ORIGINAL ARTICLE

Sexual Function

Sexual health in Polish elderly men with coronary artery disease: importance, expectations, and reality

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Deterioration in overall health, hormonal disturbances, and erectile dysfunction (ED) contributes to limitations in sexual activity in the elderly, which is further limited by incorrect beliefs about the hazards of sexual activity in cardiac patients. We aimed to analyze the occurrence of ED in elderly men, their perception of the relevance of good sexual function, and their expectations of physicians. A cross-sectional study encompassed 731 patients with coronary artery disease (CAD) subjected to cardiac rehabilitation. Demographic data and data on modifiable risk factors and patient expectations were collected. ED was assessed using the IIEF-5 questionnaire. Relationships among the risk factors for ED, occurrence of ED, and patient expectations, as well as the changes in the indicators between 2012 and 2016, were analyzed. The mean age of men was 70.7 ± 5.1 years. The prevalence of ED was 93.0%. The IIEF-5 score was significantly associated with age, tobacco smoking, exercise tolerance, time to diagnosis of CAD, and treatment with calcium channel blockers and diuretics. Patients declared that sexual activity was overall important (47.9%) or very important (25.6%). Three hundred and sixty (49.3%) patients expected their physician to show interest in their sexual health, but the topic was addressed in only 12.5%. Over the past few years, we have observed an increase in the awareness and importance of sexual health as well as a significant increase in patients' expectations of physicians to show interest in their sexual health. Patients' expectations of discussing and receiving treatment for ED remain an unmet medical need.

INTRODUCTION

A number of factors contribute to a reduction in sexual activity at advanced ages.[1] Physiological changes result from the worsening of overall health, hormonal disorders, and erectile dysfunction (ED).[2] An accumulation of risk factors (*e.g.*, hypertension, diabetes, hyperlipidemia, obesity, tobacco smoking, and sedentary lifestyle) leads to damage in arterial vessels supplying the corpora cavernosa of the penis with blood.[3] A negative effect of age also results from a prolonged exposure of the vascular endothelium to various risk factors.[4] As a result, ED mainly affects men burdened with several modifiable risk factors and comorbid coronary artery disease (CAD).[5] Poor knowledge about risk factors for ED, treatment options for ED, and the general safety of being sexually active and returning to sexual activity after exacerbations of CAD further decrease interest in sexual activity.[3,6] Societal and psychological factors negatively influence sexual health of the elderly, as well.[7,8] Sexual activity at an advanced age has been ignored or even denounced. Furthermore, there is a widely accepted incorrect belief that sexual activity in cardiac patients is a risky behavior

that often provokes another myocardial infarction and death, which results in patients' avoidance of engagement in sexual activity. However, societal changes relating to the sexual sphere have also reached the elderly. The media often address issues of sexual health. The European Association of Urology recommended sildenafil as a first-line treatment for ED and additionally, affordable generics of sildenafil were launched along with its approval as an over-the-counter medication.[9]

This new situation presents a substantial challenge for physicians and yet, the issue of sexual health in elderly men with CAD has not been studied. The aim of the study was to analyze the prevalence of ED in men with CAD aged 65 years and above, their perception of the relevance of good sexual function, and their expectations of physicians in terms of discussing and improving sexual health.

PATIENTS AND METHODS

This cross-sectional study was conducted between January 2012 and December 2016. Overall, 731 patients with CAD aged 65 years and above undergoing cardiac rehabilitation in five centers were

