

ORIGINAL ARTICLE

Sexual function following radical prostatectomy: a prospective longitudinal study of cultural differences between Japanese and American men

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We conducted a cross-cultural comparison of the recovery of sexual function and bother during the first 2 years after radical prostatectomy (RP) between American and Japanese men. A total of 275 Japanese and 283 American men who underwent RP alone were prospectively enrolled into longitudinal cohort studies of health-related quality of life outcomes. Sexual function and bother (distress) were estimated with English and validated Japanese versions of the UCLA Prostate Cancer Index before RP and 1, 2–3, 4–6, 12, 18 and 24 months after RP. Each subject served as his own control. Japanese men reported lower sexual function scores at baseline, even after adjusted for age, prostate-specific antigen (PSA) and comorbidity (38 vs 61, $P < 0.001$). The two groups had similar baseline sexual bother (70 vs 69, $P = 0.84$). Japanese men had a smaller improvement in sexual function ($\beta = 0.8$ vs $\beta = 5.3$) and bother ($\beta = 0.2$ vs $\beta = 2.9$) over time than did the American men postoperatively, after adjusting for baseline score, age, baseline PSA and nerve-sparing. American men were more likely than Japanese men to regain their baseline sexual function by 24 months after surgery (hazard ratio (HR) = 1.60; 95% confidence interval (CI) = 1.06–2.42). In contrast, American men were less likely than Japanese men to return to baseline sexual bother (HR = 0.57; 95% CI = 0.44–0.75). This study demonstrates that Japanese and American men experience different patterns of recovery of their sexual function and bother after RP. Ethnicity may be a contributing factor.

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Introduction

Radical prostatectomy (RP) is a standard treatment for patients with localized prostate cancer and a life expectancy of more than 10 years who accept the risk of treatment-related complications.¹ Erectile dysfunction (ED) represents a principal source of postoperative adverse events for patients who have undergone RP. Several cross-national surveys have shown that ED is more prevalent in Japanese men than in men from other countries, suggesting cultural differences in the perception of sexual function and its importance.² Race and ethnicity are important factors in health-related quality of life because of their impact on satisfaction with care.

Ethnic comparisons of sexuality after prostate cancer treatment have been limited to studies of non-Hispanic whites, African-Americans and Hispanics in the United States.³ Disparities in sexual function among Asian men treated for prostate cancer have not been fully explored. Even across Asia, attitudes and behaviors vary a great deal among Chinese, Japanese, Korean and other cultures.

This study provides the first cross-cultural comparative data on the recovery trajectory of sexual function and bother between American and Japanese men during the first 2 years after RP.

Materials and methods

Subjects

Between June 2001 and December 2002, 324 Japanese men with localized prostate cancer (cT1-T3N0M0) who

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underwent RP enrolled in a longitudinal outcomes study. The men were treated at Tohoku University Hospital, two of its affiliated hospitals and Kurashiki Central Hospital. RP in Japan was performed by 15 staff urologists or under their supervision. Between 1999 and 2003, 307 American men with localized prostate cancer (cT1-T3N0M0) who underwent RP at the University of California Los Angeles, also enrolled in a longitudinal outcomes study. In both groups, indications for nerve-sparing depended on preoperative (the number and Gleason score of the positive biopsies, serum prostate-specific antigen (PSA) and patient preference) and intra-operative (surgeon's discretion) factors, prioritizing cancer control over nerve preservation. Recruitment was consecutive. All recruitment and study protocols were approved by the respective institutions' Human Subjects Committees.

Outcome measures

Sexual function and bother (distress over sexual dysfunction) were measured with the UCLA Prostate Cancer Index. Each Prostate Cancer Index domain is scored from 0 to 100 points, with higher scores representing better outcomes.⁴ A previously validated Japanese translation of the questionnaire was used in Japan.⁵ Questionnaires were administered at seven time points, beginning with a baseline (t0) survey completed at home within the month before surgery, and returned in postage-prepaid envelopes. All subjects were aware of their cancer diagnosis prior to completing the baseline questionnaire. Follow-up surveys were completed at 1 (t1), 2–3 (t2), 4–6 (t3), 12 (t4), 18 (t5) and 24 (t6) months after RP.

