

Assessing and addressing sexual concerns in individuals diagnosed with coronary artery disease¹

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Conflict of interest

The authors declare no conflict of interest

Keyword

Cardiac disease, gender differences, sexual behaviour, counselling, sex therapy

Key points

- Coronary artery disease is associated with sexual concerns;
- Coronary patients expect nurses to discuss the topic of sexuality;
- Including sexual assessment in their routine clinical practice can help nurses in identifying sexual concerns;
- Providing sexual counselling can help in the resolution of sexual concerns.

Reflective questions

- What are the main barriers and facilitators in discussing the topic of sexuality with your patients in your clinical setting?
- What approach would you use with an individual diagnosed with coronary artery disease to introduce the topic of sexuality?
- What elements would you consider important to address while discussing sexual concerns?

Abstract

Sexual concerns are frequently reported in individuals diagnosed with coronary artery disease. These concerns may be related to disorders in one or more phases of the sexual response cycle (i.e., desire, arousal, and orgasm). Sexual concerns have been linked to anxiety, depressive symptoms, and feelings of despair. As such, nurses should have an understanding of the aetiology of sexual concerns in this population and use appropriate assessment and support strategies. This clinical article discusses several key aspects of evidence-based practice to assess and address sexual concerns in individuals diagnosed with coronary artery disease. Early assessment of biological, psychological and pharmacological causes of sexual concerns should be carried out. Sexual counselling may be offered to meet specific information needs. Adding pharmacological agents and referring to a sex therapist can be considered to effectively address sexual concerns of this population.

Introduction

Sexuality is a major component of individuals' quality of life, regardless of their age (Lee et al. 2016). Sexual concerns, which are disturbances in the sexual response cycle, are frequently reported in individuals diagnosed with coronary artery disease (CAD) (American Psychiatric Association 2013). Indeed, more than half of men and a quarter of women diagnosed with CAD report sexual concerns (Rundblad et al. 2017). The deleterious impact of CAD on sexuality can also be illustrated by the fact that fewer individuals diagnosed with CAD report being sexually active compared to individuals without CAD (Steptoe et al. 2016). Sexual concerns have been linked to anxiety, depressive symptoms, and feelings of despair for individuals with CAD and their partners (Steinke et al. 2013). Moreover, more than half of individuals with CAD report not feeling informed about their sexuality and see the resuming of sexual activities as challenging (Byrne et al. 2014; Rundblad et al. 2017). Importantly, individuals with CAD generally do not know that their sexual concerns may be caused, or exacerbated, by CAD. A previous study reported that about two third of individuals with CAD and their partners were unaware of this relationship between their sexual concerns and CAD (D'Eath et al. 2018).

Evidence shows that individuals with CAD and their partners expect that healthcare professionals, including nurses, address the topic of sexuality (Byrne et al. 2013). Nurses are expected to promote the health and the well-being of individuals, attend to their care needs, and listen to their concerns (Nursing & Midwifery Council 2018). As sexual health is an integral component of individuals' well-being, nurses should establish a therapeutic relationship with individuals with CAD to discuss, assess and address sexual concerns, if any. However, few nurses routinely engage individuals with CAD and their partners in a discussion about sexual activities (Abu Ali et al. 2018; D'Eath et al. 2018; Rundblad et al. 2017). This may be due to a lack of knowledge regarding sexual concerns in individuals with CAD and a lack of confidence in addressing this topic (Abu Ali et al. 2018; Shindel and Parish 2013).

The aim of this article is to discuss sexual concerns that may be experienced by individuals with CAD. The article will provide an overview of the sexual response cycle, describe the aetiology of sexual concerns in individuals with CAD and summarise evidence-based recommendations to assess and address sexual concerns. In this article, the term “sexual concerns” will refer to self-reported disturbances while engaging in sexual activities. “Sexual

activities” is used to refer to all sexual acts than an individual may wish to engage in, either alone or with one or more partner(s). The term “partner” refers to any individual with whom sexual acts are consensually performed, regardless of the type of relationship between these individuals, their biological sex, their gender identity, and their sexual orientation. Although the term “partner” will be used exclusively in its singular form in this article to ease the reading, we recognize than an individual may have more than one partner.

