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TESTICULAR SELF-EXAMINATION: VALIDATION OF A TRAINING STRATEGY FOR EARLY CANCER DETECTION

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Testicular self-examination (TSE) can lead to early diagnosis and treatment of testicular cancer, the third leading cause of death in young men. We evaluated the effectiveness of a brief and specific checklist for teaching TSE skills. Ten men were videotaped while performing testicular self-examinations before and after training. The TSE training resulted in large and significant increases in the number of TSE steps completed and duration of the TSE. Two urological validation measures supported the improvements observed in the mens' self-examinations. Subjects reported continued performance of TSE during a follow-up telephone interview. This pilot study indicates that a brief and specific checklist is an effective strategy for teaching early cancer detection skills.

DESCRIPTORS: self-examination, task analysis, cancer, urology, behavioral medicine

Testicular cancer is the third leading cause of death in men between the ages of 15 and 40 and is responsible for 19% of all cancer deaths in this age group (Droller, 1980; Young, Percy, & Asire, 1981). Although testicular cancer is relatively rare (2.0–3.7 per 100,000), the age-adjusted incidence of testicular cancer is rising for white males in the United States and in several European countries (Schottenfeld et al., 1980).

Early detection and treatment can lead to the cure of testicular cancer. Unfortunately, about 50% of patients are diagnosed after the cancer has spread beyond the testes to the abdomen, pelvis, or other solid organs (Cummings, Lampone, Mettlin, & Pontes, 1983). In these patients the chances for cure and thus, survival, are much smaller (Bosl et al., 1981). The patient with testicular cancer is at great risk for advanced metastases because of the "hurricanelike" growth of the tumors, which is one of the fastest growing tumors (Markland, 1977). The optimistic prognosis that results from early detection and treatment of testicular cancer underscores the critical need for teaching testicular self-examination (TSE).

TSE can result in early detection of testicular cancer. However, most men between the ages of 15 and 40, the group with the highest risk for testicular cancer, know nothing about testicular cancer and self-examination (Cummings et al., 1983; Goldenring & Purtell, 1984). Detection of early cancer signs and symptoms is a behavioral process that requires training in the skills necessary to detect lumps, masses, or painful areas on the testes. Effective skills training programs based on task analyses have been developed for a variety of health-related behaviors, including dental care (Horner & Keilitz, 1975), menstrual care (Richman, Reiss, Bauman, & Bailey, 1984), and breast self-examination (Hall et al., 1980). Breast self-examination skills (BSE) are generally regarded to be much more difficult to learn than TSE skills (Goldenring & Purtell, 1984). A behavior analysis

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Table 1
Observational Checklist for Evaluating TSE

1. Gently pulls scrotum so that it hangs freely.
2. Uses fingers and thumbs of both hands to isolate and examine one testicle.
3. Locates the soft tender mass (the epididymis and spermatic cord) on top of and extending behind the testicle.
4. Rotates the entire surface area of the testicle between fingers and thumbs.
5. Uses fingers and thumbs to isolate and examine the other testicle.
6. Locates the soft tender mass on top of and extending behind the testicle.
7. Rotates the entire surface area of the testicle between fingers and thumbs.

approach to self-examination skills for breast cancer, including task analysis, direct observation, objective measurement, and feedback for detection of simulated lumps, has resulted in an effective BSE assessment and teaching package (Fletcher, O'Malley, & Bunce, 1985; Hall et al., 1980). Extending this approach to testicular self-examination is an important behavioral medicine contribution for improving cancer management through early detection.

Perhaps because TSE has been considered easier to teach than BSE, the need for objective validation of training procedures for TSE has been overlooked. Teaching men TSE has been assumed to be accomplished by informational pamphlets and films distributed by specialty organizations or by primary care physicians (American Cancer Society, 1978, 1982; Eaton Laboratories, 1976). These materials provide information about testicular cancer and only general instructions on conducting TSE. Objective studies that document the effectiveness of the pamphlets and films have not been conducted. A pilot study was designed to evaluate a brief educational checklist that specified the steps necessary to conduct a testicular self-examination.