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enrolled. All centers were located in Poland: Department of Cardiac Rehabilitation, Centre of Cardiac Rehabilitation and Cardiac Prevention (Głuchołazy); Department of Cardiac Rehabilitation, Hospital of the Ministry of Interior (Głuchołazy); Pulmonary Medicine and Allergy Center, Cardiac Rehabilitation Unit (Karpacz); Department of Cardiac Rehabilitation, Lower Silesian Heart Diseases Centre "Medinet" (Wroclaw); and Center of Cardiac Prevention and Rehabilitation "Creator" (Wroclaw). All patients were undergoing rehabilitation for CAD. Patients were rehabilitated due to acute coronary syndrome or after undergoing invasive procedures such as percutaneous transluminal coronary angioplasty (PTCA) and coronary artery bypass grafting (CABG). They were subjected to cardiac rehabilitation within 4 weeks following a discharge from the cardiology department. All patients were treated according to the European Society of Cardiology (ESC) guidelines. All patients were surveyed at baseline. Demographic data, information about risk factors (confirmed by checking medical records), and data on the study questions – patients' evaluation of the importance of good sexual function (ability to lead satisfying sexual activity) and their expectations of physicians to address this issue and their ED, were collected.

The analysis of modifiable risk factors included smoking, hypertension, dyslipidemia, diabetes, overweight, and poor health-promoting physical activity (sedentary lifestyle). Physical activity was assessed with the Framingham questionnaire,[8] which allowed for a retrospective evaluation of the intensity of planned, aimed, and regular forms of health-promoting physical activity. Within this category, the distances covered by walking or by bike were included, under the condition that the activity lasted for >15 min at a time. Duration of each physical activity was assessed with an accuracy of within 15 min. The benchmark of the minimal intensity of recreational physical activity, in the context of cardiovascular disease prevention, was set at 1000 Kcal per week which is equal to exercising 150 min per week.[9]

The presence of ED was evaluated using an abridged International Index of Erectile Function (IIEF-5) questionnaire, entailing five questions to be graded on a 0–5 scale (first question 1–5 points), for a total score of 5–25 points. ED was identified if the IIEF-5 was ≤21. Degree of ED defined based on the IIEF-5 was as follows; mild: 17–21; moderate: 12–16; moderate to severe: 8–11; and severe: 5–7.[10,11] Patients who underwent surgery due to prostate hypertrophy or prostate malignancy were excluded from the study. Data validity on the IIEF-5 and Framingham questionnaire was verified by making a comparison between the total score in the primary test and a control test conducted at least 7 days later.

The study was approved by the Commission of Bioethics at Wroclaw Medical University (KB-433/2010). All patients gave their informed consent to participate in the study. The study is a part of the PREVANDRO project as an introduction to targeted education aimed at educating patients on risk factors for ED, its main symptoms, possible therapeutic methods, as well as lifestyle modifications, with the aim of fulfilling the recommendations included in the European documents regarding cardiovascular disease prevention.[3,6,12,13] The education was performed by using a PowerPoint presentation, traditional printed materials (brochures, IIEF-5 questionnaire), and a website (www.kardioseksuologia.pl). The educational activities between 2011 and 2018 have reached 17 942 patients.

Data were encoded and statistically analyzed. Groups were compared with the Student's *t*-test and the Mann–Whitney U test. Relationships were analyzed with Spearman's rank correlation coefficient. For comparison of dichotomous variables, the Chi-square test (with the Yates correction for 2 × 2 tables) was used. When data were ordered, the Chi-square test for trends was performed. The Statistica package version 12 (StatSoft, Tulsa, OK, USA) was used for the analysis.

RESULTS

The clinical characteristics of the study group are summarized in **Table 1**. ED occurred in 680 (93.0%) patients. Dividing patients into quartiles elucidated the dependency between the rate of ED and age. Severe ED was the most common among the oldest patients from the

