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Authors	Saab, Mohamad M.;Landers, Margaret;Hegarty, Josephine
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The Pre-Conscious Awareness to Action Framework: An Application to Promote Testicular Awareness

Running Head: The Pre-Conscious Awareness to Action Framework

Mohamad M. Saab [a,1], Lecturer, PhD Candidate, MSc, BSc, RN, PGCTLHE

Margaret Landers [a], Lecturer, PhD, MSc, BSc, RNT, RGN

Josephine Hegarty [a], Professor, PhD, MSc, BSc, RNT, RGN

[a]**Authors' affiliation:** Catherine McAuley School of Nursing and Midwifery, University College Cork, Brookfield Health Sciences Complex, College Road, Cork, Ireland.

[1]**Corresponding author:** Mohamad M. Saab, Catherine McAuley School of Nursing and Midwifery, University College Cork, Brookfield Health Sciences Complex, College Road, Cork, Ireland.
Tel.: +353 21 490 1518
Fax: +353 21 490 1493
E-mail addresses: msaab@ucc.ie ; mohamad.m.saab@gmail.com

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ABSTRACT

Background: Health outcomes among males are markedly poorer than females. Testicular disorders can be life threatening if left untreated. Few studies promoting awareness of testicular disorders were underpinned by theory. Theory-based interventions are more likely to achieve positive health outcomes than interventions that lack a theoretical underpinning.

Objectives: To present a theory-focused analysis of the Pre-Conscious Awareness to Action Framework (PAAF) developed to enhance testicular awareness and help-seeking intentions and behaviors among men.

Method: The empirical literature on men's awareness of testicular disorder was reviewed. A qualitative study was conducted to explore men's awareness of testicular disorders, help-seeking intentions for testicular symptoms, and preferred learning strategies in relation to testicular disorders and symptoms. An iterative narrative review process of the theoretical literature on health promotion and symptom appraisal was undertaken to develop the PAAF.

Results: The PAAF comprises seven steps: pre-conscious awareness, unconscious awareness, conscious awareness, unconscious appraisal, conscious appraisal, intention, and behavior. The concept of testicular awareness was developed to familiarize men with their own testes and promote timely help-seeking.

Discussion: Researchers are encouraged to use the PAAF to underpin health-promoting interventions aimed to enhance testicular awareness, symptom appraisal, and help-seeking.

Keywords: Awareness; theoretical model; testicular disease.

1. INTRODUCTION

Globally, health outcomes among males continue to be markedly poorer than females, and efforts to promote men's health remain scarce (Baker et al., 2014). This, coupled with the assumption that men are disinterested in their own health, leads to gender-based health disparity and discourages men from engaging with health services (Leone & Rovito, 2013).

Of the diseases that are seldom discussed in current men's health initiatives, disorders of the testes can have a major impact on a man's wellbeing. Testicular cancer (TC) is the most frequently diagnosed solid tumor among men aged 18 to 50 years in the United States (National Cancer Institute [NCI], 2015). The incidence of TC in developed countries doubled over the past four decades (Rosen, Jayram, Drazer, & Eggener, 2011) and TC mortality is highest in the developing world due to late presentation and limited access to care (Znaor, Lortet-Tieulent, Jemal, & Bray, 2014). TC treatment is associated with chronic complications including fatigue, neuropathy, metabolic syndromes, and infertility (Saab, Noureddine, Huijer, & DeJong, 2014).

Like TC, a number of benign testicular disorders can be life-threatening if left untreated. An example is testicular torsion which involves idiopathic twisting of the testes. This condition is a medical emergency that can lead to testicular ischemia and necrosis (Ringdahl & Teague, 2006). Another example is epididymitis and orchitis (i.e. inflammation of the epididymis and testes) that are often transmitted sexually among men aged less than 50 and can lead to sepsis and infertility if not treated promptly (Centers for Disease Control and Prevention [CDC], 2015).