The Sexual Response Cycle

Sexual health is a state of physical, mental, and social well-being in relation to sexuality (World Health Organization 2006). Individuals engage in sexual activities to experience pleasure and well-being, to build intimate relationships, to express their desire for someone else, or to procreate (Silva et al. 2017). To understand the aetiology of sexual concerns in individuals with CAD, it is essential to first understand the sexual response cycle and the physiological changes that happen during this cycle.

While several models of the sexual response cycle exist, it is generally described as a succession of three phases: desire, arousal, and orgasm (McCabe et al. 2016a; Rundblad et al. 2017). First, a stimulus, either endogenous (e.g., sexual fantasies or ideas) or exogenous (e.g., physical touch), leads to the desire to initiate sexual activities (Cour et al. 2013). Sexual desire is mostly regulated by neurotransmitters such as dopamine, which leads to an increase in sexual desire, and serotonin, which leads to a decrease in sexual desire. Hormones such as testosterone and oestradiol also appear to play a role in increasing sexual desire, while progesterone plays a role in decreasing desire (Goldstein et al. 2017). Second, during arousal, the individual’s autonomous nervous system responds to the stimulus to prepare the body for sexual activities. During this phase, the activity of the sympathetic nervous system is reduced, and neurotransmitters stimulate the dilatation of the arteries responsible for carrying the blood supply to the genital organs. In women, the increase in blood flow leads to the vascular congestion of the clitoris and the inner fold of the vagina, and transudation of the vaginal wall, thus generating vaginal lubrication (Salonia et al. 2010). In men, the congestion of blood in the erectile tissue eventually compresses the venous network, therefore trapping the blood and producing the erection of the penis (Chandra et al. 2017). Third, during the orgasm phase, the sexual tension suddenly releases, overall pleasure is felt, involuntary muscle contractions may occur, and the

heart rate and the systolic blood pressure increase from 10 to 15 seconds before dropping back to baseline values (Exton et al. 2000). Heart rate and systolic blood pressure should not exceed, respectively, 130 beats per minute and 170 mmHg in normotensive individuals. As such, it is estimated that sexual activities require a physical effort similar to the one required to climb two flights of stairs (Hellerstein and Friedman 1970; Mann et al. 2015). However, the validity of this value has been obtained from 20 to 40-year-old individuals with no known cardiovascular diagnosis and has yet to be shown in other populations. It is hypothesised that concerns in reaching the orgasm phase could result in a greater demand on the individual's cardiovascular system as a more vigorous physical effort is exerted in response (Levine et al. 2012).

The Aetiology of Sexual Concerns in Individuals with Coronary Artery Disease

Sexual concerns are rooted in biological (e.g., diabetes mellitus, hypertension), psychosocial (e.g., relationship problems, fear, depressive or anxious symptoms), and pharmacological causes (e.g., side effects of the medication taken) (Jaarsma et al. 2014; Nascimento et al. 2013).

At a biological level, sexual concerns and CAD are both associated with a stenosis of the arteries caused by endothelial dysfunctions and atherosclerosis. These are often secondary to disorders such as hypertension, diabetes mellitus, and dyslipidemia (McCabe et al. 2016b; Nascimento et al. 2013; Vlachopoulos et al. 2013). Endothelial dysfunctions lead to functional modifications of the arteries detrimental to their dilatation and constriction mechanisms. Atherosclerosis leads to structural modifications, as atheroma plaques progressively reduce the lumen of arteries. Consequently, these disorders lead to a decrease in blood flow (Hackett et al. 2016). In women, atherosclerosis in the hypogastric and pudendal arteries can lead to clitoral and vaginal insufficiency (Pérez-López et al. 2009). In men, the small diameter of the blood vessels in penile arteries (one to two millimetres) compared to coronary arteries (three to four millimetres) implies that an impairment in blood flow will manifest itself faster to the genital organs than to the heart. Thus, sexual concerns such as erectile dysfunctions are often an early warning sign of CAD (Hackett et al. 2016). It is estimated that erectile dysfunctions precede CAD in a timeframe of about three years (Montorsi et al. 2006). Diabetes mellitus and dyslipidemia both decrease the bioavailability of nitric oxide in women and in men. Nitric oxide is a mediating molecule involved in relaxing smooth muscles and increasing blood flow in the