Table 1: Baseline characteristics of the study group

Variable	Result
Number of patients (*n*)	731
Age (year), mean±s.d.	70.7±5.1
Height (cm), mean±s.d.	1.73±0.06
Body weight (kg), mean±s.d.	82.77±12.40
BMI (kg m⁻²), mean±s.d.	27.66±3.81
Demographic data, *n* (%)	
Rural area	289 (39.5)
Urban area	442 (67.0)
Education, *n* (%)	
Higher (Code 1)	163 (22.3)
Secondary (Code 2)	256 (35.0)
Vocational (Code 3)	226 (30.9)
Primary (Code 4)	86 (11.8)
Clinical data	
Previous myocardial infarction, *n* (%)	490 (67.0)
Time from diagnosis of CAD (year), mean±s.d.	6.1±7.2
Tolerance of effort (MET), mean±s.d.	6.37±2.12
LVEDD (mm), mean±s.d.	55.29±6.95
LA (mm), mean±s.d.	43.23±5.81
IVSDD (mm), mean±s.d.	12.05±2.49
EF (%), mean±s.d.	52.8±9.5
Risk factors for CAD	
Arterial hypertension, *n* (%)	494 (67.6)
Type II diabetes mellitus, *n* (%)	233 (31.9)
Dyslipidemia, *n* (%)	413 (56.5)
Tobacco smoking, *n* (%)	496 (67.9)
Pack-years of smoking, mean±s.d.	34.53±23.08
Active smoking (*n*=774), *n* (%)	66 (9.0)
Overweight*, *n* (%)	386 (52.8)
Obesity**, *n* (%)	174 (23.8)
Sedentary lifestyle***, *n* (%)	705 (96.4)
Intensity of health-promoting physical activity (Kcal per week), mean±s.d.	187.23±396.70
Surgical treatment, *n* (%)	
PTCA	264 (36.1)
CABG	219 (30.0)
PTCA and CABG	176 (24.1)
Conservative treatment, *n* (%)	72 (9.9)
Beta-blockers	674 (92.2)
Angiotensin-converting enzyme inhibitors	582 (79.6)
Angiotensin receptor blockers	56 (7.7)
Calcium channel blockers	117 (16.0)
Diuretics	203 (27.8)
Statins	693 (94.8)

*25≤ BMI <29.9 kg m⁻²; **BMI ≥30.0 kg m⁻²; ***Energy expenditure <1000 Kcal per week. CABG: coronary artery bypass grafting; CAD: coronary artery disease; EF: ejection fraction; IVSDD: intraventricular septum diastolic diameter; LA: left atrium; LVEDD: left ventricular diastolic diameter; MET: metabolic equivalent of task; PTCA: percutaneous transluminal coronary angioplasty; s.d.: standard deviation; BMI: body mass index

4th quartile (55.1%). Good sexual function was reported in 15.1% of the youngest patients (1st quartile) compared to 1.5% of the oldest patients (4th quartile). The rates of ED are summarized in **Table 2**.

The presence of ED was significantly linked with age (mean ± s.d.: 71.0 ± 5.1 years *vs* 67.3 ± 3.5 years; $P < 0.001$), sedentary lifestyle (3.1% *vs* 9.8%; $P = 0.035$), left ventricular diastolic diameter of the heart (mean ± s.d.: 55.61 ± 6.96 mm *vs* 51.33 ± 5.64 mm; $P = 0.006$), left ventricular ejection fraction (mean ± s.d.: 52.5% ± 9.4% *vs* 57.4% ± 8.9%; $P = 0.021$), and exercise tolerance (mean ± s.d.: 6.14 ± 1.95 metabolic equivalents of task [METs] *vs* 8.74 ± 2.38 METs; $P < 0.001$). The occurrence of ED was significantly linked to the place of residence, education, body mass index (BMI), overweight or obesity, dyslipidemia, smoking in the past and present, number of pack-years, the intensity of physical activity, hypertension, diabetes, number of risk factors, duration of CAD, echocardiographic parameters such as the size of left atrium and the thickness of the intraventricular septum, as well as the type of invasive and pharmacological treatment. The multivariate analysis did not show the presence of a combination of the aforementioned factors which would be significantly linked to ED.