Experimental studies aimed at raising men's awareness of benign testicular disorders are lacking (Saab, Landers, & Hegarty, 2016a), and only half of the studies promoting TC awareness reviewed by Saab et al. (2016b) were underpinned by theory. Sidani and Fleury (2016) defined

interventions as “a set of inter-related activities directed toward attaining common goals” (p. 190). Theory-based interventions help achieve positive health outcomes more than interventions that lack a theoretical basis (Michie, Johnston, Francis, Hardeman, & Eccles, 2008; Savage, Farrell, McManus, & Grey, 2010). Moreover, theory development is a key step in the Medical Research Council framework used to develop and evaluate complex health interventions (Craig et al., 2013). Therefore, a good theoretical understanding of a phenomenon is key to modelling an intervention, understanding how an intervention instigates change, and exploring the role of potential moderating and influencing variables (Michie et al., 2008; Sidani & Fleury, 2016).

In nursing, theory serves as a roadmap to design, implement, and evaluate interventions to promote health, maintain health, manage illness, and provide comfort at end-of-life (Sidani & Fleury, 2016). The elements of theory building include concepts, statements, and theories (Walker & Avant, 2011). Concepts are a mental image of a phenomenon and are regarded as the building blocks of a theory. Statements specify the context of theory building, either by defining the concepts (i.e. non-relational) or describing the relationship between them (i.e. relational). Walker and Avant (2011) defined theory as “an internally consistent group of relational statements that presents a systematic view about a phenomenon and that is useful for description, explanation, prediction, and prescription or control” (p. 7). It is often used to express a new idea or insight into the nature of a phenomenon. Theory is built using three key processes; synthesis, derivation, and analysis. Synthesis involves using information to construct a new concept or theory, derivation allows researchers to redefine a concept to fit a new context, and analysis involves clarifying refining, or sharpening concepts or theories (Walker & Avant, 2011).

This paper presents a theory-focused analysis of the Pre-Conscious Awareness to Action Framework (PAAF) developed to enhance testicular awareness and help-seeking intentions and

behaviors among men aged 18 to 50 years since those who fall within this age group are at the highest risk for testicular disorders (CDC, 2015; NCI, 2015; Ringdahl & Teague, 2006).

2. METHODS

The PAAF was developed following a synthesis of evidence from the empirical and theoretical literature on awareness, help-seeking, and symptom appraisal (Table 1).

2.1 Reviews of the empirical literature

A systematic review of exploratory studies on men's awareness of TC and self-examination (n=25 studies) (Saab et al., 2016c), a systematic review of experimental studies promoting awareness of TC and self-examination (n=11 studies) (Saab et al., 2016b), and an integrative review of exploratory studies on men's awareness of benign testicular disorders (n=4 studies) (Saab et al., 2016a) were conducted. It was found that men lacked awareness of TC, self-examination, and benign testicular disorders and many intended to delay help-seeking for testicular lumpiness, swelling, and pain (Saab et al., 2016a,c). Ten of the 11 reviewed interventions promoting awareness of TC and self-examination succeeded in doing so. Moreover, six studies mentioned using theories, yet failed to map them onto the development and testing of the interventions (Saab et al., 2016b). Of note, none of the reviewed studies reported on men's preferred learning strategies, explored qualitatively their awareness of benign testicular diseases, or attempted to raise their awareness of diseases other than TC.

2.2 Qualitative Study

Findings and gaps from the reviewed empirical literature informed a qualitative study aimed at exploring men's (n=29) awareness of benign and malignant testicular disorders, help-

seeking intentions for testicular symptoms, and preferred learning strategies in relation to testicular disorders and symptoms. This study is reported in detail in Saab et al. (2017a,b).

Overall, men were unaware of the risk factors, signs and symptoms, and treatment of TC. Moreover, men's awareness of non-malignant testicular disorders was lacking, which echoes findings from the empirical literature (Saab et al., 2016a,b,c). A number of men intended to delay help-seeking for testicular symptoms due to knowledge deficit, symptom misappraisal, fear, embarrassment, cultural factors, cost and access to care, and inability to differentiate between normal and abnormal lumps (Saab et al., 2017a) (Figure 1). To help raise awareness, men recommended using educational interventions that are brief, visually stimulating, novel, and positively worded, with the use of light and simple language (Saab et al., 2017b).

2.3 Review of the theoretical literature

Data from the empirical literature and qualitative study helped plan an interactive educational intervention aimed at enhancing men's awareness of the normal testes and the most common testicular symptoms (e.g. lumpiness, swelling, and pain) and disorders (e.g. TC, epididymitis, orchitis, and testicular torsion). The ultimate goal of this intervention was to enable men to seek timely medical attention for testicular symptoms.

