Published in final edited form as:

Breast Cancer Res Treat. 2013 February ; 137(3): 829–836. doi:10.1007/s10549-012-2387-8.

Adherence to Adjuvant Hormone Therapy in Low-income Women with Breast Cancer: The Role of Provider-Patient Communication

Yihang Liu, MD, MA, MS¹, Jennifer L. Malin, MD, PhD², Allison L Diamant, MD, MSHS³, Amardeep Thind, MD, PhD⁴, and Rose C Maly, MD, MSPH¹

¹Department of Family Medicine, David Geffen School of Medicine at University of California, Los Angeles, California

²Division of Hematology-Oncology, VA Greater Los Angeles Healthcare System

³Department of Medicine, David Geffen School of Medicine at University of California, Los Angeles, California

⁴Department of Family Medicine, Department of Epidemiology and Biostatistics, University of Western Ontario

Abstract

Purpose—To assess the impact of patient-provider communication on adherence to tamoxifen (TAM) and aromatase inhibitors (AI) 36 months after breast cancer (BC) diagnosis in a low-income population of women.

Methods—California statewide surveys were conducted among 921 low-income women with BC at 6-, 18-, and 36-months after BC diagnosis. A subset of 303 women with stage I–III BC who initiated hormone treatment after diagnosis was identified. Bivariate and multivariate logistic regression analyses were performed, and adjusted adherence rates were calculated. The main outcome measure was self-reported hormone use at 36 months after BC diagnosis and the chief independent variables were patient-centered communication after diagnosis by patient report as measured by the Consumer Assessment of Healthcare Providers and Systems (CAHPS) and patients' self-efficacy in patient-physician interactions (PEPPI).

Results—Overall adherence to TAM/AI was relatively high (88%). Adjusted rates of adherence were 59% and 94% for patients with the lowest vs. highest scores on the CAHPS communication scale (AOR=1.22, P=0.006) and 72% vs. 91% for patients with the lowest and highest rating of PEPPI (AOR=1.04, P=0.04). Having at least one comorbid condition also increased the odds of adherence to hormonal therapy (AOR=3.14, P=0.03). Having no health insurance and experiencing side-effects from hormone treatment were barriers for adherence (AOR=0.12, P=0.001; AOR=0.26, P=0.003, respectively).

Conclusions—Patient-centered communication and perceived self-efficacy in patient-physician interaction were significantly associated with patient adherence to ongoing TAM/AI therapy among low-income women with BC. Interventions on patient-provider communication may provide opportunities to improve patient outcomes in this vulnerable population.

Correspondence: Rose C. Maly, MD, MSPH, Department of Family Medicine, David Geffen School of Medicine at UCLA, 10880 Wilshire Blvd, Ste. 1800, Los Angeles, CA 90095-7087, Phone: 310-794-6096, Fax: 310-794-6097, rmaly@mednet.ucla.edu.

CONFLICT OF INTEREST DISCLOSURES

The authors declare that they have no conflict of interest.

INTRODUCTION

For women with hormone receptor positive breast cancer (BC), long term use of adjuvant hormone therapy for at least 5 years has been demonstrated to prevent disease relapse and improve disease free survival [1,2]. However, adherence to adjuvant therapy among BC patients is a continuing challenge, especially among low-income women, given the barriers to accessing medical care that many experience [3,4,5].

Despite its effectiveness, rates of adherence to hormone therapy among BC patients have been reported to be relatively low, ranging from 50%–72% [4,6,7,8,9]. Previous studies have identified a number of patient characteristics as predictors for nonadherence. Older, nonwhite, and unmarried women are less likely to be adherent to hormone therapy [4,7,10]. Comorbidity, higher tumor stage, prior receipt of adjuvant chemotherapy, hormone therapy adverse effects and patients' negative beliefs about hormone therapy have also been identified as being associated with nonadherence [4,8,11,12,13,14].

Some studies suggest that improved patient-physician communication may be a key to enhancing patient adherence to treatment [15,16,17]. Good communication between patient and physician might help patients overcome adherence barriers associated with a lack of understanding and appropriate information about hormone therapy. From the physician side, patient-centered communication involves exploring patients' ideas and concerns, and assesses and responds to their emotions and understanding [18,19]. Studies have shown that patient-centered communication is associated with better patient outcomes [20,21,22].

