

# Hot Flash Experience in Men With Prostate Cancer: A Concept Analysis

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**Purpose/Objectives:** To provide a clear definition of the hot flash experience in men with prostate cancer receiving hormonal treatment.

**Data Sources:** Articles, book chapters, and electronic sources.

**Data Synthesis:** The hot flash experience has not been explored previously in men with prostate cancer. The physiologic and psychological scopes of the phenomenon are described as a multidimensional experience.

**Conclusions:** The essential attributes of hot flashes in men consist of physiologic (e.g., warmth, sweating, chills) and psychological (e.g., anxiety, impaired memory, agitation) factors. Antecedents to the experience include demographics, disease, and treatment modality. Consequences include effects on sleep, cognition, and health-related quality of life.

**Implications for Nursing:** Evaluation of the hot flash experience in men receiving hormonal ablation should include assessment of the symptoms associated with the treatment modality and nursing interventions to help ameliorate symptoms. Future research is needed to focus on providing symptom management to decrease the severity or prevent the occurrence of multiple symptoms related to androgen ablation therapy.

The concept of the hot flash experience in men has received minimal attention in the medical literature and none in the nursing literature. Unfortunately, the severity, natural history, and associated symptoms of hot flashes in men have not been studied widely (Stearns et al., 2002). Hot flashes have been well recognized as a significant clinical problem in menopausal women and women treated for breast cancer. However, the experience is also a significant problem for men treated with androgen ablation for prostate cancer. Hot flashes are a side effect of androgen ablation, which is based on the hypothesis that the tumor is androgen dependent (Frodin, Alund, & Varenhorst, 1985; Loprinzi et al., 1998). Prostate cancer is the most prevalent cancer in men, and an estimated one in six will develop the disease in his lifetime (American Cancer Society, 2005). Worldwide, prostate cancer is the most frequent cancer diagnosis of the urogenital tract in men. Most of the studies that mention hot flashes in men with prostate cancer have been done in countries other than the United States, such as England, Belgium, Sweden, Finland, the Netherlands, and the Slovak Republic (Cervenakov, Kopecny, Jancar, Chovan, & Mal'a, 2000; Empson & Purdie, 1999; Stearns et al.; van Anel & Kurth, 2003).

In 1895, Hugh Cabot, MD, studied the effects of castration on the treatment of prostatic enlargement and was the first to describe hot flashes in men as uncomfortable flushes of

## Key Points . . .

- ▶ Conceptual clarification of the hot flash experience in men is needed to allow oncology nurses to effectively assess and manage the cluster of symptoms by developing interventions to improve symptom management.
- ▶ Health-related quality of life is an outcome measurement of symptom management. Decreasing the number and severity of symptoms in the hot flash experience may increase the overall health-related quality of life of this patient population.
- ▶ Further research is needed to investigate the physiologic measurements of hot flashes and sleep disturbances in men with prostate cancer.

heat that are similar to those experienced by women during menopause (Kouriefs, Georgiou, & Ravi, 2002). Almost 50 years later, in 1941, Huggins, Stevens, and Hodges demonstrated the dependence of prostate cancer on androgens. In their study, 9 of 21 castrated patients experienced hot flashes beginning two to three weeks after surgery.

The purpose of this article is to provide a clear definition of the hot flash experience in men with prostate cancer who are receiving hormonal treatment. Concept analysis is a method that allows researchers to examine and clarify the defining attributes of a concept. Currently, no concept analysis of hot flashes exists in the literature. The framework of Walker and Avant (1995) is used to provide a clear definition, the identifying antecedents, the defining attributes, and the consequences of the concept. A model and borderline case also are presented.

## Literature Review

Men with prostate cancer diagnosed as metastatic or locally advanced disease are presented with treatment options

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intended to suppress the production of testosterone (i.e., androgen ablation), thereby slowing the growth of the cancer. The treatment options may be surgical castration with bilateral orchiectomy or medical castration with luteinizing hormone-releasing analogs, antiandrogens, or estrogen. Each treatment option is associated with unpleasant side effects or symptoms that include hot flashes, or flushes, in as many as 70%–80% of patients (Clark, Wray, & Ashton, 2001) that may persist for as long as eight years (Karling, Hammar, & Varenhorst, 1994; Spetz, Zetterlund, Varenhorst, & Hammar, 2003). More than 50% develop hot flashes severe enough to warrant treatment (Charig & Rundle, 1989). Hot flashes in men may be overlooked because of healthcare provider lack of experience with and failure to anticipate symptoms (Heinemann & Saad, 2003) or because of patients' denial of symptoms (Frodin et al., 1985).