An iterative narrative review process of the theoretical literature on health promotion and symptom appraisal was undertaken to source and derive an underpinning theory/model. Derivation involves redefining a concept, statement, or theory from one context to another (Walker & Avant, 2011).

Six categories of multidisciplinary theories and models used in health promotion were identified as follows: behavioral change theories, intervention-based models, ecological theories

and models, planning models, communication theories, and evaluation models (Nutbeam, 2013; Raingruber, 2014). A behavioral change model, namely the Transtheoretical Model (TTM), provided insight into the cognitive domains involved in the thinking processes underpinning the development of awareness and intentions to alter behavior (Prochaska & DiClemente, 1986). Therefore, the five stages of the TTM (i.e. pre-contemplation, contemplation, preparation, action, and maintenance) served as a stepping stone to the construction of the PAAF.

A side-by-side comparison between the TTM and PAAF is presented in Table 2. The TTM and PAAF are process models that use predefined and interconnected stages in order to achieve a certain goal (Prochaska & DiClemente, 1986; Wislon & Schlam, 2004). However, while the TTM aims to 'treat' harmful behaviors, the primary goal of the PAAF is to raise awareness in order to promote healthy behaviors. Moreover, the TTM is comprised of five stages, whereas the PAAF is comprised of seven stages (i.e. pre-conscious awareness, unconscious awareness, conscious awareness, unconscious appraisal, conscious appraisal, intention, and behavior) derived from the TTM (Prochaska & DiClemente, 1986), and the literature on neurobehavioral psychology (Baumeister, Masicampo, & Vohs, 2011; Dehane & Naccahe, 2001) and symptom appraisal (Whitaker, Scott, & Wardle, 2015). Furthermore, while the TTM addresses the effect of consciousness on behavior, the PAAF acknowledges the impact of three stages of awareness (i.e. pre-conscious, unconscious, and conscious awareness) on behavior. Another difference pertains to symptom appraisal which is an integral part of the PAAF and not the TTM.

3. RESULTS

Movement between the steps of the PAAF is a fluid process (Figure 2). Individuals move in and out of unconscious and conscious awareness/appraisal as thoughts move in and out of consciousness and as the individual and the environmental context of thinking changes.

3.1 Pre-Conscious Awareness

According to Sigmund Freud, pre-consciousness and unconsciousness are not synonymous (Natsoulas, 1996). While lack of awareness is a possibility, individuals in the pre-conscious awareness stage can be either under-informed about certain behaviors, have relevant discrete pieces of unlinked information, or are somewhat informed but not consciously thinking about the information. For instance, notwithstanding that men in the qualitative study lacked knowledge of TC risk factors, signs and symptoms, treatment, and screening; almost all of them reported having heard of TC through the media, school, college, family members, friends, and/or colleagues (Saab et al., 2017a,b). In other words, men were not oblivious to testicular disorders, as they were able to recall certain information in relation to these disorders when prompted.

There are a number of hypotheses as to why men in the reviewed literature and qualitative study lacked awareness. One explanation is that men are often preoccupied with life matters that they may perceive as more important than their own health, such as starting college, building a career, or establishing a family (Saab et al., 2014). Therefore, conflicting responsibilities have the potential to mask health awareness or push it to the bottom of their list of priorities. Furthermore, illness is globally linked to old age, which might cause younger men to think that they are not prone to getting sick (Saab et al., 2017a). Another explanation could be what Leone and Rovito (2013) referred to as “social norms and gender scripting” (p. 246) that

depict how men should and should not behave. These are thought to negatively affect men's health awareness and subsequent health outcomes.

3.2 Conscious and Unconscious Awareness

If one does not deliberately think about a certain behavior, it does not mean that he or she is not aware of it, which requires differentiating between conscious and unconscious awareness (Baumeister et al., 2011). This is key, since the impact both types of awareness have on health behavior had been overlooked in behavioral change theories, including the TTM.

