Testicular cancer most commonly affects younger males, and its incidence has increased in recent years. There is, however, a lack of data documenting the level of testicular cancer screening by physicians in primary-care settings in the U.S. In this retrospective study over a one-year period, we looked at the prevalence of testicular cancer screening in 200 males ages 18 to 39 in a university-based clinic in Southeast Texas. Thirty-one (15.5%) participants received a testicular examination. Three participants were asked about testicular cancer risk factors, and three had education on screening (one participant had both, for a total of five). Of the three participants receiving screening education, two were taught testicular self-examination by the physician, while the other one was given written materials on screening. These rates of testicular cancer screening are low. Interventions are needed to help improve patient and physician awareness of testicular cancer screening.

Key Words: testicular cancer, disease prevention, preventive health services, self-examination, male

Testicular cancer is the most common cancer occurring in males between 18 and 39 years. The incidence of this cancer has increased over time, almost doubling in the last 20 years (Ries, Kosary, Hankey, Miller, & Edwards, 1998). The American Cancer Society (ACS, 2002) estimates that about 7,500 new cases will be diagnosed this year alone. Treatment for this disease has also improved dramatically during this period (Ries, Miller, Hankey, Kosary, Harras, & Edwards, 1994). Despite testic-
ular cancer currently being one of the most treatable malignancies, 400 males will
die from this disease this year (ACS, 2002).

The fact that the benefit of testicular cancer screening remains controversial may
affect screening rates for this cancer. The major medical organizations differ in their
recommendations for screening. The American Cancer Society (ACS) recommends
testicular examination by a healthcare provider every one to three years, depending
on the patient’s age, as part of a general cancer checkup. It also recommends that
men practice monthly testicular self-examination (ACS, 1993). The American Acad-
emy of Pediatrics (1988) recommends that patients perform testicular self-examina-
tion beginning at age 18. The American Academy of Family Physicians (AAFP) and
the U.S. Preventive Services Task Force (USPSTF) currently conclude that there is
insufficient evidence to recommend for or against routine screening of asymptomatic
men in the general population by either physician examination or patient self-examina-
tion (U.S. Preventive Services Task Force, 1996; Zoorob, Anderson, Cefalu, &
Sidani, 2001). However, the USPSTF does recommend that screening options be dis-
cussed with patients in high-risk groups (U.S. Preventive Services Task Force, 1996).
Risk factors placing a patient in a “high-risk group” for testicular cancer include a
history of any one or more of the following: cryptorchidism (undescended testicle),
orchiopexy (surgical correction of the undescended testicle), testicular atrophy
(degeneration of the testicle), prior diagnosis of mumps, orchitis (inflammation of the
testicle), inguinal hernia, hydrocele (fluid around the testicle), and previous testicular
cancer (American Academy of Family Physicians, 1994).

Accurate information on the prevalence of testicular cancer screening in primary
care is lacking. Studies examining the prevalence of testicular cancer screening have
focused on physician self-reports of their practice of testicular examinations (Misener
& Fuller, 1995; Singer, Tichler, Orvieto, Finestone, & Moskovitz, 1993; Sladden &
Dickinson, 1995), physician self-reported rates of testicular self-examination (TSE)
education (Brenner, Hergenroeder, Kozinetz, & Kelder, 2003; Misener & Fuller,
1995; Sayger, Fortenberry, & Beckman, 1988), or patient self-reported practice of
TSE (Katz, Meyers, & Walls, 1995; Khadra & Oakeshott, 2002; Moore & Topping,
1999; Neef, Scutchfield, Eldler, & Bender, 1991; Wardle, Steptpe, Burckhardt,
Vogele, Vila, & Zarczynski, 1994; Wynd, 2002). The problem with these studies is
that they do not directly measure the actual occurrence of these behaviors. Further, it
is known that self-reported behavior can overestimate the actual behavior (Lipkus,
Rimer, Lyna, Pradhan, Conway, & Woods-Powell, 1996). The purpose of the present
study was to address this gap in the literature by conducting a retrospective chart
review to determine the prevalence of testicular cancer screening performed by
physicians and to determine the prevalence of education given to a population of
young males in a primary-care setting over a one-year period.

METHOD

SETTING AND SAMPLE

A retrospective chart review was conducted after Institutional Review Board (IRB)
approval was obtained. The chart review was conducted at a university-based family

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medicine clinic in Southeast Texas that utilizes an electronic medical record (EMR) system. The clinic has 17 family medicine faculty members and serves as a training site for 36 family medicine residents. Male patients ages 18 to 39 presenting to the university-based family medicine clinic for any reason during a one-year period were identified. We found 678 patients who visited the clinic during this period. We randomly sampled 200 of them using a Microsoft Excel random number generator. This sample size was chosen because it would give 95% confidence intervals based on a hypothesized screening rate of about 20%, based on self-reported screening rates of primary-care practices (Deans & Downey, 1998).

