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Abstract

One-hundred-and-one Australian university students aged 18-25 years, with a mean age of 22. 9 years (SD = 1.62) completed a survey assessing testicular self-examination, and knowledge of testicular cancer, d statistically significant difference was found in knowledge scores between performers and non-performers. The factors influencing performance of testicular self-examination were examined using Schwarzer's (1992) Health Action Process Approach as the theoretical framework. Results showed that the majority of men were uninformed or misinformed about testicular cancer and testicular self-examination. Eighty-three per cent of respondents did not perform testicular self-examination once per month as recommended. Intention, outcome expectancies and self-efficacy were the best predictors of testicular self-examination performance. Findings provided some support for the Health Action Process Approach.

Testicular cancer, relative to other cancers in men, is not a prevalent cancer. In 1985 there were 5,000 new cases reported in the USA and 500 deaths (Neef et al., 1991). The best estimate available was that there would be 7,600 new cases of testicular cancer, and 400 deaths in the USA by 1998 (American Cancer Society, 1998). In Australia, 400 new cases were reported in 1990 (Jelfs et al., 1991). This number increased to 514 in 1994 (Australian Institute of Health and Welfare, 1998). Moreover, the incidence of testicular cancer when examined over a longer period is on the rise. In Australia, a study reported a three- to four-fold increase since the 1940s (Stone et al., 1990).

The apparent paradox surrounding testicular cancer is that while it can lead to death, early diagnosis indicates that it is one of the most curable cancers (Queensland Cancer Fund, 1997). Further, an analysis of data reporting incidence and subsequent deaths indicates that the number of deaths had decreased by 50% since 1974 (American Cancer Society, 1998).

While the number of deaths from testicular cancer is decreasing, it is still a leading cause of death in American and Australian men aged between 15 and 44 years (Friman & Finney, 1990). The significance of this general statement is apparent when testicular cancer is compared with other cancers, and when deaths are analyzed in `years of potential life loss'. Because testicular cancer principally attacks young males, it has the highest male mortality statistics in terms of `years of potential life loss' for male cancer victims (Friman & Finney, 1990).

As with many forms of cancer, the aetiology of testicular cancer is unknown. The only major recognized risk factor is cryptorchidism (undescended testicle), which occurs in 10 to 12% of cases, leaving the risk factors for approximately 90% of cases unknown (Stone et al., 1991). The majority of cases report previous presenting symptoms, with the most common being a painless lump or swelling on the testicle (Raghavan, 1990).

Early detection of testicular cancer is of paramount importance. The survival rate for early stage testicular cancer approaches 100%; however, the prognosis is poor for individuals with

an advanced stage of the disease, with cure rates as low as 44% (Nikzas et al., 1991). Population screening as a method of early detection of testicular cancer is not justified due to the low incidence and low mortality rates (Buetow, 1996; Smart, 1990). However, Testicular Self-Examination (TSE) is a cost-effective alternative, which is simple to perform and effective in detecting abnormalities (Thornhill et al., 1987; Meffan et al., 1991). Cancer groups recommend that men perform TSE once per month from the onset of puberty through to 40 years of age (Queensland Cancer Fund, 1997).