According to Dehane and Naccahe (2001), "durable and explicit information maintenance, novel combinations of operations, and intentional behavior" (p. 9) are not possible without conscious awareness which is divided into two subtypes; the phenomenal awareness and conscious thought (Baumeister et al., 2011). Phenomenal awareness involves subjective experiences. An example is Armstrong's (1981) absent-minded driver, as driving involves automaticity and, despite being a learned behavior, is often instinctive rather than a purposefully planned course of action. In contrast, conscious thought involves reflection and reasoning. An example is a man trying to make sense of a newly discovered testicular lump. Moreover, conscious awareness helps combine various mental operations in order to plan, evaluate, and execute a novel behavior that cannot be attained unconsciously. Of note, certain mental processes are possible without conscious awareness; nonetheless, they are often short-lived (Baumeister et al., 2011). Therefore, a long-lasting memory of a recently acquired intentional behavior cannot be generated in the absence of conscious awareness (Sperling, 1960).

Taylor (2001) highlighted a form of long-term memory that is linked to unconscious awareness, namely the implicit memory which receives, stores, and recovers information outside one's conscious awareness. It is also thought to affect present behaviors as it involves habits,

attitudes, and preferences shaped by past events (Taylor, 2001). An example is the ingrained gender roles that often impact on men's health-seeking behaviors (Leone & Rovito, 2013).

3.2.1 Testicular Awareness

In order to address the lack of awareness of testicular disorders, researchers could adopt a novel and comprehensive concept namely 'testicular awareness'. To help define this concept, it is necessary to consult the literature on the concept of 'breast awareness' which was defined by Thornton and Pillarisetti (2008) as "a woman becoming familiar with her own breasts and the way they will change throughout her life. It encourages women to know how their own breasts look and feel normally so that they gain confidence about noticing any change" (p. 2119).

In order to achieve awareness, early detection of an abnormality must be followed by a specific course of action (Scott & Walter, 2010). However, a prerequisite to symptom detection, is familiarity with the normal state of the body. In the case of testicular awareness, familiarity would enable a man to establish a baseline of what is normal for him so that he would be able to recognize changes (e.g. swelling, lumpiness, and pain). This is key since lack of familiarity with one's own testes has been linked to intentions to delay help-seeking (Saab et al., 2017a).

Testicular awareness would also help promote heightened body awareness since it encourages men to become attentive to a body area that is seldom spoken about (Saab et al., 2014). Moreover, knowing the risk factors for testicular disorders would alert men to the aforementioned symptoms and disorders. For instance, men must recognize that having a first degree relative with TC increases their risk for this malignancy, and that unprotected sex exposes them to epididymitis and orchitis (CDC, 2015). Therefore, it is presumed that testicular awareness is a form of conscious rather than unconscious awareness.

Of note, testicular awareness does not necessarily involve scheduled self-examination, especially that the risks and benefits of this practice are debatable (Ilic & Misso, 2011). The U.S. Preventive Services Task Force (2011) discourages self-examination, mainly due to the potential harms of false positives, and concomitant anxiety. In contrast, proponents of TC screening argue that recommendations discouraging this practice are based on speculations rather than empirical evidence, especially that early diagnosis of TC was found to be more cost-effective than late diagnosis (Rovito, Manjelievskaia, Leone, Lutz, & Nangia, 2016). A middle ground could be reached by instructing men to feel their testes in order to establish a baseline of what is normal for them without necessarily promoting monthly testicular self-examination.

3.3 Conscious and Unconscious Appraisal

Symptoms, described as bodily sensation or changes, are subject to complex psychosocial processes. In a conceptual review of nine symptom appraisal models, Whitaker et al. (2015) defined the process of symptom appraisal as the "detection of bodily changes, interpretation of bodily changes, and responses to interpretation" (p. S28).

Detection of bodily changes involves recognizing a disturbance that can be general, localized, visible, palpable, and/or audible. This disturbance can differ in intensity and frequency (Whitaker et al., 2015). Therefore, for a bodily change to be detected, it must be of a significant magnitude. For example, a testicular lump must be large enough for a man to be able to detect it.

Symptom detection is followed by appraisal which involves "labeling, categorizing, and evaluating the bodily changes" (Whitaker et al., 2015, p.S28). Like awareness, appraisal is subject to conscious and unconscious influences as it involves reflection and reasoning in order to make sense of a symptom (i.e. conscious appraisal), and at the same time it can be impacted by past attitudes, beliefs, experiences, and/or behaviors (i.e. unconscious appraisal).