Several terms have been used in the literature to describe the phenomenon of hot flashes in the male population. Andropause has been defined as an age-related decline in serum testosterone levels in older men or as serum testosterone levels below the normal range in younger men, which is associated with a clinical syndrome consistent with androgen deficiency. The syndrome in aging men may include hot flashes but also is associated with depressed mood, decreased physical functioning, diminished sex drive, hair loss, decreased lean body mass, and decreased bone mineral density and is not specific to men with prostate cancer (Matsumoto, 2002). Andropause also has been defined as a constellation of symptoms in patients with prostate cancer, with the most significant and bothersome side effect cited as hot flashes, also termed vasomotor symptoms, followed by osteoporosis, anemia, sexual dysfunction, sarcopenia, gynecomastia, cognitive decline, depression, and a decrease in overall quality of life (QOL) (Thompson, Shanafelt, & Loprinzi, 2003). Some researchers believe that true andropause occurs only in patients receiving either surgical or chemical androgen ablation (Gordon & Emanuele, 2003). Sweating attacks studied as a key symptom in a sample of 500 aging German men and 153 women were described by both groups as sensations of sweating occurring suddenly and unexpectedly at any time, but especially at night, which supported the notion that the sensations are the same for men and women (Heinemann & Saad, 2003). The term "climacteric" has been used to describe hot flashes that result from decreased ovarian function in women and decreased testosterone in men (Vermeulen, 1993). The term "hot flash experience" will be used in this article to describe the multidimensionality of the concept.

## Defining the Hot Flash Experience

The purpose of this article is to provide a clear description of the hot flash experience, including antecedents, defining attributes, and consequences. The term "experience" has been defined as "the conscious events that make up an individual life"; "something personally encountered, undergone, or lived through"; and "the act or process of directly perceiving events or reality" (Merriam-Webster, Incorporated, 2005). Individuals' awareness or perception of the hot flash experience or any other symptom is the physical sensation interpreted in light of the experience (Rhodes & Watson, 1987). Symptom experience is a dynamic process that is

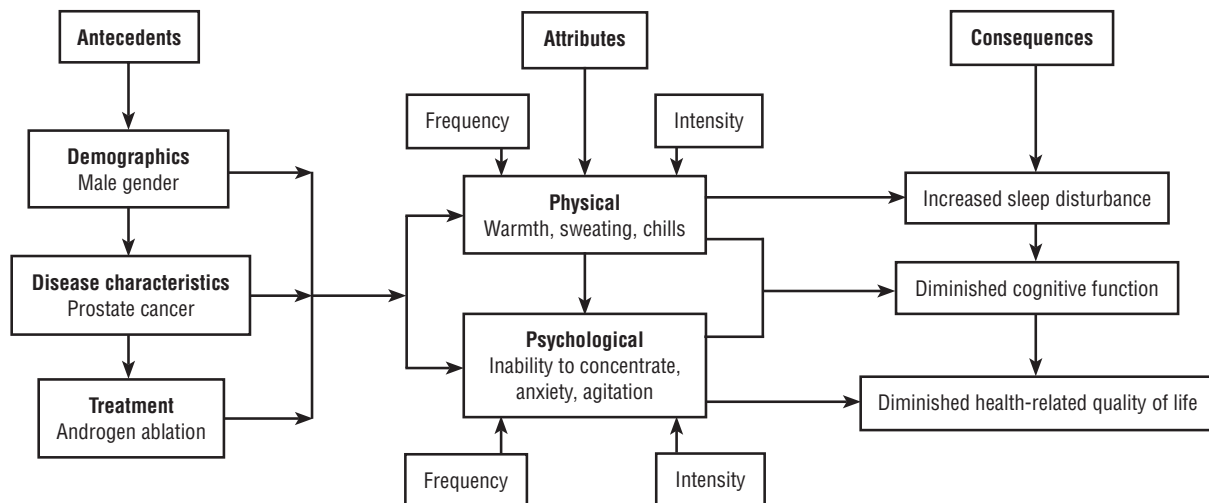
affected by gender, physiologic factors, and psychosocial factors, such as cognitive capacity components that include short- and long-term memory deficits (Dodd et al., 2001). Symptoms may be experienced as a single phenomenon; however, the multiple symptoms experienced by patients with cancer often occur simultaneously and may be multiplicative in nature (Dodd et al.; Lenz, Pugh, Milligan, Gift, & Suppe, 1997). The perceived components of the symptom experience include the frequency and intensity of various symptoms (Rhodes & Watson).