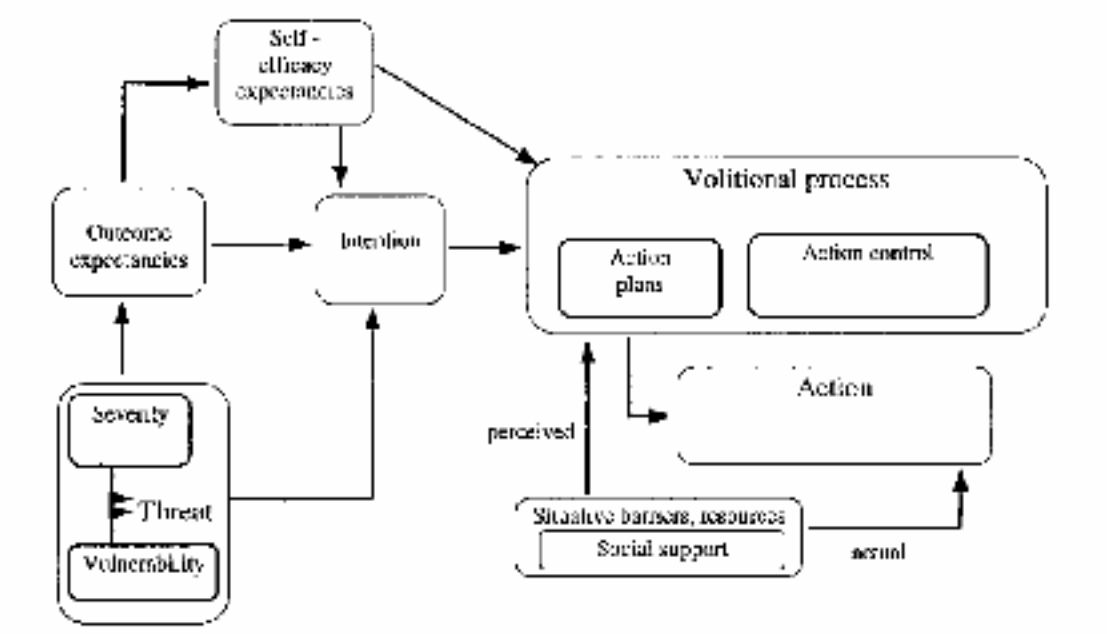

FIG. 1. The Health Action Approach (Schwarzer, 1992)

Research indicates that despite the value of TSE, the majority of men do not perform it (Cummings et al., 1983; Katz et al., Meyers, & Walls, 1995; Neef et al., 1991; Reno, 1988; Thornhill et al., 1986; Wardle et al., 1994). Unfortunately, Australian research into TSE is deficient, with the only data being an unpublished pilot study conducted by Ross and colleagues at Charles Sturt University. They surveyed 37 young mean aged 15 to 34 years of age and found that only 49% knew how to perform testicular self-examination and 43.2% had never examined their testes (Ross, personal communication).

Knowledge about testicular cancer and TSE is necessary to perform TSE effectively, and research indicates that most men are uninformed, about both (Cummings et al., 1983; Ganong & Markovitz, 1987; Klein et al., 1990; Thornhill et al., 1986; Vaz et al., 1988). Again, Australian research is limited, with the only available data being a survey conducted by Raghavan (1990), a leading oncologist at the Royal Prince Alfred Hospital in Sydney. He surveyed 80 patients presenting at his practice and reported that less than 15% of presenting patients had heard of testicular cancer and only 10% were aware that young men were in the greatest at risk age group for developing testicular cancer. It is evident that further research needs to be undertaken to determine awareness and practices in the Australian context.

Interestingly, studies have shown that increases in knowledge about testicular cancer and TSE do not produce concomitant increases in performance (Dach et al., 1989). These findings suggest that although knowledge is necessary to perform testicular self-examination, it is not sufficient, and other influencing factors need to be considered. Researchers have developed theories and models, such as the Self-Efficacy Theory (Bandura, 1977; 1986), the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), and the Health Belief

Model (Becker, 1979; Becker & Maiman, 1975; Rosenstock, 1974) to investigate the factors influencing health behaviours. A variety of health behaviours have been investigated using health behaviour models (Brubaker et al., 1987; Fishbein, 1982; Maddux, 1993; Sutton, 1989). However, research using these models to identify the factors influencing performance of TSE has been limited in number (Brubaker & Wickersham, 1990; Katz et al., 1995; Reno, 1988).

The Health Action Process Approach model was evolved by Schwarzer (1992), and was developed to address the inadequacies of earlier conceptualizations (Figure 1). The Health Action Process Approach (HAPA) includes components of previous models, which have been shown to be significant predictors of health behaviours. An investigation of the factors influencing TSE using this model as the theoretical framework may enrich the current understanding of why some men practice TSE and others do not.

The present study will investigate testicular self-examination practices in young Australian men. It will also identify the factors influencing performance of testicular self-examination using the HAPA as the theoretical framework. It is hypothesized that most men will be uninformed about testicular cancer, and testicular self-examination (TSE). Most men will not be performing TSE, and the factors operationalized as components of the Health Action Process Approach will be significant predictors of TSE performance.

Method

Participants

One-hundred-and-one male students from a private Australian university on the Queensland Gold Coast, aged 18 to 25 years, with a mean age of 22.9 years (SD = 1.62), participated in the study. Students were approached at the conclusion of their classes and asked to participate in the study, their participation rate was 100%.

