High-Risk Men’s Use of PSA Test

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\textbf{Purpose}: The Prostate-Specific Antigen (PSA) test was developed for early detection of prostate cancer. The U.S. Preventive Services Task Force (USPSTF) recommends against the use of PSA testing for men in the general U.S. population. The arguments made by the USPSTF apply to the general population with average risk, as opposed to men with increased risk, such as men with the BRCA 1 or 2 mutations. This study aimed to investigate utilization levels of the PSA test among high-risk men and identify if the test was recommended to them by their physicians.

\textbf{Methods}: Data were gathered from a previous survey and men who answered ‘yes’ to having had a genetic test for hereditary cancer (n=63) in the past were considered high-risk. \textbf{Results}: Only 58.7\% of high-risk men were recommended for the PSA test by their doctor or healthcare provider. The investigation also revealed approximately half (50.79\%) of high-risk men had utilized the PSA test.

\textbf{Conclusions}: Although the PSA test is an effective long-term diagnostic tool, it is utilized by about 50\% of men who meet the criteria for being at high-risk for developing prostate cancer and physician recommendation is sub-optimal among high-risk men.


Prostate Cancer | PSA Test | BRCA

In May 2012, the U.S. Preventive Services Task Force (USPSTF) updated their 2008 recommendation against the use of the Prostate-Specific Antigen (PSA) screening for men 75 years and older to include men in the general U.S. population of all ages [1]. However, this recommendation did not address men who have hereditary risk for developing prostate cancer such as those with Hereditary Breast Ovarian Cancer syndrome (HBOC) or BRCA mutations. While HBOC is most commonly associated with an increased risk of breast and ovarian cancer in women, men with HBOC also have an increased risk of prostate cancer. PSA measurements can be useful for men with hereditary risk by measuring changes in PSA over time and by using it as a screening tool in combination with findings on a digital rectal examination and, if deemed necessary, prostate biopsy.

Since most tests for prostate cancer include testing for PSA levels and the risk of dying from prostate cancer is small (2.8\%), the USPSTF concluded that performing additional PSA tests leads to “over diagnosis”. This over diagnosis may unnecessarily burden men with further risky tests and possibly unnecessary treatment.

Though the risk of developing cancer in men is present when mutations in both \textit{BRCA} genes occur, \textit{BRCA2} gene mutations are more strongly associated with male breast, pancreatic and prostate cancer [2]. Approximately 75.5\% of \textit{BRCA2} mutation carriers and 58.7\% of non-carriers have high-risk disease [3].

An advantage in using the PSA test is that it may provide an opportunity for early detection and subsequent intervention in high-risk men. Research suggests that if repeat PSA tests are used, men with high-grade disease show a PSA level increase of 5\% or more, while those without prostate cancer showed a decrease of 4\% or less [4]. Monitoring changes in PSA levels over a 7-week period were done in men with PSA levels between 3.0ng/ml to 19.99ng/ml because men within these ranges have a 23.9\% risk of developing prostate cancer [4]. Chandrasekharan et al monitored increasing PSA levels in patients; the detection rate was 3.74\% for all patients, 5.48\% with PSA testing and 20.9\% of those patients with abnormal PSA levels [5]. These data support the use of PSA level monitoring of high-risk patients to have an early detection of potentially aggressive forms of prostate cancer. The focus of this investigation was to examine concordance between the level of recommendation of PSA testing by physicians and uptake levels of the PSA test in high-risk men.