genital organs (Chandra et al. 2017). Diabetes mellitus can also lead to a drop of testosterone in women and men, and thus decrease sexual desire (Kizilay et al. 2017). In a cross-sectional study, Mosack et al. (2015) found that a higher number of comorbidities (cardiac- and non-cardiac) was the strongest predictor of sexual concerns in a cohort of individuals with a cardiac diagnosis. In women, it should be noted that CAD is often diagnosed in the period of menopausal transition. Therefore, it is often difficult to distinguish the specific influence that both have on sexuality (Silva et al. 2017). Like sexual concerns in women diagnosed with CAD, menopause is associated with symptoms such as vaginal dryness, and a lower level of sexual activities (Katainen et al. 2018).

At a psychosocial level, anxious symptoms caused by the perception that sexual activities can lead to health deterioration, or even death, are frequently reported (Chandra et al. 2017; Levine et al. 2012; McCabe et al. 2016b). Negative automatic thoughts, whether they are about oneself, one's partner, or the relationship, can also lead to sexual concerns (Géonet et al. 2013). Individuals with CAD may feel unattractive or perceive that their partner has no more desire towards them as the latter may play a caregiver role after the cardiac event. Female partners of individuals with CAD often report feeling concerned about a change in the dynamic of the relationship as they perceive an emotional and sexual loss following a cardiac event. For their part, male partners of individuals with CAD may perceive their partner as fragile and feel hesitant to initiate sexual activities (Arenhall et al. 2011a; Arenhall et al. 2011b). Thus, anxious symptoms and significant changes in individuals with CAD view of themselves and in the dynamic of the relationship may lead to sexual concerns or exacerbate them.

Paradoxically, while CAD and its underlying risk factors can ultimately lead to sexual concerns, pharmacological agents used in the treatment of CAD may initially lead to a reduction of blood flow in the genital arteries and worsen sexual concerns (Manolis and Dumas 2012). Although the specific effect of each medicine on sexual activities has been the object of contradictory findings (La Torre et al. 2015), thiazide diuretics (e.g., hydrochlorothiazide) and non-selective beta-adrenergic receptor blockers (e.g., nadolol) appear to be associated with the most detrimental effect on sexual function in men (Břegová and Vrublová 2015). In women, no single class of cardiac medication appears to be associated with sexual concerns (Thomas et al. 2016).

The Assessment of Sexual Concerns in Individuals with CAD

Different approaches may be used to initiate a conversation about sexuality and to assess sexual concerns in individuals with CAD, depending on the setting and nurses' background (Table 1). Steinke and Jaarsma (2015) recommend favouring the discharge period to discuss sexual activities. A more direct approach is often preferred in individuals that report clear worries about the resuming of sexual activities. A gradual approach can be adopted in individuals that may be less inclined to talk about their sexual concerns. With the matter-of-fact approach, nurses can start this conversation by stating that it is normal for an individual or their partner to worry about the resuming of sexual activities after a cardiac event and that healthcare professionals can support them (Steinke and Jaarsma 2015). Sensitivity and context approaches allow for a more natural progression into the discussion of sexual concerns. Finally, the policy approach frames the discussion and reinforces the importance of the subject. Gender matching may ease the individual in discussing sexual concerns, especially in cultures where sexuality remains a taboo subject (Abu Ali et al. 2018; Akhu-Zaheya and Masadeh 2015). It is important to keep in mind that although individuals may appear reluctant to discuss sexuality, individuals with CAD often report significant sexual concerns and information needs (Akhu-Zaheya and Masadeh 2015). However, during the intervention of the nurse, if an individual expresses the desire not to address the subject or if they wish to end the conversation, the nurse should remain respectful of their choice.