Procedure

Participants were asked to complete a questionnaire relating to testicular cancer and TSE. Participation in the study was voluntary and all questionnaires were anonymous. Educational information pamphlets published by the Queensland Cancer Fund concerning testicular cancer and TSE were distributed following completion of the questionnaire. Classes were surveyed over a two-day period to reduce the possibility of discussion between peers.

Instruments

The questionnaire took about five minutes to complete and contained 32 items (see Appendix). Twelve items pertained to demographics, knowledge and TSE practices. The remaining 23 items operationalized components of the HAPA model, namely, intention, outcome expectancies, self-efficacy, threat, social support and external barriers. For example, intention was addressed by items such as `I intend to perform testicular self-examination within the next six months' and self-efficacy was addressed by items such as `I believe that I am able to perform testicular self-examination effectively'. These items were developed by considering Schwarzer's (1994) suggestions of test construction, and all were measured on a five-point Likert-type scale with 1 representing `strongly agree' and 5 representing `strongly disagree'.

To determine the clarity and validity of knowledge questions and HAPA model questions, the instrument was reviewed by a group of Master's psychology students. These students were

asked to classify the items according to the components of the HAPA and the instrument was then revised, and trialled on a convenience sample. Cronbach's alpha reliability coefficients were obtained as estimates of the reliability of the items operationalizing the HAPA and these are shown in Table 1. With the exception of the two items related to self-efficacy the remaining items yielded reliability coefficients ranging from 0.5 to 0.68.

Table 1. *Reliability coefficients for Health Action Process Approach variables*

Variable	Number of items	Alpha
Threat	8	0.50
Outcome expectancies	6	0.68
Self-efficacy	2	0.18
Intention	4	0.68
Social support	2	0.68
Barriers	2	0.61

All data were analyzed using the SPSS 7.5 for Windows statistical package. Frequencies were computed for each of the knowledge questions and the questions concerning testicular self-examination practices. Composite knowledge scores were obtained and the mean scores of performers and non-performers of TSE were compared using an independent samples t-test.

Product moment correlations were calculated to determine the association between TSE performance and the hypothesized predictor variables. A logistic regression analysis was conducted to examine the effect of the predictor variables on TSE performance.

Results

Awareness of testicular cancer

Knowledge scores ranged from 0 (all answers incorrect) to 5 (all answers correct), with a mean of 2.15 (SD = 1.71) indicating that most men were uninformed or misinformed about testicular cancer. When the sample's knowledge and awareness of testicular cancer (me) are examined in Table 2, it can be seen that there is a general lack of factual awareness of TC. A significant difference ($p < 0.001$) was also found between the mean knowledge scores for men who performed testicular self-examination (M = 3.0, SD = 1.76) and those who did not perform TSE (M = 1.4, SD = 1.32).

Table 2. *Young men's knowledge of Testicular Cancer (TC), correct answers*

Question	Response	%
TC is most common in men aged 15–45 years	Yes	26.7
TC is most common in men aged 45–70 years	No	30.7
Intense pain in the testicle is the most common symptom of TC	No	41.6
A lump on the testicle is the most common symptom of TC	Yes	41.6
A knock on the testicles is the most common cause of TC	No	56.4

Awareness and practice of testicular self-examination

Of the 101 respondents, 59 (58.4%) had heard of testicular self-examination before the survey and 46 (45.5%) indicated that they knew how to perform it. As illustrated in Table 3, the majority of men indicated that they never perform testicular self-examination. Although the majority of men (55.4%) did not perform testicular self-examination, 96 (95%) thought that testicular self-examination was important. Ninety-five out of the 101 men (94.1%) indicated that their doctor had never examined their testicles.

Table 3. *Frequency of Testicular Self-Examination performance* ($N = 101$)

Frequency of performance	*n*	(%)
Once per month	18	17.8
Once every 6 months	14	13.9
Once per year	13	12.9
Never	56	55.4

Factors associated with testicular self-examination

Pearson's product moment correlations between testicular self-examination performance and the component variables of the Health Action Process Approach produced a number of significant associations, however, the only substantial correlation was obtained between testicular self-examination performance and intention, as shown in Table 4.