The IIEF-5 score was related to age ($R = -0.56$; $P < 0.001$), smoking (13 [upper–lower quartile: 8–17] *vs* 12 [lower–upper quartile: 7–16], $P = 0.038$), present smoking (15 [lower–upper quartile: 10–18] *vs* 12 [lower–upper quartile: 7–17], $P = 0.013$), left ventricular diastolic diameter ($R = -0.13$, $P = 0.026$), size of the left atrium ($R = -0.16$, $P = 0.008$), exercise tolerance ($R = 0.28$, $P < 0.001$), duration of CAD ($R = -0.1034$, $P = 0.005$), and treatment with calcium channel blockers (11 [lower–upper quartile: 5–16] *vs* 13 [lower–upper quartile: 8–17], $P = 0.019$) and diuretics (11 [lower–upper quartile: 6–16] *vs* 13 [lower–upper quartile: 8–17], $P = 0.013$). The remaining parameters were insignificantly connected to the IIEF-5 score.

Despite 68 (9.3%) men declaring good sexual function to be of no importance and 126 (17.2%) being undecided, 350 (47.9%) declared it to be important and 187 (25.6%) highly important. The percentage of patients to whom good sexual function was important or highly important increased statistically significantly ($P < 0.001$) over the study period (**Table 3**). Regarding sexual health as important or highly important was significantly connected to age (mean ± s.d.: 69.7 ± 4.6 years *vs* 74.2 ± 5.4 years; $P < 0.001$), hypertension (90.7% *vs* 84.6%; $P = 0.037$), undergoing CABG (85.8% *vs* 92.0%, $P = 0.021$), duration of CAD (2 [lower–upper quartile: 0–10] years *vs* 8 [lower–upper quartile: 1–12] years, $P = 0.006$), the presence of ED (87.9% *vs* 100%; $P = 0.025$), and the IIEF-5 score (14 [lower–upper quartile: 9–18] *vs* 9 [lower–upper quartile: 5–12], $P < 0.001$). The remaining parameters were insignificant.

Almost half of the study group expected their physician to show interest in their sexual health, 203 (27.8%) were undecided, and 168 (23.0%) did not want the physician to express interest in their sexual health (**Table 3**). The percentage of men who expected their physician to show interest in their sexual health increased statistically significantly ($P = 0.002$) over the study period. Patients' expectations of the physician to address their sexual health were significantly linked to age (mean ± s.d.: 69.9 ± 4.7 years *vs* 72.6 ± 5.5 years; $P < 0.001$), duration of CAD (2 [lower–upper quartile: 0–10] years *vs* 6 [lower–upper quartile: 0–12] years, $P = 0.002$), the presence of ED (87.5% *vs* 66.9%, $P = 0.026$), and the IIEF-5 score (13 [lower–upper quartile: 9–17] *vs* 11 [lower–upper quartile: 6–15], $P < 0.001$). The remaining parameters were insignificant.

The issue of sexual health was raised in 91 (12.5%) cases of patients; in 640 (87.6%) men, it was not addressed (**Table 3**). Addressing the topic of ED was statistically significantly associated with younger age (mean ± s.d.: 69.4 ± 4.3 years *vs* 70.9 ± 5.2 years; $P = 0.009$), living in urban areas (15.9% *vs* 10.2%; $P = 0.029$), higher education (3 [lower–upper quartile: 2–4] *vs* 3 [lower–upper quartile: 2–3]; $P = 0.016$), dyslipidemia (15.3% *vs* 8.8%; $P = 0.0122$), lower left ventricular diastolic dimension (mean ± s.d.: 53.21 ± 6.58 mm *vs* 55.73 ± 6.96 mm, $P = 0.0208$), and higher left ventricular ejection fraction (mean ± s.d.: 55.5% ± 8.8% *vs* 52.3% ± 9.5%, $P = 0.0335$). The remaining parameters were insignificant.