"Hot flash" has been defined physiologically as the sensation of heat associated with objective signs of cutaneous vasodilatation and a subsequent drop in core temperature (Stearns et al., 2002). Small elevations in core body temperature may trigger hot flashes when the sweating threshold has been crossed in the hypothalamus as a result of an elevation in brain epinephrine levels. Research in women has demonstrated that the thermoregulatory zone is so small as to be nonexistent. Some researchers hypothesize that an increase in core temperature will result in a hot flash in individuals with narrow thermoregulatory zones. Research in menopausal women has found that the thermoregulatory zone drops to 0°C in symptomatic women, compared to 4°C in asymptomatic women, which is similar to the findings in younger men and women (Freedman & Krell, 1999). No studies have included the objective measurement of men's core temperature. Patients experience shivering after hot flashes because their core body temperatures fall. Hot flashes have been defined subjectively as recurrent, transient periods of flushing, sweating, and a sensation of heat that often are accompanied by palpitations and a feeling of anxiety and sometimes are followed by chills (Kronenberg, 1990). In addition, hot flashes have been characterized as a sensation of intense warmth in the upper body lasting from 30 seconds to five minutes (Walsh & Schiff, 1990). Perhaps the most poignant definition of the hot flash experience in men is described in the seminal work of Huggins et al. (1941) in postorchiectomy patients. The researchers stated that hot flashes were associated with profuse perspiration and often occurred at night, forcing patients to throw off their bed covers.

In this article, the hot flash experience is defined as individuals' perceptions of the physiologic and psychosocial events that occur as multiplicative or multidimensional symptoms of the hot flash. Figure 1 provides a proposed model of the hot flash experience and its components.

## Defining Attributes

Defining attributes are characteristics of a concept that appear repeatedly in the literature (Walker & Avant, 1995). The literature regarding hot flashes in women cites numerous physiologic factors that are affected by the hot flash experience. Molnar (1975) first described the thermoregulatory responses of increased heart rate, sweating, and increased skin conductance in women who experienced hot flashes. That seminal study promoted interest in examining the objective physiologic changes that take place during the hot flash experience. Investigators in Sweden studied skin blood flow and water evaporation as a means of objectively assessing hot flashes in postorchiectomy patients. The researchers recorded cutaneous blood flow and sweating with a Doppler flow meter and an evaporimeter in 13



**Figure 1. Hot Flash Experience Model**

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patients and found that cutaneous blood flow increased synchronously with an increase in evaporation. The frequency and intensity of hot flashes as experienced by patients corresponded closely to recorded measurements (Frodin et al., 1985). That study was the only one the author found that measured physiologic changes in men during the hot flash experience.

The subjective phenomena associated with the hot flash experience in men have been described in numerous studies, most of which have taken place outside of the United States. Swedish researchers studying men postorchietomy found that 9 of 13 patients described the hot flash as a sensation of warmth that often spread from the chest to the rest of the body; was followed by sweating primarily on the forehead, chest, and back; and lasted only a few minutes (Frodin et al., 1985). Similar anecdotal case reports described the hot flash experience of five men with prostate cancer receiving hormonal treatment as increased warmth in the upper body, flushing of the skin, profuse sweating requiring changes of clothes and bed sheets, and chills (Roth & Scher, 1998). Additional attributes of hot flashes may include anxiety, an inability to concentrate, and agitation (Stearns et al., 2002).

The frequency, intensity, and duration of postorchietomy hot flashes were studied in 32 patients in Switzerland. The researchers found that hot flashes were experienced by 54%–76% of patients, occurred for the first time 1–52 weeks postoperatively, and persisted for 6–30 months (Buchholz, Mattarelli, & Buchholz, 1994). However, a Swedish study of 77 men demonstrated that 48% of patients who received medical castration experienced hot flashes for as many as five years after treatment and more than 40% had hot flashes for eight years after surgical castration (Karling et al., 1994).

Based on minimal research, the defining attributes of the hot flash experience in men appear to consist of objective and subjective physiologic and psychological symptoms as well as the frequency and duration of hot flashes. The primary physiologic attribute is the subjective phenomenon of the sensation of warmth on the skin, which may or may not include increased sweating and subsequent chills. The psychological at-

tributes are anxiety, agitation, and an inability to concentrate. The attributes may occur alone or be multiplicative in nature, with the frequency and intensity of hot flashes surrounding the complex phenomena of the hot flash experience.

## Antecedents

Identifying antecedents and consequences helps to clarify the attributes and context in which a concept is found. Antecedents are events that precede the concept under examination (Walker & Avant, 1995). Antecedents affecting the male hot flash experience include the demographic characteristics of male gender (Spetz, Fredriksson, & Hammar, 2003; Stearns et al., 2002) and disease characteristics, such as type and stage of disease (i.e., locally advanced or advanced adenocarcinoma of the prostate) (Herr & O'Sullivan, 2000; Karling et al., 1994; Schow, Renfer, Rozanski, & Thompson, 1998).