Table 4. *Correlations between Testicular Self-Examination performance and component variables of HAPA model and knowledge*

Variable	*r*
Intention	0.68**
Outcome expectancies	0.22*
Social support	0.39**
Perceived threat	0.3**
Self-efficacy	0.24*
Knowledge	0.43**

Note: $*p < 0.01$, $**p < 0.001$

A logistic regression was used to examine the effect of predictor variables on testicular self-examination performance. The Enter method was employed and the predictor (independent) variables under consideration were those that had produced statistically significant correlations with testicular self-examination performance in the initial correlation analyses. The analyses revealed that, although together the predictor variables correctly classified 86.14% of the sample (84.44% of testicular self-examination performers and 87.5% of non-performers), the only significant predictors of TSE were intention ($p < 0.001$), outcome expectancies ($p < 0.05$), self-efficacy ($p < 0.05$) and knowledge ($p < 0.05$).

Discussion

Consistent with predictions, most men surveyed were uninformed about testicular cancer and testicular self-examination, and the majority of men did not perform this health behaviour. Some support was provided for the Health Action Process Approach, with the model components of intention, outcome expectancies and self-efficacy being significant predictors of performance.

The study confirms previous findings that most men are uninformed about TC (Cummings et al., 1983; Ganong & Markovitz, 1987; Klein, 1990; Raghavan, 1990; Thornhill et al., 1986; Vaz et al., 1988). Notably, although overall levels of awareness were low, some questions were quite well answered. The majority of men knew that the most common symptom of TC is a lump on the testicle, and that a knock to the testicle is not a common cause of the disease. Of concern, however, is that the overwhelming majority of respondents did not know that TC is most likely to occur in their age group.

The levels of TSE awareness and practice identified in the present study are similar to those reported by Ross and colleagues in their Australian pilot study, suggesting that the results may be quite representative of the general population. The levels identified are also consistent with those reported by Katz et al. (1995) in their recent study based on US data. In contrast, the results are remarkably higher than those reported in earlier studies (Cummings, 1983; Neef, 1991; Reno, 1988; Thornhill, 1986), suggesting that perhaps there has been an increase in awareness and practice of testicular self-examination in young men over the last decade. Alternatively the results may reflect the well-educated bias of the university student sample in this study. Nevertheless, the majority of men reported not performing TSE, and of those that were, few reported performing it once a month as recommended.

Intention was the most significant predictor of performance, which is consistent with the Health Action Process Approach and other health behaviour theories. Intention has been consistently found to be a significant predictor of health behaviours and the present study supports these findings. The fact that intention, together with the other predictor variables, could not correctly classify the entire sample suggests the presence of a post-intentional pre-actional stage as proposed by Schwarzer (1992).

As expected, self-efficacy was a significant predictor of performance that is consistent with the Health Action Process Approach and Bandura's (1977; 1986) Self-Efficacy Theory. However, as the self-efficacy scale had low reliability, this prediction should be viewed with caution. Furthermore, the studies conducted by Brubaker and Wickersham (1990) and Katz et al. (1995) also identified self-efficacy as a significant predictor of TSE performance.

As hypothesized, outcome expectancies significantly affected whether an individual would perform TSE. This is in accordance with the Health Action Process Approach and is also consistent with the Health Belief Model, in the form of its cost-benefits component. The results of the present study are thus consistent with those obtained by Reno (1988), who (1988), who found the cost-benefit component of the Health Belief Model to be a significant predictor of TSE performance.

Consistent with the Health Action Process Approach, outcome expectancies were significant predictors of self-efficacy expectancies. Moreover, outcome expectancies also significantly predicted intention. Contrary to predictions, and inconsistent with the HAPA approach, social support and barriers were not identified as significant predictors of performance. This may be due to the nature of the health behaviour being investigated. In contrast to other health behaviours, such as smoking cessation or healthy eating, TSE is a behaviour performed privately and is therefore unlikely to be influenced by social support. Moreover, performance

of the behaviour is unlikely to be influenced by situative or resource barriers like other health behaviours, such as exercising.

Inconsistent with predictions, threat was not a significant predictor of performance. Threat did, however, act as a distal influence on performance through knowledge and outcome expectancies. This is, in part, consistent with the Health Action Process Approach since the model proposes that threat exerts its influence on health behaviours through outcome expectancies. Moreover, knowledge was identified in the present study as a significant predictor of outcome expectancies.