Symptom appraisal is a ‘delicate’ stage as it is subject to misinterpretation which can cause people to delay help-seeking; this was the case for a number of men in the qualitative study (Saab et al., 2017a). In addition, the impact of the external environment on the detection of bodily changes must not be overlooked (Pennebaker, 1982). For instance, excessive stimulation from the external environment can shift a person’s attention away from a symptom.

3.4 Help-Seeking Intention and Behavior

Following awareness and appraisal, a response is generated, which involves reaching a decision regarding the action that must be taken in relation to the symptom experienced. In the case of testicular awareness, a man decides either to seek medical attention or not. Alternately, he can revert to self-help measures, inform his family and friends, delay help-seeking, or adopt dysfunctional coping strategies such as denial and avoidance (Saab et al., 2017a).

As aforementioned, a number of barriers to help-seeking exist; these including lack of knowledge, symptom misappraisal, fear, embarrassment, machoism, and conflicting responsibilities. On the other hand, having the motivation and ability to seek help, and having access to healthcare settings positively influence one’s intention to seek medical care (Leventhal, H., Leventhal, E. A., & Contrada, 1998). Social support, disclosure of symptoms to friends, having an inherent help-seeking drive, and symptom severity also serve as enablers for help-seeking (Saab et al., 2017a). Finally, one can speculate that, when a man becomes ‘testes aware’, he is more likely to seek medical attention for testicular symptoms. This also is supported by evidence from the reviewed literature on men’s awareness of TC and self-examination (Saab et al., 2016c).

Relational statements are key to specifying the relationship between the concepts of the PAAF (Walker & Avant, 2011). These were simplified and presented in Figure 3, with the "-" sign depicting a negative relationship and the "+" sign depicting a positive relationship.

4. CONCLUSION

To the best of the authors' knowledge, the PAAF is the first framework to highlight the impact of three stages of awareness (i.e. pre-conscious, unconscious, and conscious awareness) and two stages of symptom appraisal (i.e. unconscious and conscious appraisal) on help-seeking intentions and behaviors. Moreover, The PAAF was applied to the concept of 'testicular awareness' that was first introduced in this paper. This concept can be instrumental in familiarizing men with their own testes and enabling them to detect abnormalities. This could influence their decision to seek timely medical attention, thus preventing potential complications that are linked to delayed help-seeking such as testicular ischemia, sepsis, and infertility.

In order to tailor effective health-promoting messages, researchers are encouraged to underpin their interventions with behavioral change theories, intervention-based models, and/or theories of health communication; an example is the PAAF discussed in the present paper. The authors are currently using the PAAF to build and test an interactive intervention aimed at raising men's testicular awareness.

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FIGURE LEGENDS

Figure 1. Barriers to awareness and appraisal of testicular symptoms (Saab et al., 2017a).

Figure 2. The PAAF as applied to the concept of testicular awareness (Saab et al., 2016a,b,c; Whitaker et al., 2015).

Figure 3. Simplified statements illustrating the relationship between the key concepts of the PAAF (Walker & Avant, 2011).