Statistical analysis

Demographic and clinical variables were compared with χ^2 analysis. For multivariate analyses, we first conducted an analysis of covariance to compare the sexual function and bother scores of both groups at baseline and at each follow-up, adjusting for age, baseline serum PSA and type of nerve-sparing procedure (none, unilateral or bilateral, with none as the reference group). PSA was dichotomized at less than or at least 10 ng ml⁻¹. We used a Bonferroni correction of $\alpha = 0.05/7 = 0.0071$ to adjust for multiple comparisons across time. Next, we performed repeated-measures analyses with linear mixed models to estimate the rate of change in both sexual domains, minimizing the effect of missing data and controlling for baseline scores, age, baseline PSA and type of nerve-sparing. Finally, we assessed sexual function and bother using the principles of survival analysis with Cox proportional hazard models to characterize recovery trends. We created models based on the occurrence of each subject's return to his own baseline score. A subject was considered to have returned to baseline if his domain score was at least 90% of his baseline. Once a subject returned to baseline, his time to return was censored. All statistical analyses were performed with SAS 9.0 (SAS Institute, Cary, NC, USA).

Results

Surveys were sent to 324 and 307 men in the Japanese and American groups, respectively. We excluded 49

Japanese and 24 American men who received androgen ablation before or after surgery, leaving 275 Japanese and 283 American men for this analysis.

Table 1 presents selected demographic and clinical characteristics of the study samples. The American men were younger, had a lower mean pre-biopsy PSA and had earlier clinical T-stage tumors and lower biopsy Gleason scores. The American men were more likely than the Japanese men to undergo nerve sparing. Although comorbidity counts were similar between groups ($P = 0.82$), fewer American than Japanese men reported a history of cardiovascular disease or diabetes (2.8 vs 7.2% and 4.5 vs 10.1%, respectively). Response rates varied from 79 to 100% at each time point.

Figure 1 presents adjusted mean domain scores at each time point. The Japanese men had worse sexual function scores than the American men before RP (40 vs 59, $P < 0.01$). Although both groups declined substantially at 1 month and improved over the next 24 months, both group means were lower than baseline at all post-operative time points. After 1 month, the American men had better mean sexual function scores than did the Japanese men at all subsequent assessments ($P < 0.01$).

Table 1 Demographic and clinical characteristics of the study sample ($n = 558$)

No. of patients	Japan, 275 (%)	US, 283 (%)	P-value
<i>Age at survey (years)</i>			<0.001
Mean \pm s.d.	67.2 \pm 5.6	59.9 \pm 7.1	
Median	68	61	
Range	47–81	40–75	
<i>PSA at diagnosis (ng ml⁻¹)</i>			0.003
Mean \pm s.d.	8.9 \pm 8.2	7.1 \pm 6.2	
Median	7.1	6.0	
Range	2.6–111	0.2–50	
<i>Clinical tumor stage</i>			<0.001
T1	150 (55)	200 (71)	
T2	112 (41)	81 (29)	
T3	13 (5)	2 (1)	
<i>Gleason score</i>			<0.001
≤ 6	105 (38)	203 (72)	
≥ 7	170 (62)	80 (28)	
<i>Nerve-sparing</i>			<0.001
Bilateral	61 (22)	233 (82)	
Unilateral	131 (48)	28 (10)	
None	83 (30)	22 (8)	
<i>Comorbidity count^a</i>			0.819
0	97 (35)	106 (37)	
1	107 (39)	102 (36)	
2	49 (18)	48 (17)	
3 or more	22 (8)	27 (10)	
<i>Ethnicity</i>			—
White	—	238 (84)	
Black	—	6 (2)	
Hispanic	—	6 (2)	
Asian	275 (100)	13 (5)	
Multi-racial	—	3 (1)	
Other	—	17 (6)	

Abbreviation: PSA, prostate-specific antigen.