Also inconsistent with the Health Action Process Approach was the identification of knowledge as a significant predictor of performance. The HAPA does not specify knowledge as influencing health behaviours, because very little research has shown it to be a direct predictor of health-related behaviour. Nevertheless, the present results suggest that knowledge is an important factor influencing whether men perform TSE which is consistent with the results of others (Ganong & Markovitz, 1987; Neef et al., 1991; Reno, 1988). Moreover, knowledge was identified as a significant predictor of self-efficacy and outcome expectancies. These relationships appear likely since an individual usually needs to know how to perform a behaviour before they can determine the outcomes of the behaviour and before they can be confident in their ability to perform it.

The results of the study must be viewed with caution for a number of reasons. First, the sample studied was not representative of the general population and therefore generalizability is limited. Moreover, the data was based on self-reports which can be inaccurate and influenced by social desirability. Another cautionary interpretation of the data needs to be exercised as the sample was not representative of the general population for this particular age group. The respondents were better educated than the general population and were therefore likely to be more informed; however, they represented the age group who are at greatest risk of developing the disease.

Testicular cancer is a deadly disease that affects a growing number of men in Australia each year. The disease strikes when men are young and in their most productive years. This study has found that among a sample of well-educated young men only 17.8% performed testicular self-examinations(TSE) once a month as recommended by anti-cancer organizations. Over half of the sample (55.5%) never performed TSE. Increasing young men's knowledge and awareness of testicular cancer, and the practice of TSE, would increase the likelihood of early detection and thereby decrease the mortality rate. Young men's intentions, social support, perceived threat, self-efficacy and outcome expectancies were significantly correlated with their performance of TSE, which added some support to the Health Action Process Approach model. Participants' knowledge of testicular cancer was also related to whether TSE was performed.

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Appendix

1. Age
2. Nationality
3.

(a) Testicular cancer is most common in men aged 15-45 years.

(b) Testicular cancer is most common in men aged 45-70 years.

(c) Intense pain in the testicle is the most common symptom of testicular cancer.

(d) A lump on the testicle is the most common symptom of testicular cancer.

(e) A knock to the testes is the most common cause of testicular cancer.

- 4. Have you heard of Testicular Self-Examination?
- 5. Do you know how to perform Testicular Self-Examination?
- 6. How often do you examine your testicles for any sign of lumps?
- 7. How often does your doctor examine your testicles?
- 8. Do you think it is important for men to perform Testicular Self-Examination?
- 9. Most people who get testicular cancer die.
- 10. Successful treatments are available for testicular cancer.
- 11. There is little chance of a cure from testicular cancer even with early detection.
- 12. Testicular cancer is one of the least deadly forms of cancer.
- 13. Testicular cancer is a dangerous disease.
- 14. My risk of getting testicular cancer is very low.
- 15. My risk of getting testicular cancer is very low compared to other males my age.
- 16. It is likely that I will develop testicular cancer at some point.
- 17. If I perform Testicular Self-Examination my chance of detecting testicular cancer is increased.
- 18. If I perform Testicular Self-Examination regularly I will reduce my risk of dying from testicular cancer.
- 19. If I regularly perform Testicular Self-Examination I will detect cancer before it becomes deadly.
- 20. If I perform Testicular Self-Examination I might discover something I don't want to know about.
- 21. If I perform Testicular Self-Examination I am likely to feel embarrassed.
- 22. If I perform Testicular Self-Examination I am likely to feel pain.
- 23. I believe that I am able to perform Testicular Self-Examination effectively.
- 24. I believe that if shown how I would be able to perform Testicular Self-Examination effectively.
- 25. I intend to perform Testicular Self-Examination within the next month.
- 26. I intend to perform Testicular Self-Examination within the next 1-6 months.
- 27. I intend to perform Testicular Self-Examination within the next 6-12 months.
- 28. I intend to have my doctor examine my testicles within the next 1-6 months.
- 29. My family, partner, and/or friends think that it is important from me to perform Testicular Self-Examination.
- 30. My doctor thinks that it is important from me to perform Testicular Self-Examination.
- 31. I think that it would be inconvenient to perform Testicular Self-Examination in the shower.

32. I think that performing Testicular Self-Examination would be very time consuming.