METHOD

Subjects

Subjects were 10 men between the ages of 25 and 35 (mean = 32 years) who were recruited from the Greater Kansas City Metropolitan Area by posted announcements at the University of Kansas. The first 10 men between the ages of 18 and 40 years of age who volunteered were entered into the study. Because of a possible confound due to medical training, medical students, residents, and physicians were ineligible. No requirement for education background was set.

Subjects signed an informed consent document specifying that they would be filmed while conducting a TSE and that the videotape would be numerically coded and stored in a secure location. The study was conducted in the Department of Audiovisual Services television studio at the University of Kansas Medical Center.

Procedure

A brief, specific checklist was developed by the experimenters that listed the exact steps required for completion of a satisfactory TSE ("Steps for Testicular Self-Examination," available from the authors). The checklist was developed from two pamphlets distributed by the American Cancer Society (1976, 1982), discussions with urologists, and observation of the Eaton Laboratories (1976) film.

Each subject was accompanied to the television studio by one of the experimenters. The experimenter explained that cameras were controlled from an adjacent booth and that the subject was able to watch his videotaped session on the monitor located inside the studio. Subjects were shown the place and position to stand during the videotaping and were informed that the camera would film from the navel to the midthigh area only.

For the pretest, the subject was instructed to pull down his pants after the experimenter left the studio and examine his testes to detect testicular cancer. They were given no other instructions. When finished, the subject pulled up his pants. The experimenter then returned and gave the subject the educational checklist. The subject was given the opportunity to ask any questions after reviewing the checklist. After the experimenter answered any questions, the subject was instructed to conduct a TSE by following the checklist steps.

The experimenter left the studio, and the posttest TSE was videotaped.

After the posttest, the experimenter reentered the studio and asked if the subject had detected any lumps, masses, or other problems. Each subject was offered the opportunity to receive an examination by a board-certified urologist to check the accuracy of the self-examination.

Design

A one-group pretest-posttest design (Campbell & Stanley, 1963) was used to evaluate the effects of the training checklist on TSE.

Data Collection

Direct observation of the pre- and posttest videotapes resulted in the percentage of TSE steps completed and the duration of the self-examination for each subject. Seven steps from the educational checklist that were considered crucial for an adequate self-examination were used to score the videotapes (Table 1). The educational checklist included an instructional item about conducting a TSE following a bath or shower when the scrotum is loose and easily examined; this step was not included in the criteria for scoring the study videotapes.

Each subject's pre- and posttest videotapes were randomly ordered on a master tape. The film technician coded the pre- and posttest segments so that, following scoring, each subject's pre- and posttest scores could be matched. The primary observer, who was not informed whether segments were pre- or posttest, scored the randomly ordered segments by noting the occurrence or nonoccurrence of each TSE step. The percentage of steps completed was calculated for each segment. Duration was measured using a stopwatch from the time that the subject first touched his testes or genital area to the end of contact.

Interobserver agreement was assessed by having a second observer independently observe and score a random selection of three pretest and three posttest videotape segments. The second observer's percentages were compared with those of the primary observer to determine agreements and disagreements for each checklist step. Interobserver agreement, calculated by dividing the number of agreements by agreements plus disagreements and multiplying by 100, was 86%.

Social Validation

Two methods were used to socially validate the adequacy of the subjects' self-examinations (Wolf, 1978). First, the randomly ordered TSE videotape segments were rated by a board-certified urologist, who rated each of the 20 segments on the master tape using a 7-point Likert-type scale, with 1 indicating an unsatisfactory TSE and 7 indicating a very satisfactory TSE. The other method was testicular examination by a board-certified urologist following completion of the posttest.

Telephone Interview

Subjects were contacted by telephone approximately 6 months following participation in the study to determine how well they were able to describe the TSE checklist steps, how often they reported performing TSE subsequent to the training, where the TSE was conducted, whether they had contacted a physician about a discovered anomaly, and whether they had discussed TSE or shared the TSE checklist with other men.