From the patient's side, self-efficacy in interacting with physicians, that is, their self confidence in being able to obtain medical information and attention regarding their chief medical concerns from physicians [23], is also a key component in effective patient-physician communication. Previous studies have shown low-income and racial/ethnic minority women are less likely to receive adjuvant treatment for BC and have a higher rate of discontinuation of treatment [3,24,25]. Research findings have suggested that disadvantaged patient populations receive suboptimal care in part due to less self-efficacy in interacting with physicians [26,27,28]. Therefore, it is possible that increased patient self-efficacy and sense of empowerment during the patient-physician encounter could result in higher adherence rates among vulnerable populations.

Few studies have investigated the impact of patient-physician communication on hormone therapy adherence among BC patients [10,29,30]. None, to our knowledge, among low income populations. This study, of a defined population of low-income women with BC who initiated hormone treatment, assessed the impact of patient-physician communication on adherence at 3 years after BC diagnosis. A better understanding of the role of patient-physician communication, a malleable avenue for change, would permit the implementation of strategies to improve adherence to adjuvant hormone therapy in vulnerable populations.

METHODS

Study sample

The details of the study design and sample have been described previously [31]. In brief, study participants were aged 18 years and older, newly diagnosed with BC and enrolled in the California Breast and Cervical Cancer Treatment Program (BCCTP) between February 2003, and September 2005. The BCCTP is funded in part by Medicaid and by the state of California to provide treatment for breast and cervical cancer for un- and under-insured, low-income women (< 200% Federal Poverty Level).

Eligible women were first interviewed by phone in English or Spanish at 6 months, and then followed up at 18 months, and 36 months after their diagnosis of BC. The 6 month baseline interview specifically targeted patient demographic information and measures of patient self-efficacy in interacting with physicians, while the 18 month and 36 month interviews focused on comprehensive measures of quality of care and quality of life. A total of 921 women out of 1509 eligible women were initially recruited for the baseline interview at 6 months for a 61% response rate. Compared with survey responders, non-responders were older (52 vs. 50 years, $p<0.0001$), more likely to be Asian/Pacific Islanders, and less likely to be Latina and whites (11.6%, 37.6%, 26.5% vs 7.4%, 53.4%, 31.7%, respectively, $p<0.05$). Of the 921 women who participated in the first interview, response rates at 18 months and 36 months were 86% (N=796) and 73% (N=669), respectively.

We obtained and abstracted detailed clinical information from patients' medical records at 18 months after BC diagnosis including clinical information about tumor characteristics, staging, and details of treatment. Eight hundred (87%) patients consented to the medical record review and we were able to successfully retrieve and abstract medical records for 97% (n=776) of this group. The inter-rater reliability between abstractors for data on BC characteristics and treatment data ranged from 0.68 to 1.00, indicating good to excellent agreement. Women who were eligible for hormone therapy were identified from the medical records with the following criteria: 1) stage I–III, 2) estrogen receptor positive or progesterone receptor positive BC, 3) tumor size greater than 1 cm or tumor involving the axillary lymph nodes, and 4) no recurrence of BC prior to 36 months. Among these, a total of 303 women who initiated tamoxifen/aromatase inhibitors for the first time subsequent to their initial cancer diagnosis were included in these analyses.

Measures

The main outcome variable was hormone use at 36 months after BC diagnosis. This variable was measured by patient self-report in the 36 month survey. The main independent variable was patient-centered communication by medical oncologists after diagnosis based upon patient report as measured by the Consumer Assessment of Healthcare Providers and Systems (CAHPS) [32]. The CAHPS survey is widely used to measure experiences of care and has well-established validity and reliability [32,33], which was assessed at the 18 month interview. The four questions assessing patient-centered communication were as follows: (1) How often did the medical oncologist listen carefully to you? (2) How often did he/she explain things in a way you could understand? (3) How often did he/she show respect for what you had to say? (4) How often did he/she spend enough time with you? Response categories were based on a 4-point Likert scale: never, sometimes, usually and always. The CAHPS sum scale has a range from 4 to 16, with higher scores indicating better patient-centered communication. Cronbach's alpha for this scale was 0.94 in our study.