DISCUSSION

Our study showed that the prevalence of ED in elderly men with CAD exceeded 93.0%. The IIEF-5 score was significantly associated with age, tobacco smoking, exercise tolerance, duration of CAD, and treatment with calcium channel blockers and diuretics. The majority of

Table 2: Comparison of erectile dysfunction severity by quartiles

Quartile	Age (year)	No ED, n (%)	ED mild, n (%)	ED moderate, n (%)	ED moderate to severe, n (%)	ED severe, n (%)	Total
1st	65–66	28 (15.1)	75 (40.5)	51 (27.6)	17 (9.2)	14 (7.6)	185
2nd	67–69	17 (9.0)	47 (25.0)	72 (38.3)	30 (16.0)	22 (11.7)	188
3rd	70–73	3 (1.9)	11 (6.8)	52 (32.1)	55 (34.0)	41 (25.3)	162
4th	74–90	3 (1.5)	9 (4.6)	34 (17.4)	42 (21.4)	108 (55.1)	196
Total		51 (7.0)	142 (19.4)	209 (28.6)	144 (19.7)	185 (25.3)	731

ED: erectile dysfunction defined as IIEF-5 ≤21 scores. Degree of ED defined based on IIEF-5 scores: mild (17–21); moderate (12–16); moderate to severe (8–11); and severe (5–7). IIEF: International Index of Erectile Function

Table 3: The rate of erectile dysfunction, importance of sexual health, patient expectations of the physician to show interest in their sexual health, and the rate of addressing the issue of sexual health during a visit in coronary artery disease patients aged 65 years and above in each subsequent year of the study period

Year	Prevalence of ED, n (%)	Importance of good sexual function		Patient expectations of physician interest		Rate of addressing sexual health, n (%)
		Not important, n (%)	Important and very important, n (%)	Yes, n (%)	No, n (%)	
2012	87 (92.2)	13 (14.4)	58 (64.4)	41 (45.6)	26 (28.9)	14 (15.6)
2013	227 (93)	34 (13.9)	163 (66.8)	107 (43.9)	64 (26.2)	26 (10.7)
2014	151 (93.2)	10 (6.2)	117 (72.2)	78 (48.2)	38 (23.5)	22 (13.6)
2015	99 (92.5)	7 (6.5)	82 (76.6)	58 (54.2)	19 (17.8)	12 (11.2)
2016	120 (93.8)	4 (3.1)	117 (91.4)	76 (59.4)	21 (16.4)	17 (13.3)
Total	680 (93.0)	68 (9.3)	537 (73.5)	360 (49.3)	168 (23.0)	91 (12.5)

ED: erectile dysfunction

CAD patients claimed that sexual function was important (47.9%) or very important (25.6%) to them. Over the study period, we observed an increase in the awareness and importance of sexual health as well as in the level of patients' expectations of physicians to address their sexual health.

The present study includes several limitations. As this is a cross-sectional study, only relationships between the analyzed variables could be presented without determining their causative effects. Data are largely survey based and thus subject to limitations of accuracy and recall bias. All patients included were from a single country. Thus, the cultural aspects commented upon in the manuscript may differ from that of the reader.