RESULTS

The averages and individual scores for the pre- and posttest testicular self-examinations are shown in Figure 1 (left panel). The average percentage of steps completed on the pretest was 35% (range = 0%–57%); the average on the posttest was 97% (range = 85%–100%). The percentages were significantly different, $t(9) = 11.73$, $p < .001$, paired t test.

The average duration of the TSE for the pretests was 16 seconds (range = 4–31) and for the posttests, 46 seconds (range = 17–106), which was a significant increase in duration of the self-examinations, $t(9) = 3.92$, $p < .0035$. Each subject showed an increase in duration of the TSE following training; the increases ranged from 10 to 84 seconds.

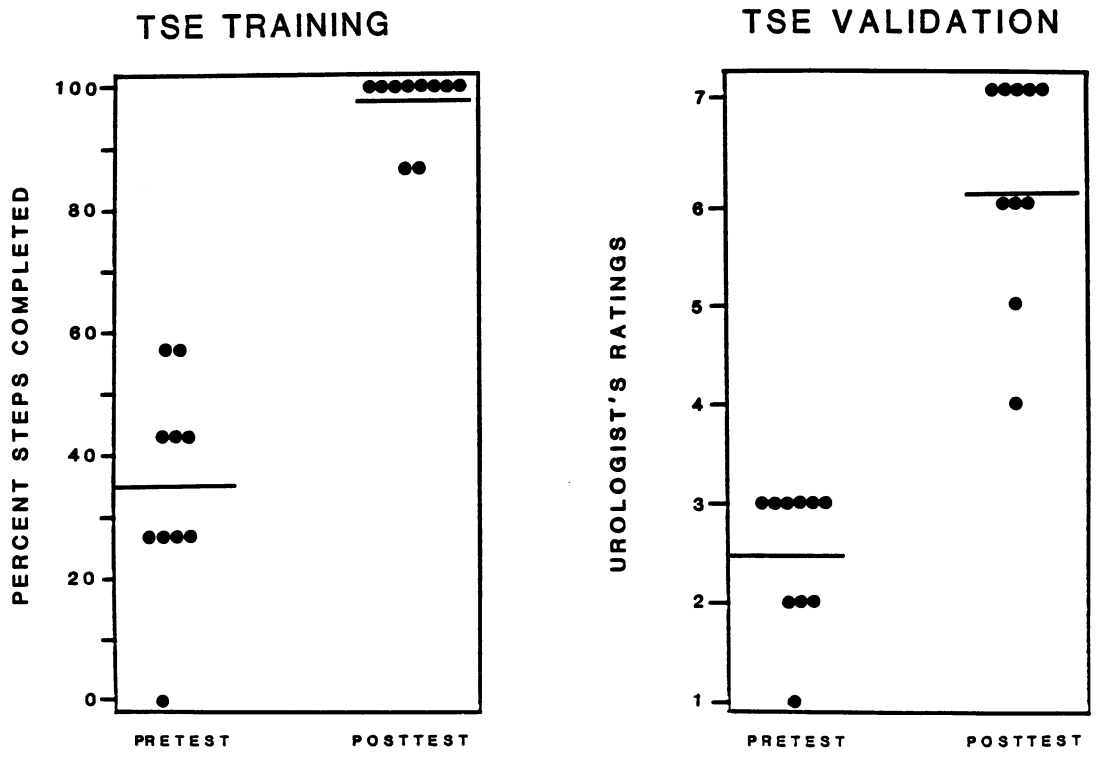

Figure 1. The left panel shows the percentage of steps completed during the pretest and posttest testicular self-examinations. The right panel shows urologist's ratings; 1 = unsatisfactory, 7 = very satisfactory. Data points indicate individual scores or ratings. Horizontal lines indicate condition means.

Figure 1 (right panel) shows the averages and individual ratings from the urologist's social validation of the videotape segments. The average pretest rating was 2.5. The average posttest rating was 6.2. Thus, ratings by the urologist reflected a similar increase in satisfactory testicular self-examinations following the brief educational intervention.