\textbf{Methods}

\textbf{Survey and Procedures} During the time period of November 2008 to May 2009, recruiting emails were sent to the Facing Our Risk of Cancer Empowered (FORCE) list-serve members and information about the web-based survey was placed on their website. FORCE is an international web-based community of women, men and loved ones with a personal or family history of \textit{BRCA}. To ensure broad geographic representation, advertisements were also placed in 26 states and cities on Craigslist (a website for classified advertisements). Initial responses were collected through Moffitt’s Survey Methods Core [8]. The results of this investigation were derived using a subset of data from a larger study exploring men’s perceptions and attitudes toward Preimplantation Genetic Diagnosis (PGD) among families with a BRCA mutation [8]. As an incentive, respondents had the option of participating in a drawing for a $25 gift card. The 41-item online survey assessed: Demographics; Clinical characteristics; PSA physician recommendation; PSA uptake; Genetic counseling/testing (personal and familial); Perceptions of PGD; Attitudes toward PGD; Previous PGD usage and Preferred source of PGD information. This current study assessed responses to the items pertaining to Demographics; Clinical characteristics; PSA physician recommendation and PSA uptake.

Responses were separated into categories of men who indicated they had a genetic test for hereditary cancer in the past (n=63), and those who had not (n=164). Men who answered ‘yes’ to having had a genetic test in the past were considered high-risk for the purpose of this investigation. The investigation focused on the relevant questions answered by these high-risk men.

Additional demographic information such as race, marital status, education level and religious affiliation were also included. Data analysis included descriptive statistics using SPSS (Version 17.0).

\textbf{Results} The high-risk males (n=63) in this study were mainly non-Hispanic (90.6\%), White (70.3\%), Married (46.9\%), College Graduates (54.7\%), Protestants or Catholics (59.4\%) and had Health Insurance (71.9\%).

Table 1 shows whether high-risk males reported physician recommendation for PSA testing. Fifty nine percent (58.7\%) of high-risk men were recommended for the PSA test by their doctor or healthcare provider, while 31.7\% were not. Among the 31.7\% of high-risk men not recommended for a PSA test, 20.0\% tested positive for a gene that may put them at increased risk for hereditary cancer. Among those with a VUS result, 40.0\% reported not getting physician recommendation.

Table 2 shows whether high-risk males had a PSA test. Fifty one percent (50.79\%) of high-risk men that did not have the option of participating in a drawing for a $25 gift card. The 41-item online survey assessed: Demographics; Clinical characteristics; PSA physician recommendation and PSA uptake.

Table 2 shows whether high-risk males had a PSA test. Fifty one percent (50.79\%) of high-risk men that did not have a PSA test, 17.2\% tested positive for a gene that may put them at increased risk for hereditary cancer. Among those with a VUS result, 44.8\% reported not having a PSA test.

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Discussion

In this investigation, an important distinction must be made in the definition of ‘high-risk’. Men classified as ‘high-risk’ were those who had their blood drawn by a nurse or healthcare professional to see if they carried a gene that may put them at increased risk for hereditary cancer (i.e. those men who answered ‘yes’ to survey question 16). Due to recent studies suggesting high-risk men who carry a BRCA mutation are prone to developing aggressive forms of prostate cancer, physicians should consider discussing and recommending PSA testing for this group. Rather than initiating invasive prostate biopsies, monitoring PSA levels through repeated tests over several weeks may prove to be more beneficial to high-risk men [4]. The results of this investigation show (See Table 1) that although the majority (58.7%) of high-risk men were recommended for a PSA test; others (31.7%) were not. This potentially means that men not recommended risk late or no detection of prostate cancer, which may lead to a poorer prognosis.

Apart from being recommended for a PSA test, the results of this investigation revealed how many of these high-risk men actually had a PSA test. Table 2 shows that 50.79% of high-risk men had a PSA test while 46.03% did not have a test. The data also showed that 17.2% of men who did not take the PSA test were positive for a gene that may put them at increased risk for hereditary cancer. Once again, the data revealed possible cases where men who should be undergoing adequate prostate cancer screenings failed to do so.