Several guiding principles should be followed when discussing sexuality. First, nurses should pay close attention to their attitude and body language while asking individuals permission to discuss sexual concerns. This will avoid giving the impression of discomfort or of a reluctance to discuss (Chandra et al. 2017). When asking a question, nurse should explain the rationale behind it. Close attention should be paid to topics that appear to generate discomfort for the individual or their partner. Third, nurses should avoid medical jargon and answers that could be interpreted as a form of judgement. Finally, the environment in which the discussion takes place is also important to consider so that the privacy and confidentiality of the information exchanged is preserved (Abu Ali et al. 2018).

Table 1. Approaches to sexual assessment

Approach	Focus/example of a way to initiate a conversation
<i>Direct approach</i>	Use focused direct questions to assess sexual concerns or problems. “How is your sex life after your myocardial infarction?”
<i>Gradual approach</i>	Ask general questions about the individual’s sexual activities and then move on to more sensitive topics. “Have you been thinking about the resumption of sexual activities?”
<i>Matter-of-fact Approach</i>	Use experiences of other individuals or evidence from research. “Many people have concerns about resuming sex after a myocardial infarction. Do you have any concerns?”
<i>Sensitivity approach</i>	Directly address the sensitivity of the topic. “Some people feel that talking about sexuality is not easy. However, it is an important topic for most people, and coronary artery disease may have an impact on your sexuality. Is it okay if I ask you a few questions?”
<i>Context approach</i>	Introduce sexual concerns in a broader context. “Along with resuming physical activity after your myocardial infarction, it is also important to consider the resumption of sexual activities.”
<i>Policy approach</i>	Introduce the organisational policy to frame the discussion. “In our team at the clinic, we think it is important to discuss sexuality and the effect of the treatment. Therefore, I would like to ask a few questions regarding this subject.”

Note. Table adapted from Steinke and Jaarsma (2015)

Current evidence suggests eight main clinical assessment elements that nurses should pay close attention to regarding sexual activities in individuals with CAD (Levine et al. 2012; Steinke et al. 2013). These clinical elements are reported in Table 2 and nurses should consider referring to them during their assessment of sexual concerns.

Table 2. Main clinical elements for nurses to assess in individuals with CAD regarding sexuality.

Main clinical assessment elements	Justification
<i>Concerns of the individual and his or her partner</i>	Asking directly about sexual concerns or introducing sexuality through other areas of concerns (e.g., exercise, alimentation) can be a good conversation starter for sexual assessment (Steinke and Jaarsma 2015).
<i>Medical history and comorbidities</i>	Sexual concerns and CAD share common risk factors (e.g., diabetes, dyslipidemia, hypertension). Nurses should ensure that all comorbidities are addressed to avoid sexual concerns or reduce their impact (i.e., medication, lifestyle behaviours) (McCabe et al. 2016b; Mosack et al. 2015; Nascimento et al. 2013; Vlachopoulos et al. 2013).
<i>Exercise endurance</i>	Sexual activities require exercise endurance similar to climbing two flights of stairs, gardening, or mowing the lawn (3 MET to 4 MET in terms of energy expenditure) (Hellerstein and Friedman 1970; Mann et al. 2015).
<i>Sexual activities</i>	Individuals with CAD are statistically less sexually active than other individuals.(Steptoe et al. 2016) Individuals should be asked if their level of sexual activity is a concern or if it changed following their cardiac event.
<i>Sexual desire</i>	Anxious symptoms and fear of resuming sexual activities are frequently reported in individuals with CAD. Dynamic changes between partners may also be perceived as or lead to a drop of desire. Women most frequently report problems related to the desire phase (Rundblad et al. 2017).
<i>Sexual arousal</i>	Issues related to vaginal lubrication or pain during penetration in women and concerns in maintaining the erection in men are reported (Chandra et al. 2017; Salonia et al. 2010).
<i>Orgasm</i>	Cardiac stress is at the highest during the orgasm phase and is favourable to the onset of cardiac symptoms. Men most frequently report concerns related to the arousal and orgasm phases (Rundblad et al. 2017).
<i>Medication currently taken, including medication to treat sexual concerns</i>	Medication frequently taken by individuals with CAD may lead to sexual concerns (Jaarsma et al. 2014; Nascimento et al. 2013). Moreover, nurses should also assess if the individual is taking other medications to resolve their sexual concerns or to enhance their sexual performance as these can be unregulated and potentially hazardous.