Nine of the 10 subjects reported no detection of lumps, masses, or other anomalies following the posttest TSE. Six subjects chose to receive the examination by the urologist; the other subjects declined and were told to seek a testicular examination from a private physician. The one subject who reported detection of a painful lump was examined by the urologist, who also detected the lump. It was diagnosed as epididymitis, which was treated with an antibiotic. No problems were detected for the other five subjects who received the urological examination.

Seven of the 10 subjects were interviewed by telephone from 5 to 7 months after participation in the study. All seven accurately described the TSE checklist steps and reported continued performance of TSEs while taking a shower or after going to bed. Five subjects reported satisfactory maintenance of TSE: two men reported performing weekly self-exams and three men reported monthly self-exams. Two subjects had performed self-exams less frequently: one man reported an exam every month and the other reported two self-exams in the 6-month follow-up. The men had not detected any anomalies and had not contacted a physician. They also had not discussed or shared the TSE checklist with other men.

DISCUSSION

The results of this pilot study show that dramatic increases in the percentage of TSE steps com-

pleted and significant increases in exam duration occurred following the brief educational intervention. The social validation ratings by the urologist corresponded to these findings and showed that after training, most men were rated as having conducted a satisfactory or very satisfactory TSE.

The posttest self-examinations contrasted sharply with the pretest self-examinations. In the pretest exams, the men conducted few of the steps considered necessary for a thorough exam. They were especially negligent in the crucial step of rotating the testis between the thumb and forefingers. In fact, some of the men did not even examine their testes, but rather examined the scrotal sac and penis. The urologist commented that some men did not spend a sufficient time on the pretest TSEs and that other men spent enough time for a thorough examination, but obviously did not know what to do. Search duration has been associated with increased detection of simulated breast lumps (Fletcher et al., 1985). Validation of a satisfactory search time for detection of testicular problems is needed.

Regular monthly performance of TSE is recommended (American Cancer Society, 1982). Although this study was not designed to investigate variables related to regular and accurate performance, the seven men contacted at follow-up accurately reported the checklist steps. Five of the seven men reported continued performance of self-exams monthly or more often, whereas two men had performed fewer self-exams than recommended. Extensions of this pilot work should investigate strategies for maintaining regular and thorough self-exams, which are crucial for achieving early detection of testicular problems.

This study suggests that a brief and specific educational checklist, when delivered in the context of videotaped performance assessments, increases young men's ability to conduct a satisfactory TSE. Observing the TSE performance on the videotape monitor may have contributed to the checklist's effectiveness. Because one subject detected an anomaly for which a medical examination was needed, the skills identified by the task analysis may be sufficient for men to detect early signs and symptoms of testicular cancer. However, further study is needed to determine the parameters of training required to ensure that anomalies are detected (Fletcher et al., 1985; Stephenson, Adams, Hall, & Pennypacker, 1979). Models of testes with a range of simulated lumps, masses, and other anomalies may be needed to train accurate detection of the early signs of testicular cancer (cf. Hall et al., 1980).

Young men who are most likely to contract testicular cancer are almost completely unaware of its threat to their health or even of the existence of the disease (Cummings et al., 1983). They are also unaware of the relatively simple self-examination procedure that, if performed regularly and thoroughly, could lead to early detection and treatment of testicular cancer (Goldenring & Purtell, 1984). This study showed that a small sample of men were taught satisfactory TSE skills, but only a simple quasi-experimental analysis was conducted. Further research could extend the science of early cancer detection by replicating these procedures across a larger group of men in experimental studies.

Additional strategies are needed to motivate men to perform a monthly TSE; to assess lump detection as a result of training; to maintain the thoroughness of TSE across time; to ensure that medical attention is sought for any suspicious lump, mass, or painful area; and to document the effectiveness of a variety of dissemination methods that reach large numbers of men (e.g., high school physical education and health classes, primary care physicians, health clubs and spas, peer training). Further study of testicular self-examination is needed to document that regular performance of TSE will result in earlier diagnosis and treatment of testicular cancer.

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