There are many studies that include a record of PSA test uptake in high-risk men; these studies, of course, have their own definition of high-risk. One study by Arras-Boyd et al classified high-risk men as African-Americans and men without healthcare access [6]. In the Arras-Boyd et al study, 49.3% of men who had been screened for prostate cancer previously had a PSA test. Another study by Mitra et al classified men at high-risk as those who had a mutation in the BRCA1 or BRCA2 genes [7]. The study by Mitra et al revealed the PSA test uptake rate for men with the BRCA2 mutation was 49%, while for the BRCA1 mutation it was 35% [7]. The results of the uptake rate among men with a BRCA1 mutation were substantially lower than reported in other studies. This could be due to the fact that BRCA1 mutations have a small effect on the increase of cancer risk as compared to BRCA2 mutations. We compared our results to those obtained in the 2000 National Health Interview Survey. The Survey reported that men with no history of prostate cancer and above 50 years old, 56.8% had a PSA test, 34.1% had a test during the previous year and 30% had three or more in the last 5 years [10]. These results are similar to ours.

It can be assumed there are additional factors, which may account for uptake of the PSA test beyond physician recommendation. Many studies, such as Malmi et al, investigated the attitudes and perceptions of men who decided to opt-out of prostate cancer screenings. The results of this ‘attitudes’ investigation revealed that about 39% of the men who responded indicated they opted-out of the prostate-cancer screening because they did not want to think about prostate cancer and 28% reported they opted-out because they feared the unpleasant experience of further diagnostic examinations [9]. These results indicate the need to further educate high risk men about the benefits of prostate cancer screening and available support.

An alternative way to investigate why many high-risk men do not participate in the PSA test is to consider their views on genetic tests in general. The study by Quinn et al explored the attitudes of men with a known BRCA mutation or those with a partner or first degree relative with the mutation, towards PGD. Quinn et al concluded that when men think of the PGD test in terms of ‘health and safety’ they are about three times more likely to consider the test than if they thought of the PGD test in terms of ‘health and safety’ and ‘religion and morality’ [8]. The implication of this is that religious views can decrease the willingness of men to participate in genetic testing and if this is persistent, it may increase the risk of prostate cancer being undiagnosed in these men.

Limitations of this study include a small sample size, which may impact the size of the range of error. Another limitation was a lack of racial/ethnic diversity; a more heterogeneous sample may have yielded different results particularly among African-Americans [6]. We also did not ask respondents if they had other forms of testing such as a prostate biopsy. Also, we did not have the ability to conduct a follow up investigation to identify if any of the men with the VUS/Inconclusive genetic test result developed a hereditary cancer in the future.

Conclusions

In conclusion, using a unique definition of ‘high-risk men’, this investigation revealed the rate of the PSA test uptake among these men is consistent with the results of other studies. These results add to the argument that although the PSA test is an effective long-term diagnostic tool, it is only being utilized by about 50% of men who meet the criteria for being at high-risk for developing prostate cancer. It is essential that steps be taken to increase the participation rate of the repeat PSA test by men thought to be at higher-risk for developing prostate cancer. The benefits of PSA testing over performing immediate biopsies include reduced health risks, reduced costs and maintaining long-term psychological well-being. This study revealed a large amount of men who had a genetic test result of ‘VUS/Inconclusive’ were not recommended for a PSA test by their physicians (40%) or never had a PSA test (44.8%). Future studies should investigate if any of these men are eventually diagnosed with prostate cancer.

Table 1. Physician Discussion in relation to Genetic Test Result

<table>
<thead>
<tr>
<th>Did Physician Recommend a PSA Test?</th>
<th>Genetic Test Result*</th>
<th>VUS/ Inconclusive/ Don't Know/ Prefer not to answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Don't Know/Prefer not to answer</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

*Due to non-responses, the valid percentage for each table may not equal 100%.

Table 2. PSA Uptake in relation to Personal Risk

<table>
<thead>
<tr>
<th>Did you take a PSA Test?</th>
<th>Genetic Test Result*</th>
<th>VUS/ Inconclusive/ Don't Know/ Prefer not to answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Don't Know</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*Due to non-responses, the valid percentage for each table may not equal 100%.
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