Other patient-physician communication independent variables were: 1) patient-perceived self-efficacy in patient-physician interactions (PEPPI), and 2) whether reasons for needing hormone therapy were specifically discussed by physicians. Both variables were measured from the 6 month baseline interview. Self-efficacy in patient-physician interactions was measured using the validated 5-item Perceived Efficacy in Patient-Physician Interactions (PEPPI) questionnaire [34]. PEPPI measures patients' perceived ability to obtain needed medical information and attention to their chief medical concerns from physicians. The PEPPI sum scale has a range from 0 to 50, with higher scores indicating greater self-efficacy; Cronbach's alpha for this scale was 0.96.

Other independent and potentially confounding variables included tumor stage and side effects from hormone treatment abstracted from the medical records. Patient sociodemographic characteristics, financial adequacy as measured by the question "Do you

have enough money to cover your needs?”, comorbidity as measured by the Katz et al. adaptation of the Charlson Comorbidity Index [35] were obtained from the 6 month patient self-report. Health insurance status at 36 months after BC diagnosis was also included in the analysis model. Language and acculturation can serve as significant barriers to optimal communication. Therefore among Latinas, language-based acculturation was determined by the five-item Marin Acculturation Scale [36].

Data Analysis

Among women who initiated hormone treatment after BC diagnosis, summary statistics, including means and percentages, were calculated to describe participants’ demographic and clinical characteristics and scores on communication and other independent variables. Bivariate relationships between outcome and independent variables were assessed using unadjusted logistic regression models. A multivariate logistic regression model was then fit to investigate correlates of hormone use at 36 months after BC diagnosis, controlling for potential confounders. Potential interactions between patient-centered communication and side effects, insurance status and ethnicity were assessed in the multivariate analyses. Adjusted adherence rates were also calculated controlling for all other continuous covariates held at their mean value and the modal response for categorical covariates. Multicollinearity was examined for all independent variables and was found not to be a problem. The Hosmer-Lemeshow test indicated adequate fit of the multivariate logistic regression model.

All statistical analyses were conducted using SAS, version 9.1; two-sided alpha levels with *p* values less than 0.05 were considered statistically significant.

RESULTS

Descriptive Statistics

Table 1 shows the descriptive statistics of the sample. The sample was predominately less-acculturated Latinas (49%), with whites accounting for approximately one third (34%). The average age was approximately 51 years. The majority of the population reported financial hardship (60%) and about 41% had not graduated from high school. Slightly over half were married or partnered. About 73% of the sample had discussed the use of hormone therapy with one or more physicians. Most women reported use of hormone therapy at 36 months after BC diagnosis (88%) and over one third (36%) had experienced side effects from the hormone treatment. With respect to medical characteristics, about one third of the sample had at least one comorbidity and the majority of women were diagnosed either with stage II or stage III BC (70%). About 45% of the patients underwent mastectomy, about one third had received radiation therapy, and more than 75% of the patients reported receipt of adjuvant chemotherapy.

Factors Associated with Hormone Use at 36months after BC Diagnosis

In the bivariate analyses (results not shown), being a less-acculturated Latina was positively associated with greater hormone treatment adherence at 36 months after BC diagnosis (OR=4.8, *P*=0.0003). Both patient-centered communication and PEPPI had positive impacts on adherence (OR=1.11, *P*=0.054; OR=1.03, *P*=0.064, respectively); while experiencing side effects from hormone treatment had a negative impact on adherence (OR=0.29, *P*=0.0009).

Table 2 presents the results of the multivariate regression models and the adjusted adherence rates. Having at least one significant comorbidity was positively associated with hormone treatment adherence (AOR=3.14, *P*=0.03). Less-acculturated Latinas were much more likely to adhere to hormone treatment than whites (AOR=9.08, *P*=0.001). However, women who

experienced side-effects from hormone treatment were less likely to use hormone pills at 36 months after BC diagnosis compared to those who did not have side-effects (AOR=0.26, $P=0.003$). Not having health insurance was a major barrier for hormone treatment adherence (AOR=0.12, $P=0.001$). The adjusted proportion of women without health insurance taking hormone therapy at 36 months was 56%, vs. 91% for women with health insurance.