Sexuality of elderly people is a marginalized and often overlooked topic. Old age is not seen as a time when one can healthily and safely engage in sexual activity. CVD adds to this because stereotypes exist on the necessity of conducting a life-saving lifestyle. Sexual activity in this group of patients is considered a hazardous behavior. A study conducted on Polish population showed that only a small percentage (0.1%) of patients with CVD had ever taken type 5 phosphodiesterase (PDE5) inhibitors and only 4% of cardiologists discussed the problems of sexual health with their patients.[12] Yet, sexual health is an important factor influencing the quality of life in the elderly.[14] Many reports document a substantially higher rate of ED among elderly men than in younger men. Hyde *et al*.[14] reported that as many as 49.4% of men aged 75–95 years suffered from ED and an unmet need of addressing sexual health dysfunctions in male cardiac patients. Lyngdorf and Hemmingsen[15] found the prevalence of ED in Danish males aged 75–80 years to be 52%. In the American population, ED occurred in 43.8% of men aged 60–69 years and in 70.2% at an age of over 70 years.[16] Analyses conducted based on MMAS (a 9-year follow-up of over 1000 men aged 40–70 years) showed that the older the men, the bigger the changes in sexual function, such as taking up sexual activity, the occurrence of erection, the presence of sexual drive, ejaculation reached by masturbation, sexual satisfaction, and difficulties with orgasm.[17] The prevalence of ED in cardiac patients, especially older men, is rarely reported in the literature but all studies show that a high percentage of patients with CVD experience ED. Dostálová *et al*.[18] examined the occurrence of ED in patients with acute myocardial infarction. In 76 patients below 45 years old, 26% experienced mild ED and 7% severe ED. In patients above 45 years of age, mild ED occurred in 52% and severe in 38%.[18] Kloner *et al*.[19] diagnosed ED in 53 (70%) out of 76 patients with chronic stable CAD visiting their cardiologist. Solomon *et al*.[20] investigated 132 men subjected to coronary angiography about sexual disorders and found 45% of them admitted to having ED, although 65% achieved a score of below 21 in the IIEF questionnaire, suggesting a diagnosis of ED. Kałka *et al*.[6] reported a prevalence of ED 76.45% in 1007 postmyocardial infarction patients undergoing cardiac rehabilitation. What is more, out of 1136 cardiac patients surveyed by Kałka *et al*., [12] only 45 (3.96%) had a chance to discuss problems with sexual function with their cardiologist. These findings indicate a high prevalence of ED among cardiac patients, low awareness of ED symptoms, and an unmet need of addressing sexual health dysfunctions in male cardiac patients.

Multiple factors such as age-associated hormonal changes, diabetes, depression, prostate disease, smoking, and obesity lead to ED in the elderly. Sexual function can also be negatively influenced by medications for chronic diseases, which also increase ED.[14,21,22] Nevertheless, an enormous influence on the development of ED in the elderly is rooted in changes in the cardiovascular system, which emerge at the basis of vasculogenic ED. The rate of ED is already high in young cardiac patients, reaching 55%–80%.[12,23,24] We determined the occurrence of ED among CAD patients aged over 65 years to be 93%.

In our study, the presence of ED was significantly related to age, which is the most potent and widely recognized risk factor for ED. The presence of ED was also linked to echocardiographic parameters determining the condition of the left ventricle of the heart as well as the exercise tolerance. This draws attention to the importance of elderly patients' physical condition in terms of sexual function. Moreover, sedentary lifestyle was the only risk factor that has been proven to negatively influence exercise tolerance, regardless of patient age. Those dependencies have also been observed in younger patients.[25,26]

We have grown accustomed to regarding elderly patients as nonsexual and to thinking of sexual activity at an advanced age as a behavior outside the norm. However, Starr and Weiner[27] found that 97% of 60–70 year olds and 93% of 80 year olds do not only think about sex, but also miss it. In the American population of married patients aged over 60 years, 73.8% of men and 55.8% of woman were sexually active.[28] Besides the present health condition, the sexual health of elderly patients is influenced by the frequency of sexual activity at earlier stages of life and their evaluation of its importance at an advanced age. In our study, 73.5% of men stated that good sexual function is important or highly important to them, which significantly exceeds the 9.3% of patients to whom it is unimportant. In patients approximately 10 years younger, the ability to function well sexually was important or highly important for 81.5% of respondents and unimportant for 4.9%.[12] The CHARMS study reported a lack of interest in sexual activity in 10% of patients.[29]