^aComorbidity checklist includes hypertension, stomach, intestinal and gastrointestinal diseases, heart disease, cancer (other than prostate), lung disease, diabetes, stroke and blood disease.

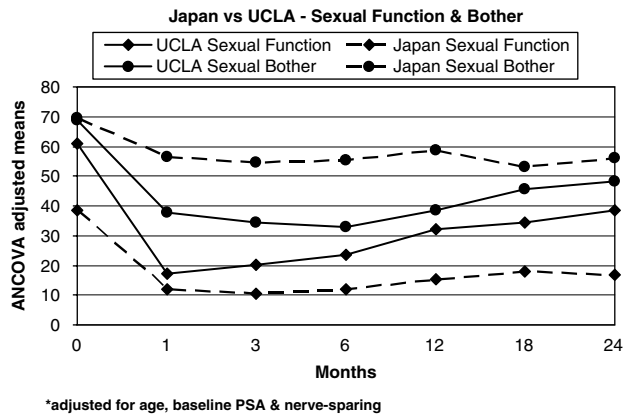


Figure 1 Longitudinal changes in sexual function and bother over time in Japanese and American men, adjusted for age, PSA and nerve-sparing.

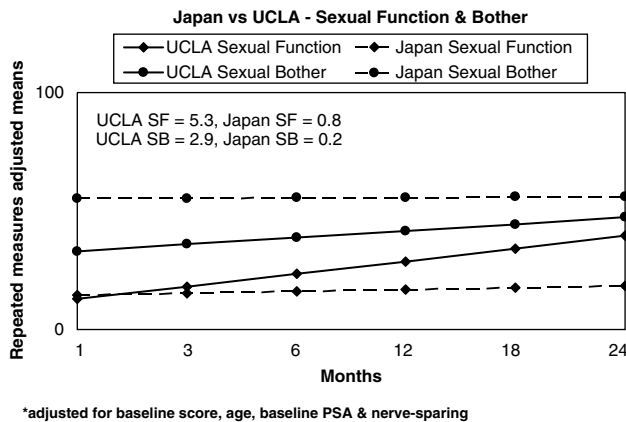


Figure 2 Repeated-measures analysis of sexual function and bother in Japanese men and American men, adjusted for age, PSA and nerve-sparing.

With regard to sexual bother scores, Japanese and American men did not differ at baseline (70 vs 68, $P=0.64$). After RP, the Japanese men demonstrated significantly equivalent or better sexual bother scores (less distress) than did the American men at all postoperative time points. Both groups showed worse sexual bother scores (more distress) than at baseline throughout the postoperative follow-up.

We noted a significant difference in postoperative trends between the Japanese and American men (Figure 2). Adjusting for baseline sexual function, age, baseline PSA and type of nerve-sparing, the Japanese men had smaller improvements in sexual function over time than did the American men ($\beta=0.8$ vs $\beta=5.3$). We noted a similar pattern for sexual bother ($\beta=0.2$ vs $\beta=2.9$).

Figures 3a and b present Kaplan–Meier curves representing the proportion of men who returned to their own baseline sexual function or bother score. At 2 years postoperatively, 22% of Japanese men and 35% of American men had fully returned to baseline sexual function. Among those who did return to their own baseline, the adjusted mean recovery time was 9.3 months for the Japanese men and 10.3 months for the American men ($P=0.56$). American men tended to regain their baseline sexual function more rapidly than