The racial/ethnic breakdown of our sample was 43.5% (n = 87) non Hispanic White, 27% (n = 54) Hispanic, 22.5% (n = 45) African American, and 7% (n =14) Asian. The average age of the subjects was 29.8.

**INSTRUMENT**

Each participant’s electronic medical record (EMR) was reviewed for all visits occurring during the one-year period using a data extraction form specifically developed for this study. Demographic information (e.g., age and ethnicity) was collected together with visit history information (e.g., the number of visits and type of visit), for instance, a well male examination versus a visit for a specific problem. A well male examination or physical is a routine examination performed when the patient is well and the emphasis of the visit is on age-appropriate preventive health issues. Visits were coded as a physical/well male examination if this was (1) stated in the dictation, (2) the patient came in for an annual visit, or (3) a new patient visit was associated with a comprehensive evaluation. Screening was coded as having occurred if the physician documented the performance of a testicular examination at any visit.

**PROCEDURE**

At the time of the patient visit, the physicians dictate all visit information as free text. This dictated information includes a detailed history, physical examination, and an assessment and management plan (including patient education provided to the patient). This information is transcribed by a dictation service, and the physician reviews this information for accuracy before signing off on the note in the EMR.

The note for each visit was searched for evidence of discussion or provision of written materials on testicular cancer risk factors and/or screening (including TSE). Any evidence of discussion or provision of written materials for other types of patient education issues such as healthy lifestyle or preventive health (e.g., diet and exercise) was also noted. All patient visits for each participant during the study period were reviewed since preventive health care in primary-care settings is often discussed during a visit for another reason and/or specific problem (Stange, Zyzanski, & Jaen, 1998).

Inter-rater reliability between the principal investigator (PI) and research technician was established by having each one separately extract information from 10 charts and then checking for differences in coding. Points of disagreement were dis-
cussed and clarified. The process then was repeated for a second set of 10 charts until no further differences were identified. The research technician then continued with extraction of information from the remainder of the charts. During the course of the study, the research technician identified 20 charts that needed coding clarification. Both the PI and the research technician examined these charts to ensure consensual coding.

RESULTS

Of the 200 participants, 47.5% \( (n = 95) \) were new patients to the clinic. Each participant had an average of 2.2 visits over the year (range 1-8), with 26.5% \( (n = 53) \) having a physical or well male examination during this time. Of these 53 well male examinations, 30 occurred in the 95 new patients to the clinic (31.6%) and 23 in the 105 existing clinic patients (21.9%). The remaining 73% \( (n = 147) \) of patients presented to the clinic most commonly with the following symptoms: upper respiratory/ear, nose, and throat (ENT) symptoms; gastrointestinal symptoms; dermatological problems; and musculoskeletal problems.

Overall, 15.5% \( (n = 31) \) of our participants had screening for testicular cancer (see Table 1). Twenty-eight percent \( (n = 15) \) of those having a well male examination received testicular cancer screening, whereas only 11% \( (n = 16) \) of those visiting for another reason received it. If patients presenting specifically for a testicular problem are excluded (total seven), then this latter number drops to six percent \( (9/140) \). Only five participants out of our total sample (2.5%) had a discussion on testicular cancer risk factors \( (n = 3) \) or education on screening \( (n = 3) \) or both \( (n = 1) \). Of the three patients who received education on screening, two were taught TSE by the physician, and another was given written materials on testicular cancer. Only three of these five patients actually received a testicular examination by the physician.

Table 1

<table>
<thead>
<tr>
<th>Type of screening</th>
<th>Total sample ( (N = 200) )</th>
<th>During a well male examination ( (n = 53) )</th>
<th>During a visit for other reasons ( (n = 147) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testicular examination performed</td>
<td>15.5% ( (31) )</td>
<td>28.3% ( (15) )</td>
<td>10.8% ( (16) )</td>
</tr>
</tbody>
</table>

Table 2 shows the frequency of testicular cancer screening education compared with other areas of other patient education (e.g., diet and exercise) given to this patient population. None of the participants that were screened for testicular cancer were found to have testicular cancer.
Table 2