Younger men tend to show an increased interest in having good sexual health. In our study, the presence and severity of ED as well as the duration of CAD are factors which are reflected significantly in the perception of good sexual function. Elderly patients who suffer from CAD for a shorter period of time and have no symptoms of ED place a higher meaning on good sexual function. Patients after surgical treatment of CAD pay less attention to good sexual function, which could be linked to the difference between the reconvalescence of patients treated surgically and those treated conservatively. An interesting observation from our study is the significant increase in the importance of good sexual function over the study period, which is possibly rooted in the societal changes regarding sex.[30,31] Sexual activity has become one of the many factors contributing to a good quality of life in the elderly.[14] Another cause lies in the development and increasing the availability of safe therapies.[32] Sildenafil was developed to treat CAD in 1980; however, Phase l trials revealed improvement in the quality of erection. Ultimately, sildenafil was brought onto the market in 1998 as Viagra (Pfizer), the first drug improving erectile function, and it quickly captured the majority of the market.[33] When the patent for Viagra ended, it resulted in the launch of many affordable generics. Next, a shift from prescription medication toward an over-the-counter drug took place. This was accompanied by an aggressive media campaign regarding the effectiveness and accessibility of the over-the-counter drug. It was emphasized as a medication for people with ED regardless of age, resulting in a dynamic increase in sales in Poland – from 648 000 packs of sildenafil in 2016 to 2.82 million packs in 2017 (IQVIA).[34] The rising importance of good sexual function in elderly men has arguably had an influence on the significant increase in patients' expectations of their physician to show interest in this issue.

Studies from the literature show that 55%–63% of cardiac patients stated a desire for their physician to express interest in their sexual function.[12,29] Admittedly, this percentage was lower in our study, but it is growing successively, which serves as a signal for those in medicine. The

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lower interest in sexual health among patients with ED may result from too little knowledge about the nature of ED and a lack of motivation to fight for improvement in sexual function.[6,13] Shabsigh *et al*.[24] drew attention to the low awareness of the occurrence of ED. In their study, only 133 (17.8%) knew that they were suffering from ED.[24] The level of knowledge of treatment options for ED in patients with CAD is also very low. The awareness about the possibility of using PDE5 inhibitors was only observed in 11.5% of patients after a myocardial infarction.[6]

In our study, the topic of sexual health during medical appointments was discussed with 12.5% of patients and did not change over the study period. Physicians more often addressed the issue with younger men living in urban areas. Higher levels of patient education increased physicians' interest in their patients' sexual function, which suggests that it was easier to address the subject, often regarded as difficult, with more educated patients.[12] Unfortunately, physicians rarely pay attention to modifiable risk factors which negatively affect sexual health. Despite a considerable concentration of many different risk factors, only dyslipidemia was associated with higher physician interest in the sexual function of their patients. Duration of CAD translates into a greater number of medical appointments and may potentially increase the chances of addressing the issue of ED, but its effect remained insignificant. In the CHARMS study, 66% of the respondents stated that they never talked about sexual health during a medical appointment.[29] Moreover, there was an inverse relationship between the increase in ED with age and the percentage of patients who were treated for ED. Frederick *et al*.[35] showed that only 25.4% out of 6 228 509 men with ED were treated for ED. In addition, men >60 years of age were treated less in comparison to younger patients ($P < 0.001$).

Increasing life expectancy contributes to an increasingly older population, but the aim of medicine is both to prolong life and improve its quality. One of the factors at play in a good quality of life is sexual health. The present study indicates that we have started to make progress in reaching this aim. One of the means to realize it is the promotion of knowledge about sexual health directed toward both physicians and their patients.

CONCLUSION

The prevalence of ED increases with age, and it occurs in over 93% of patients with CAD at age 65 years or above. Within the past few years, we have observed an increase in the awareness and importance of good sexual health as well as an increase in patients' expectation of physicians to show interest in their sexual health. The expectations are not met by any means as only roughly one in ten elderly patients with CAD addressed the topic in meetings with physicians.

AUTHOR CONTRIBUTIONS

LR, RZ, and DK conceived the article; LR, RZ, JG, MR, and DK designed the work; JG, MS, RS, WP, WD, AJ, DK, and MW collected the data; LR, MS, RS, WP, WD, AJ, and DK analyzed the data; LR, RZ, MR, WD, and DK interpreted the data; LR, RZ, JG, RS, WP, WD, and DK drafted the article; MR, MS, AJ, MW, and DK revised the work for important intellectual content; and DK supervised the work. All authors read and approved the final manuscript.

COMPETING INTERESTS

All authors declare no competing interests.

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