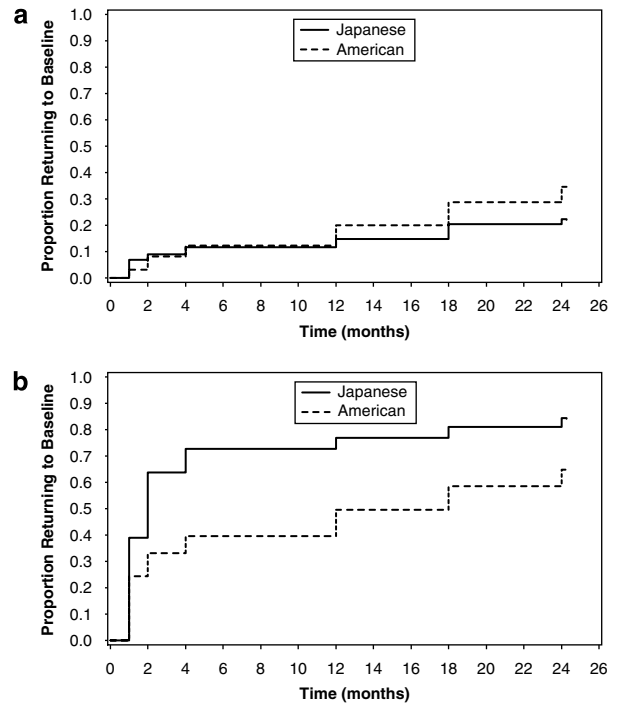


Figure 3 Kaplan–Meier analysis of the proportion of subjects returning to baseline sexual function (a) and sexual bother (b) scores over time.

Japanese men (hazard ratio (HR) = 1.503; 95% confidence interval (CI) = 0.98–2.29). Older subjects were somewhat less likely than younger subjects to return to baseline sexual function (HR = 0.97; 95% CI = 0.94–0.99). The higher the baseline sexual function score, the less likely men were to return to their own baseline sexual function (HR = 0.974 per point of baseline sexual function score; 95% CI = 0.967–0.980). Bilateral nerve-sparing made a significant contribution to the recovery of sexual function (HR = 2.65, 95% CI = 1.52–4.60), while baseline PSA and unilateral nerve-sparing did not. When the analysis was restricted to only those subjects who underwent nerve-sparing, the HR for the cross-national comparison increased from 1.50 to 2.24 (95% CI = 1.47–3.40). By 1 year postoperatively, more than 76% Japanese men had reached baseline sexual bother, but there was little additional recovery after 12 months. Adjusted mean recovery time was 3.3 months for the Japanese men and 6.5 months for the American men ($P<0.01$). Multivariate modeling revealed that American men were less likely than Japanese men to return to their baseline sexual bother (HR = 0.59; 95% CI = 0.44–0.78). As with sexual function, the better the baseline sexual bother score (less distress), the less likely men were to return to their own baseline (HR = 0.985 per point of baseline sexual bother score; 95% CI = 0.981–0.989). Sexual bother was not significantly associated with age, baseline PSA or nerve-sparing.

Discussion

We found significant racial/ethnic variations in the recovery of sexual function and bother up to 24 months

after diagnosis among the men who underwent RP. First, Japanese men reported worse sexual function scores at baseline, even after adjustment for age, PSA and comorbidity. In contrast, no significant difference was observed in sexual bother scores between the two groups at baseline. Masumori *et al.*⁶ examined the decline in sexual function with age in Japanese and American men using a self-administered questionnaire. In their study, ED and decreased libido were noted in a greater proportion of Japanese than American men. Population-based data in Japan indicate that the proportion of ED was 20, 42 and 64% for ages 50–59, 60–69 and 70–79, respectively, all higher than in other countries.^{7,8} Our results also suggest that discussion of sexually related topics may still be repressed in Japanese patient–doctor encounters. According to the Global Survey of Sexual Attitudes and Behavior, people in East Asia were the least likely to talk to their doctor about sexual problems, although they reported higher ED rates than in Western countries.⁹ Among those who do not seek treatment, younger men seem to believe that their ED will resolve spontaneously, while older men resist seeking treatment, because they feel ED is a natural part of aging. In addition, while erectile rigidity contributes to the frequency of sexual intercourse, it is not necessarily associated with a satisfactory sexual life in the Japanese men's partners.¹⁰ These factors appear to impact the discrepant sexual function and bother among Japanese men.