CAD, Coronary artery disease; METs, Metabolic Equivalent of Task; PDE-5, phosphodiesterase type 5 inhibitor

Addressing sexual concerns in individuals diagnosed with coronary artery disease

According to the American Heart Association, addressing sexual concerns in individuals with CAD should begin by advising individuals with unstable CAD and severe symptoms (e.g., anginal pain while performing light physical activities) to refrain from performing sexual activities until the resolution of their clinical state (Levine et al. 2012). However, there are no contraindications in performing sexual activities for individuals with CAD without anginal pain and who had angioplasty or a coronary artery bypass graft (Levine et al. 2012). Physical exertion and emotions felt during sexual activities could, rarely, precipitate anginal pain (Mann et al. 2015). Anginal pain during physical activities represents less than 5% of all reported angina pain and less than 1% of all reported myocardial infarction. Anginal pain during sexual activities is less frequent in individuals that do not already report anginal pain during physical activities and more frequent in sedentary individuals (DeBusk 2003). As such, the adoption of healthy lifestyle behaviours should have a positive impact on sexual health (Chandra et al. 2017).

Sexual concerns may be addressed through sexual counselling, medicine, and sex therapy. If sexual counselling alone cannot resolve sexual concerns, the addition of medicine can be considered (Levine et al. 2012). In the case where sexual concerns are associated with distress and cannot be addressed with standard counselling or with medicine, referral to a sex therapist may help in alleviating the distress and in resolving sexual concerns. Sex therapists provide psychotherapy and are specialised in the treatment of sexual concerns (Weeks et al. 2015).

Sexual Counselling

Sexual counselling is an interactive helping process focused on improving individuals' sexual health and addressing sexual concerns by making the necessary adjustments or by enhancing their coping skills (Johnson et al. 2012). During sexual counselling, information tailored to concerns of individuals with CAD and their partners should be offered for them to safely resume sexual activities. Sexual counselling varies in length and can be offered both in acute and community settings. A position paper of the European Society of Cardiology Council on Cardiovascular Nursing and Allied Professions highlights the active role that nurses should take in providing sexual counselling to individuals with CAD and their partner (Steinke et al. 2013). False beliefs about the resumption of sexual activities should be addressed and can

directly help in resolving sexual concerns. The main information needs of individuals with CAD and possible answers that nurses can provide are reported in Table 3.

Table 3. Main information needs of individuals with CAD regarding sexuality and examples of answers to provide.

Main information needs	Examples of answers that can be provided
<i>How CAD affects their sexual activities?</i>	Individuals with CAD may rarely experience angina during sexual activities (Dahabreh and Paulus 2011). However, CAD may lead to sexual concerns in certain individuals, such as problems regarding desire, arousal, or orgasm. If it is the case, skilled healthcare professionals can support them in resolving sexual concerns (Rundblad et al. 2017).
<i>When can sexual activities be resumed?</i>	Sexual activities may be resumed a week after a cardiac event treated by medication or with angioplasty. In the case of an uncomplicated coronary artery bypass graft, individuals should wait six to eight weeks (Manolis et al. 2015).
<i>How to prepare for the resumption of sexual activities?</i>	Sexual activities should be resumed in a familiar environment. Individuals should refrain from eating and void alcohol two to three hours before sex (Levine et al. 2012).
<i>At what intensity can sexual activity be resumed?</i>	Foreplay requires a low amount of energy from an individual and should not be a concern. It is, however, difficult to quantify the allowed intensity of coital sexual activities. The presence of CAD symptoms such as anginal pain and dyspnoea should guide the intensity of sexual activities.(Manolis et al. 2015)
<i>What position should be privileged during sexual activities?</i>	Lying on the back or on the side require less energy than being on the top. As such, this position should be privileged. If the individual has a sternotomy, pressure around this area should be avoided (Manolis et al. 2015).
<i>What are the warning signs to report during sexual activities?</i>	The warning signs to report during sexual activities are the same as the ones to report outside sexual activities: chest pain, dyspnoea, palpitations, dizziness, and fatigue (Steinke and Jaarsma 2015).
<i>What medication may be used to address sexual concerns?</i>	PDE-5 inhibitors can help in addressing sexual concerns in men. Nitrates are contraindicated in men taking PDE-5 and alpha blockers should be prescribed cautiously to avoid excessive hypotension (Manolis et al. 2015). In women, oestrogen therapy can help in alleviating sexual concerns (Weinberger et al. 2018).
<i>What is the impact of the medication on sexual activities?</i>	Thiazide diuretics and non-cardioselective beta blockers may exert a negative effect on sexual activities in men (Manolis et al. 2015). In women, no single pharmacological agent frequently used has been found to negatively affect sexual activities (Thomas et al. 2016). Individuals should not stop taking their medication if they experience sexual concerns but rather discuss them with their primary care provider.