The third antecedent is the type of treatment, considered to be androgen ablation, consisting of either medical castration with the use of luteinizing hormone-releasing hormones, antiandrogens, or estrogens; or surgical castration requiring bilateral orchietomy (Schow et al., 1998; Spetz, Hammar, Lindberg, Spangberg, & Varenhorst, 2001; van Aniel, Kurth, & de Haes, 1997).

## Consequences

Consequences are events that occur as a result of a concept (Walker & Avant, 1995). The hot flash experience has been found to affect a variety of health outcomes, such as sleep disturbance and declines in cognitive functioning and overall health-related QOL (HRQOL).

Hot flashes are noted more frequently at night and may awaken patients from sleep. The disturbance of sleep results in fatigue, which, in turn, may lead to poor concentration and impaired memory (Kronenberg, 1990; Walsh & Schiff, 1990). The findings of a Swiss study of 32 postorchietomy patients who completed mailed surveys showed that 30%–50% of those

experiencing hot flashes sought palliation of the symptoms because of significant discomfort and inconvenience affecting sleep (Buchholz et al., 1994). A Swedish study of 77 men with prostate cancer who were treated with androgen ablation and experiencing hot flashes reported that five of the patients in the study stated that they had significant sleeping problems (Karling et al., 1994).

British researchers randomized 82 men with advanced prostate cancer to androgen ablation versus monitoring the disease so that they could evaluate cognitive dysfunction. Researchers reported a decrease in cognitive functioning in patients receiving androgen ablation. After six months of treatment with androgen ablation, the men demonstrated decreases in memory, attention, and executive functions (i.e., verbal fluency) (Green et al., 2002). Support for the possible relationship between androgen ablation and diminished cognitive function has been demonstrated by findings that estrogens and androgens play a protective role in neurodegeneration (Tan, Pu, & Culbertson, 2004).

Men treated with androgen ablation have demonstrated a decrease in overall HRQOL (Herr & O'Sullivan, 2000; Thompson et al., 2003). Most of the studies of men receiving androgen ablation described an overall decline in HRQOL (Kouriefs et al., 2002; van Andel & Kurth, 2003) but did not address specifically the effect of hot flashes on HRQOL. However, a study in Britain evaluated 129 patients with locally advanced prostate cancer to establish which attributes of treatment were most important to them, assuming a life expectancy of five years. The researchers found that the men were willing to give up increased life expectancy to avoid side effects of treatments. The men's responses indicated that they were most willing to give up life expectancy to avoid the limitations of decreased physical energy, hot flashes, diarrhea, and diminished sex drive (Sculpher et al., 2004).

## Model Case

A model case is a real-life example of a concept that uses all of the defining attributes identified for that concept (Walker & Avant, 1995). The construction of cases helps to further define and understand the concept. The following model case of the hot flash experience in men illustrates the occurrence of the concept.

Mr. P is a 59-year-old male with a history of advanced prostate cancer who was diagnosed 15 months ago. He began receiving hormonal injections every three months at the time of diagnosis. He complains of waking up every night for the past four to five months feeling warm, with sweat on his chest and forehead. He states that this lasts for 5–10 minutes and is followed by chills. His wife now sleeps in the guest bedroom because his frequent nocturnal awakenings are affecting the quality of her sleep as well. The episodes are making him feel anxious, and he states that he feels agitated during the day and cannot concentrate when working at his construction company. Mr. P's supervisor has counseled him on his short temper with other employees and has asked him if he needs to take some time off to get some rest. The patient and his wife now are asking his healthcare provider if another treatment for his prostate cancer could be used that does not have side effects.

This model case includes all of the attributes of the hot flash experience. Mr. P is a good example of a man experi-

encing the multidimensionality of hot flashes. He describes the meaning of the experience as it relates to his personal and occupational roles.

## Borderline Case

The borderline case is one that contains some, but not all, of the defining attributes and may contain most or all of the criteria but differ substantially in one of them (Walker & Avant, 1995). The following case describes such a scenario.

Mr. L is a 72-year-old male with a history of advanced prostate cancer who is receiving hormonal treatments for his disease. He also has a history of general anxiety disorder for which he takes anti-anxiety medications. He states that he has had sweating attacks since beginning the hormonal treatments for his cancer, but they do not bother him. He states he has them occasionally, perhaps once or twice a week, but he is not sure of the frequency of the sweating because he is such a sound sleeper. Mrs. L says her husband has never felt better and feels that he has more control of his life now that the cancer is being treated. They are very pleased with the treatment.