Table1. Synthesis and derivation processes guiding the development of the PAAF

STEPS	METHODS	KEY FINDINGS
Empirical literature reviews	• Systematic review of 25 quantitative and qualitative studies exploring men's knowledge, awareness, and attitudes towards testicular cancer and self-examination (Saab et al., 2016c)	• Men lacked awareness of testicular cancer risk factors, signs and symptoms, and treatment • Few men practiced self-examination with the majority not knowing what to look for • Many reported an intention to delay help-seeking for testicular lumpiness • Men perceived education about testicular cancer and self-examination as important
	• Systematic review of 11 experimental studies promoting men's awareness of testicular cancer and self-examination (Saab et al., 2016b)	• Ten of the 11 studies successfully raised men's awareness of testicular cancer and self-examination e.g. a college campaign (Wanzer et al., 2014) and mass media (Trumbo, 2004) • None of the studies reported on men's preferred learning strategies a priori • Six of the 11 studies were underpinned by theory
	• Integrative review of four quantitative studies exploring men's awareness of benign testicular disorders (Saab et al., 2016a)	• Men's awareness of benign testicular disorders was lacking • Many reported an intention to delay help-seeking for testicular lumpiness and pain • No qualitative or experimental studies were identified in the literature search
Qualitative descriptive study	• To explore men's (n=29) awareness of testicular disorders, help-seeking intentions for testicular symptoms, and preferred strategies for learning about testicular disorders and symptoms (Saab et al., 2017a,b) • 12 semi-structured individual interviews and three focus groups were conducted with men aged 18-47 years. • Data were analyzed using qualitative content analysis • Trustworthiness was enhanced by selecting a heterogeneous sample, cross-checking the analyzed data, member-checks, memoing, and using field notes and audit trails	• Men lacked awareness of testicular cancer; very few reported having heard of benign testicular disorders; and many intended to delay help-seeking for lumpiness, swelling, and/or pain • Barriers to awareness and help-seeking included: lack of prior knowledge, symptom misappraisal, fear, embarrassment, machoism, lack of endorsement by the health system, cost and access to care, and inability to differentiate between normal and abnormal lumps • Facilitators to awareness and help-seeking included: prior knowledge, regular self-examination, clinical testicular examination, personal and/or family history of testicular disease, aging, being gay, access to support, inherent health-seeking drive, and perceived threats to fertility • Men stressed the importance of raising awareness using educational interventions that are brief, simple, visually appealing, novel, and positively worded
Theoretical literature review	• An iterative narrative review process of the theoretical literature on health promotion, symptom appraisal, and neurobehavioral psychology was undertaken. • Six categories of multidisciplinary theories used in health promotion were identified: behavioral change theories, intervention-based models, ecological theories and models, planning models, communication theories, and evaluation models (Nutbeam, 2013; Raingruber, 2014)	• The five stages of the Transtheoretical Model guided the development of the seven stages of the Pre-Conscious Awareness to Action Framework • The literature on neurobehavioral psychology helped derive the concepts of pre-conscious, unconscious, and conscious awareness • The empirical literature, the qualitative study, and the concept of "breast awareness" helped create and define the concept of "testicular awareness" (Thornton & Pillarisetti, 2008) • The literature on symptom appraisal helped derive the concepts of unconscious and conscious appraisal (Whitaker et al., 2015)

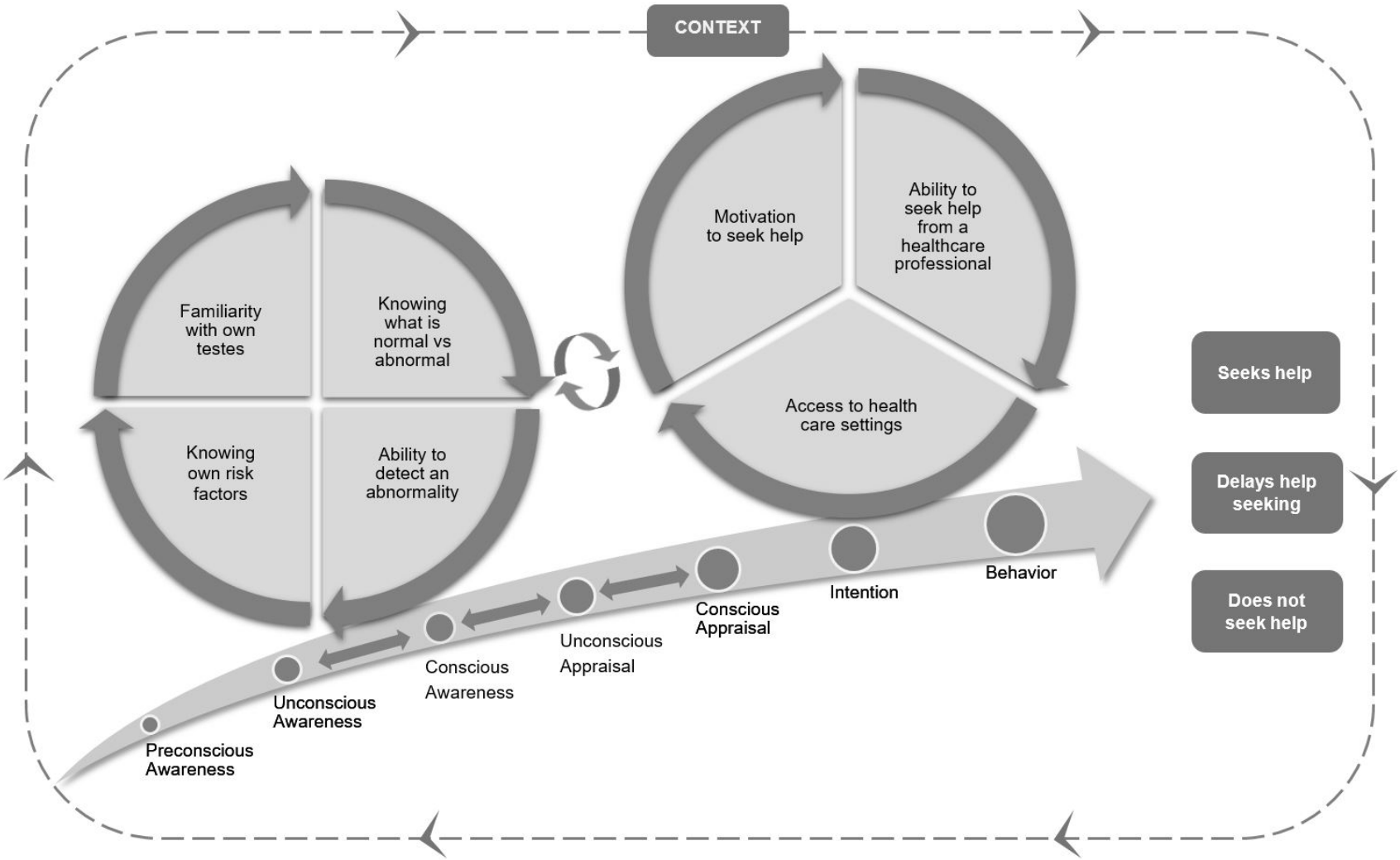
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Table 2. Comparison of the key characteristics of the TTM and the PAAF

