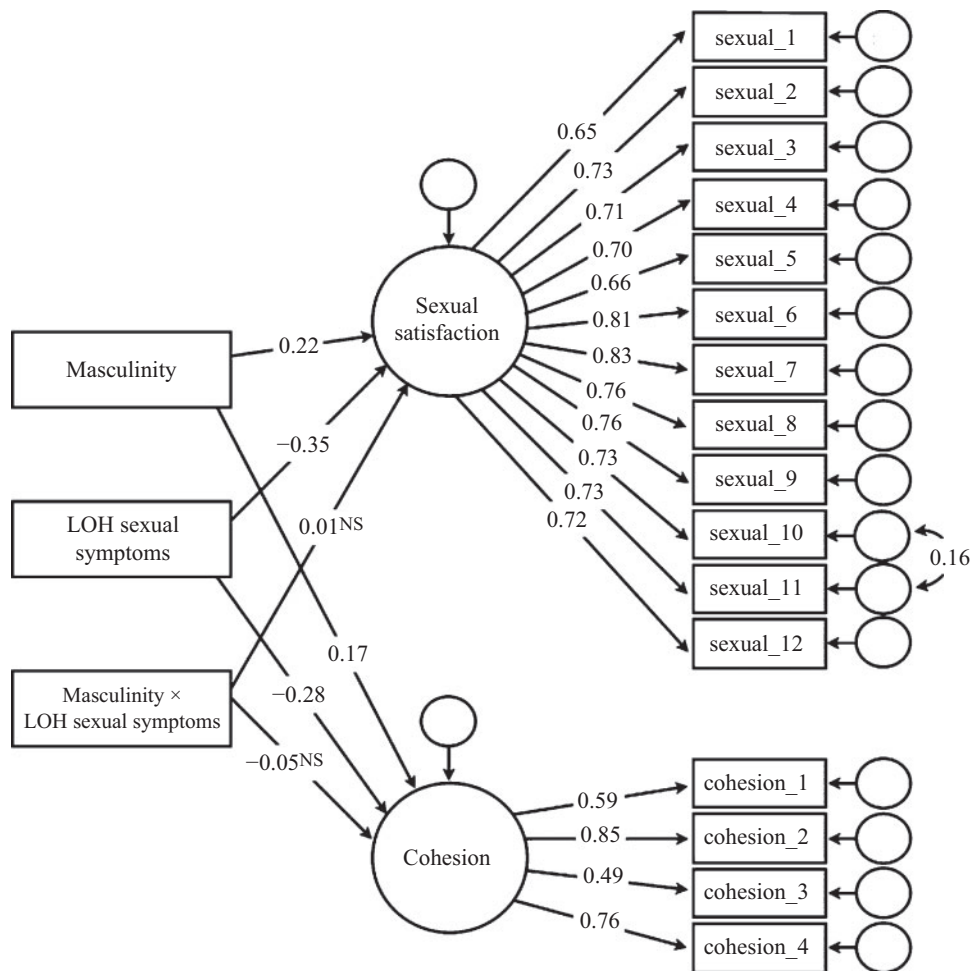


Fig. 1. Structural equation for the hypothesised relationships between masculinity, sexual satisfaction and dyadic cohesion, moderated by late-onset hypogonadism (LOH) sexual symptoms (values presented are standardised factor loadings and regression coefficients). Note 1: unless stated not significant (NS), all trajectories are significant; $P < 0.001$. Note 2: P -value of trajectory to sexual satisfaction = 0.827, P -value of trajectory to cohesion = 0.351).

$P < 0.001$, CFI = 0.904, TLI = 0.887, RMSEA = 0.078, 90% CI 0.071–0.085). Contrary to our prediction, LOH sexual symptoms did not significantly moderate the effects of masculinity on sexual satisfaction or dyadic cohesion. However, both masculinity and LOH sexual symptoms had significant direct main effects on both sexual satisfaction and dyadic cohesion.

Discussion

To the best of our knowledge, the present study is the first to evaluate the association between traditional gender roles (masculinity) and sexual symptoms of LOH among middle-aged men. Our results showed direct effects of masculinity and LOH sexual symptoms on sexual satisfaction and dyadic cohesion, suggesting that men with higher stereotypical masculinity scored higher on sexual and relational satisfaction, whereas men with higher levels of LOH sexual symptoms scored lower on sexual and relationship satisfaction. However, it should be noted that the mean scores for sexual symptoms of LOH were low, suggesting a low prevalence of sexual symptoms among the men in the present study. As for masculinity scores, the observed mean in this sample was above the scale's midpoint, suggesting moderate to high stereotypical masculinity.

These results can be compared with other findings in the literature, namely with men who experienced prostate cancer,^{26–29} where physical and emotional effects of both the disease and the treatment had an effect on men's sense of masculinity and their relationship with their partner. This leads us back to the male gender role socialisation theory,³⁰ where men are seen as adopting fewer health-promoting beliefs and behaviours (e.g. asking others for help). This concept reinforces the belief that masculinity is a social construct, where a lack of agency or instrumental characteristics is perceived as not being 'masculine', thus as a weakness.²⁸ Furthermore, in a study with men with and without erectile dysfunction,³¹ it was found that sexual satisfaction, as well as dyadic adjustment, were determinants of men's self-concept. A similar perspective was found in a study with African American prostate cancer survivors.²⁹

In terms of limitations, this study used a non-random community sample and may not reflect the broader population of men with sexual symptoms of LOH. Another limitation of the study was the use of SEM to test for underlying theoretical relationships between variables, although causality cannot be ascertained from a cross-sectional study. Finally, an important limitation of this study was the reliance on self-report measures, thus excluding observable hormone data. As such, the present findings are based on sexual indicators of LOH alone, and further research is needed to explore the relationship between masculinity and LOH.

In summary, we argue that stereotypical masculinity may be changing, and men could be embracing new and improved ways of developing strategies to encourage themselves and to include their partners in the process, because health professionals and partners are crucial in seeking help for psychological and sexual interventions.³² It would be a suitable strategy to challenge men to confront stereotypical masculinity and to involve their

partners, because some studies with couples affected by erectile dysfunction and other sexual symptoms of LOH have highlighted the importance a partner can have for men's sexual functioning and satisfaction.^{33,34}

Conflicts of interest

The authors declare no conflicts of interest.

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