In this case, the defining attributes of increased sweating and frequency are present, but the psychological attributes are missing. The patient is not disturbed by the hot flashes. He has a previous history of anxiety disorder not associated with the current treatment regimen.

## Empirical Referents

Empirical referents are categories of actual phenomena that, by their existence, demonstrate the occurrence of the phenomenon (Walker & Avant, 1995). They are observable properties of the concept, or how the defining attributes can be measured. Hot flashes are difficult to measure because of their transient and unpredictable nature, and they have been the object of little investigation. The physical attributes of cutaneous blood flow and sweating have been measured in very few studies. Frodin et al. (1985) used the laser Doppler flow meter to measure cutaneous blood flow and the evaporimeter to measure the rate of evaporation of the sweat accumulating on the chest, forehead, and forearms. An ambulatory hot flash monitoring device has been used in women to record skin conductance levels on sternal skin in breast cancer survivors and was found to be a feasible method for objectively assessing hot flashes (Carpenter, Andrykowski, Freedman, & Munn, 1999; Carpenter et al., 2004).

Most studies use questionnaires or diaries to evaluate the frequency, intensity, and duration of hot flashes in men and women. The HRQOL instruments used with patients with prostate cancer may contain one question related to hot flashes. For example, the European Organization for the Research and Treatment of Cancer QOL tool that is specific to prostate cancer asks patients, "Do you have hot flashes?" (Herr & O'Sullivan, 2000). The lack of identified instruments clearly demonstrates the need to explore the concept of hot flashes in further research.

## Implications for Nursing Practice and Research

The lack of progress concerning the concept of the hot flash experience in men is an indication of the need for clarification

of the concept. The hot flash experience in men should no longer be ignored. This concept analysis provides a foundation for additional development of the concept and facilitates further inquiry into the phenomena taking place during the experience.

Nurses and other healthcare professionals need to have a greater understanding of the definition of the hot flash experience among men and women as well as its essential attributes and implications for managing the multidimensionality of the concept. Healthcare providers should explore the potential effectiveness of an intervention for several symptoms because multiple symptoms often occur simultaneously. Development of an oncology assessment tool that incorporates clusters of symptom experience, such as sleep disturbances, cognitive dysfunction, and hot flashes, would be helpful to healthcare providers treating patients with prostate cancer through all phases of the treatment plan.

Nurses can educate patients and family members about the symptoms and side effects of androgen ablation. Patients should be educated about the impact of sleep disturbances on activities of daily living, cognitive functioning, and fatigue, as well as the long-term prevalence of symptoms. Then, nurses can plan interventions to help manage the magnitude of the symptoms, such as sleep hygiene, methods to improve memory, and pharmacologic and nonpharmacologic ways to alleviate hot flashes.

The National Institutes of Health convened a workshop in early 2004 to assess the current status of hot flash measurements and to consider barriers to and opportunities for improving them (Miller & Li, 2004). Scientists from a broad range of disciplines deliberated on the issue and recommended improved knowledge in many areas: the physical process of hot flashes, identification of additional factors to measure, sternal skin conductance systems, instruments for collecting data about intensity and interference with activities

of daily living, and animal models to elucidate triggers and mechanisms of hot flashes. Animal models could be used to increase understanding of the neurobiology of hot flashes (Miller & Li). Healthcare practitioners should become aware of the etiology, treatment, and consequences of hot flashes in patients treated with medical and surgical castration whose treatment, in most cases, is palliative.

## Conclusions

The literature is replete with interventions to alleviate hot flashes in postmenopausal women and patients with breast cancer; however, the management of hot flashes in patients with prostate cancer has received minimal attention from researchers in the medical and nursing literature. Treatments that may improve hot flashes include estrogens, progesterones, and selective serotonin reuptake inhibitor-type antidepressants, such as venlafaxine (Quella et al., 1998) and fluoxetine, all of which have additional side effects. Transdermal clonidine demonstrated efficacy in a small pilot trial of postorchietomy patients (Parra & Gregory, 1990) but had no effect in a larger, randomized clinical trial (Loprinzi, Goldberg, et al., 1994). Megestrol acetate also has been used with some efficacy (Loprinzi, Michalak, et al., 1994). Alternative treatments have not been studied widely in this patient population; however, in one small, uncontrolled study, acupuncture had some efficacy in patients (Hammar et al., 1999). Nurses can educate other healthcare providers, patients, and family members regarding possible treatments for hot flashes and sleep disturbance to improve cognition and positively affect QOL.

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