	TTM[a]	PAAF
Discipline	Clinical psychology and psychotherapy	Health promotion and neurobehavioral psychology
Primary goal	To treat and change pre-existing addictive/harmful behaviors (e.g. smoking)	To raise awareness to promote new and healthy behaviors (e.g. early help-seeking)
Development	Comparative analysis of 29 systems of psychotherapy	Iterative process of synthesis, derivation, and analysis
Stages	Five stages: pre-contemplation, contemplation, preparation, action, and maintenance	Seven stages: pre-conscious awareness, unconsciousness awareness, conscious awareness, unconscious appraisal, conscious appraisal, intention, and behavior
Pre-contemplation vs. Pre-conscious awareness	People in the pre-contemplation stage are uninformed or under-informed about the consequences of their behavior	People in the pre-conscious awareness stage are uninformed, under-informed, have relevant discrete pieces of unlinked information, or are somewhat informed but not consciously thinking about the information
Consciousness vs. Conscious awareness	Highlights the role of consciousness raising in promoting intentions to change a behavior	Highlights the role of conscious awareness and memory in retaining new information, combining various mental processes, and understanding and shaping behavior
Symptom appraisal	No symptoms involved as the primary goal is to treat pre-existing addictive behaviors	Involves labeling, categorizing, and evaluating bodily changes
Intention	Intention to change and take action imbedded in the contemplation and preparation stages respectively	A separate stage that is impacted by motivation and ability to seek help and access to healthcare services
Action vs. Behavior	Course of action needed to modify one's lifestyle. It must be maintained to avoid relapse	Ultimate behavior is to seek timely medical attention in response to a symptom
Context	Emphasis on the impact of the harmful behavior on the social environment	Emphasis on the impact of intrinsic and extrinsic factors on the seven stages of the framework
Testing	Tested in various contexts (e.g. smoking cessation, alcohol use, and weight reduction)	Currently being used to build and test an interactive intervention aimed at raising men's testicular awareness

[a] Prochaska and Di Clemente (1986)


CONTEXT
Familiarity with own testes
Knowing what is normal vs abnormal
Knowing own risk factors
Ability to detect an abnormality
Motivation to seek help
Ability to seek help from a healthcare professional
Access to health care settings
Preconscious Awareness
Unconscious Awareness
Conscious Awareness
Unconscious Appraisal
Conscious Appraisal
Intention
Behavior
Seeks help
Delays help seeking
Does not seek help

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