Second, Japanese men recovered less of their sexual function scores than did American men following RP, even after adjustment for age, PSA and nerve-sparing. This suggests that their sexual behavior, or possibly socio-cultural or ethnic differences, may contribute to the reported recovery of sexual function. Stephenson *et al.*¹¹ noted that 51% of 1977 men who underwent RP or radiotherapy for prostate cancer ever used ED treatment at 5 years. In the eastern Asian countries, most took no action because of the belief that ED is not a medical issue.¹² Although Japanese beliefs regarding sexual dysfunction have changed considerably in recent years, discussion of sexually related topics continues to be uncommon in Japanese patient–doctor encounters. In fact, the most commonly cited reason for not self-referring to a doctor is that sexual problems are not medical problems.⁹ Conversely, American men may seek help from the partner, family members or other sources of social support with regard to ED after prostate cancer treatment.¹³ These studies illustrate a discrepancy between Japanese and American men's motivation to seek treatment for ED following prostate cancer treatment. Our Kaplan–Meier analysis suggests that the proportion of Japanese men who return to baseline was similar at every time point until 12 months. This may be because the baseline sexual function scores of the American men were much higher than those of Japanese men; hence, it took more time to return to baseline. After that, American men were more likely to return to baseline sexual function.

Third, we found a trend suggesting that the Japanese men were more likely than the American men to return to their baseline levels of sexual bother (distress). Moreover, return-to-baseline analyses revealed more rapid recovery of baseline sexual bother in the Japanese men than in the American men. These findings are

consistent with other reports that elderly Japanese men, unlike their American counterparts, do not report dissatisfaction with their sex life.¹⁴ Most Japanese men feel that ED is a natural part of aging and may view post-operative ED as a normal side effect of cancer treatment. Thus, they tend to accept their deterioration and not seek help. Contrary to Japanese men, the American men express distress from post-operative ED. This is consistent with other reports documenting the great weight sexual dysfunction carries with many American men.¹⁵ However, it is notable that the Japanese sexual bother scores were lower than baseline at all postoperative time points, also reflecting dissatisfaction with the delayed recovery of sexual function after RP. Recent studies have reported various approaches regarding the implementation of penile rehabilitation programs, their initiation time, the frequency of application, the type of vasoactive agents and the dosage regimen, but currently no consensus exists.^{16,17} Hence, early initiation of rehabilitation protocols after RP may promote the speed and degree of recovery of erectile function.

There are several important potential limitations to this study. First, this group is not a random sample and might not be representative of all men undergoing RP. Second, we did not distinguish those men who used erectile aids such as type 5 phosphodiesterase inhibitors or vacuum devices after RP. These factors may be significant predictors of sexual function recovery. Third, although the preoperative clinical stage and Gleason scores were different between the two groups, we could not control for them in the multivariate analyses because of differing application patterns of the T-stage criteria in the two countries, potentially introducing ascertainment bias. Fourth, a 24-month survey was not completed by 21% of those who completed a baseline survey. However, this rate was comparable with previous works^{18,19} and is unlikely to have introduced bias. Finally, health-related quality of life and patient satisfaction may also depend on factors such as patient counseling, which are more difficult to measure.

Despite these limitations, our cross-cultural comparative study may be helpful in counseling patients about therapy decisions for newly diagnosed, localized prostate cancer. Different cultures have different concepts of health, sexuality, well-being, illness and disease. Even using validated survey instruments, we must remain aware that cross-cultural issues may significantly impact data collection and clinical assessment.

Conclusions

Japanese and American men show different patterns of sexual recovery after RP. In the absence of an underlying biological explanation for cross-national differences in sexual function, we suspect that ethnicity and cultural differences play a significant role in the perception of sexual function and related distress.

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