CAD, Coronary artery disease; PDE-5, phosphodiesterase type 5 inhibitor

Pharmacological Treatment

As the medication taken by individuals with CAD may cause or exacerbate sexual concerns, especially in men, medication review should be considered to modify dosage or substitute medicines associated with sexual concerns, if such issues are reported (Břegová and Vrublová 2015). For instance, Shivananda and Rao (2016) suggest substituting non-cardioselective beta blockers for cardioselective ones, thiazide diuretics for loop diuretics, and angiotensin converting inhibitors for angiotensin receptor blockers as these medicines are susceptible to exert less negative impact on sexual activities. The ratio of risks versus benefits of substituting medicines should be discussed with the primary care provider (Manolis et al. 2015). Moreover, individuals should be advised to never change or stop their medication regimen by themselves without first consulting their primary care provider.

Treatment of sexual concerns in men has seen a greater amount of research conducted than in women (Chandra et al. 2017). Consequently, an important number of therapeutic options are available for men diagnosed with CAD and reporting sexual concerns. In both men and women, the use of short-acting form of nitrate (i.e., sublingual or spray), as prescribed, right before sexual activities, may help in preventing discomfort or chest pain (Steinke and Jaarsma 2015). In men, Phosphodiesterase type-5 (PDE-5) inhibitors, such as sildenafil and tadalafil, can help in increasing the blood flow to the genital organs and maintain the erection. This type of medication should, however, not be used in conjunction with nitrate, as it can lead to severe hypotension, or if the arterial blood pressure at rest is inferior to 90/60 mmHg (Kloner et al. 2018). Moreover, it should be used cautiously with alpha-adrenergic antagonists (e.g., doxazosin, prazosin) due to the risk of orthostatic hypotension. Other therapeutic options that appear safe in men with CAD include testosterone replacement for those with androgen deficiency, and intra-urethral therapy, such as the administration of alprostadil, which increases the blood flow in the genital organs (Corona et al. 2015).

In women, a recent systematic review concluded that, aside from counselling and psychotherapy, intra-vaginal oestrogen therapy appeared to be the most effective and safe pharmacological intervention for addressing sexual concerns. Limited or conflicting evidence exists to support the effectiveness and the safety of other therapeutic options for women, such as the use of testosterone or flibanserin, a novel pharmacological agent used specifically for the

treatment of hypoactive sexual desire disorder by modulating serotonin and dopamine levels (Weinberger et al. 2018).

Conclusion

This clinical article discussed a selection of the literature regarding sexual concerns in individuals with CAD to suggest relevant clinical assessment elements, to highlight the information needs of individuals regarding sexual activities, and to provide guidance in addressing sexual concerns. As this article focused specifically on a population diagnosed with CAD and the interrelations between this diagnosis and sexual activities, further works should be undertaken to describe how nurses should discuss, assess and address sexual concerns in other populations, for instance, individuals diagnosed with the human immunodeficiency virus (HIV) or with substance use disorder (Chou, Huang et Jiann, 2015; Krüsi et al., 2018). Conditions such as these would certainly benefit from an extended discussion that is, unfortunately, beyond the scope of this article.

Sexual concerns and a decrease in the frequency of sexual activities are frequently reported in individuals with CAD. As such, nurses should include sexual assessment in their routine clinical practice and provide counselling to address sexual concerns.

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