Rates of Documented Patient Education

<table>
<thead>
<tr>
<th>Type of education</th>
<th>Total sample (N = 200)</th>
<th>During a well male examination (n = 53)</th>
<th>During a visit for other reasons (n = 147)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% (N)</td>
<td>% (n)</td>
<td>% (n)</td>
</tr>
<tr>
<td>Testicular cancer screening and/or discussion of risk factors</td>
<td>2.5% (5)</td>
<td>3.7% (2)</td>
<td>2% (3)</td>
</tr>
<tr>
<td>Diet</td>
<td>18% (36)</td>
<td>20.7% (11)</td>
<td>17% (25)</td>
</tr>
<tr>
<td>Exercise</td>
<td>16% (32)</td>
<td>24.5% (13)</td>
<td>12.9% (19)</td>
</tr>
</tbody>
</table>

DISCUSSION

Our study at a university-based, family medicine clinic revealed a low prevalence of screening for testicular cancer and even lower rates of patient education regarding this type of cancer. Only 1% (n = 2) of the patients were taught testicular self-examination (TSE) by a physician, and just one patient received literature on the subject. Education on diet and exercise was documented more frequently. These findings are important since physician recommendation for screening is considered to be a major influence in educating patients about the importance of screening (Vernon, 1997). Further, this study is unique in that it directly measured the rates of testicular cancer screening prevalence by medical record review. Although other studies have attempted to measure rates of testicular cancer screening, they have done so indirectly. Two studies (Singer et al., 1993; Sladden & Dickinson, 1995) describe physician self-reported practice of routine testicular examination as an indicator of actual screening and report rates of 10% and 21%. However, these are likely to be overestimates of actual rates, since it is known that physicians tend to overestimate actual screening behavior (Zack, DiBaise, Quigley, & Roy, 2001). Studies using physician-reported rates of teaching of TSE as a measure of screening prevalence (Brenner et al., 2003; Misener & Fuller, 1995; Sayger et al., 1988) have found these rates to be 18-40%. This again relies on physician-reported behavior and is likely to be over-reported; furthermore, teaching of TSE does not mean that patients regularly or correctly perform the examination. Indeed, studies assessing rates of TSE by patients as a measure of screening prevalence find rates to be between 2-36% among patient and community samples (Khadra & Oakeshott, 2002; Moore & Topping, 1999; Neef et al., 1991; Singer et al., 1993; Wardle et al., 1994; Wynd, 2002). Again, patient-reported rates may not be accurate (Lipkus et al., 1996).

Notwithstanding methodological issues, clearly the prevalence of screening for testicular cancer is poor. The possibility exists that there were other potential sources of information on testicular cancer for our patients, for instance, magazines, the World Wide Web, and television that may have provided additional material for
our participants. However, studies investigating patient knowledge of this cancer consistently report low awareness (Katz et al., 1995; Mackey, Nacey, & Delahunt, 1994; Moore & Topping, 1999; Rodriguez, Velez, Serrano, & Casado, 1995; Wardle et al., 1994). This lack of awareness may mean that patients do not request screening themselves. Low screening prevalence may also be due to physician hesitancy in broaching the subject, patient reluctance, or a combination of all three factors. The case for mass screening may not be compelling based on current evidence, but the need for education and appropriate screening in this age group is crucial in educating young males about the importance of preventive health. The USPSTF currently argues for, and the AAFP has argued for in the past, the targeted screening of high-risk groups (American Academy of Family Physicians, 1994; U.S. Preventive Services Task Force, 1996). Since only three of the 200 participants had a documented discussion on risk factors for testicular cancer, physicians seem to be failing even to define this “high-risk group” in our clinical setting.

Limitations of this study include the lack of generalizability of our findings to other settings; further, the one-year period may not be adequate, as some subjects may have been screened outside our study time frames or in other settings. Other limitations include an under-documentation of patient education by the physician, although we believe this is less of a problem in this study because of our free-text dictation system and the expectation that all patient education issues are recorded in the dictation. The strengths of our study are twofold: first, the inclusion of the three major racial/ethnic groups residing in the United States, and second, the examination of the full age range of patients at higher risk from this cancer. The study is thus not limited to the adolescent/pediatric age range of patients.

This study shows that rates of screening and patient education for testicular cancer remain low, even during complete physical/well male examinations. Our study needs to be replicated with larger samples in different settings to see if testicular cancer screening is adequately addressed in other primary-care clinics. Physician characteristics associated with performance of testicular cancer screening need to be explored. An improved understanding of physician and patient knowledge about testicular cancer issues will aid the development of interventions to improve screening rates and thus help lessen the morbidity and mortality from this cancer.

REFERENCES