After controlling for potential confounders, greater patient-centered communication from oncologists at 18 months post-diagnosis positively predicted ongoing use of hormone therapy at 36 months after BC diagnosis (AOR=1.22, $P=0.006$). For example, controlling for other covariates, a rating of 4 on the CAHPS communication scale was associated with a 59% adherence rate as compared with 94% for a rating of a 16. Patients with greater self-efficacy in patient-physician interactions were also more likely to be adherent to hormone treatment (AOR=1.04, $P=0.04$). Adjusted rates of adherence were 72% vs. 91% for women with the lowest and highest rating of perceived self-efficacy (Table 2). No interaction effects were observed between patient-centered communication and insurance, side effects, or ethnicity.

Age, educational level, marital status, tumor stage and treatment received for BC were not significant correlates of hormone adherence at 36 months after BC diagnosis. Also, discussion with physicians about why hormone therapy would be needed did not have an impact on hormone adherence among this population.

DISCUSSION

Patient-centered care is an important benchmark for quality of healthcare, and communication has been identified as a key to achieving patient-centered care [18,19,21]. Communication between BC patients and their physicians in our study population might be particularly challenging, given the fact that the majority of the study population consisted of a less acculturated ethnic minority with language barriers known to have less self efficacy in patient-physician interactions compared to other populations [23]. This is one of the first studies focusing on the role that patient-centered communication played in adjuvant hormone therapy adherence in a low-income population. This study is also particularly notable for its large Latina representation, allowing a close examination of an important patient outcome in the largest racial/ethnic minority group in the U.S.[37], about which little is known.

Overall, self-reported use of TAM/AI at three years was relatively high (88%) in our study population and compares favorably to other recent studies. Partridge et al. reported adherence of 82% to 88% in the first year and 62% to 79% in year 3 in three commercially insured populations, and most of the women who were non-adherent were found to have discontinued therapy [38]. Kahn et al, reported that at 4 years, 79% of women with early stage breast cancer were still taking hormonal therapy[39], while Hershman et al. found that by 4.5 years, 68% of women with early stage breast cancer treated in the Kaiser Permanente of Northern California health system were continuing therapy[40]. Hershman et al found that the estimated survival at 10 years was 81% for women who continued adjuvant hormonal therapy compared with 74% for those who discontinued [9]. Extrapolating from these data, notwithstanding the more advanced disease in the BCCPT cohort, given their higher than expected adherence rate at three years, the women in our study may have better outcomes than might be otherwise expected.

The positive impact of patient-centered communication on adherence from our study is consistent with Kahn et al's study showing patient-centered care as a positive predictor of patient adherence to ongoing tamoxifen use among women with BC in a general population

[10]. This result is also consistent with prior literature demonstrating improvement in patient outcomes such as better cancer care and reduced symptom burden with the use of patient-centered communication [20,21,22]. This type of communication might be particularly needed to deliver care among a population with language barriers and less confidence in their ability to get their physicians to attend to their health concerns than other populations [41,42]. Studies show that patients report difficulties in communicating with physicians such as the physician not listening to their concerns, caring about their problems, or providing enough information about their treatment [43,44,45]. By showing respect to patients, spending enough time with patients, listening carefully to patients' questions, and explaining things in a manner that the patient can understand, patient-centered communication may help address patients' concerns and achieve better clinical outcomes. A recent study has shown that patients were less likely to have tamoxifen treatment interruptions if they were given chances to ask questions about treatment at diagnosis [46].

Findings from the current study indicate that patients with higher perceived self-efficacy in interacting with physicians had greater odds of use of hormone at 3 years after BC diagnosis. This finding consistently supports the concept that self-efficacy in interacting with physicians is positively associated with many positive BC outcomes in vulnerable populations [26,27,28]. Women with greater self-efficacy may be able to solicit and incorporate information that is personalized to their particular informational and psychosocial needs for decision-making about hormone therapy.

As expected, hormone therapy discontinuation rates were significantly greater among women those physicians documented side effects. Although TAM and AIs are generally well tolerated, associated adverse effects include vasomotor symptoms and gynecologic problems [47]. Side effects have been reported as major reasons for hormone therapy non-adherence in many studies [10,12,48]. Grunfeld et al showed that about one fifth of women discontinued tamoxifen therapy within the 3-year follow up because of side effects [14]. However, patients are more likely to be adherent to the hormone therapy if they are well informed about the side effects before the treatment initiated, underscoring the need for effective patient-physician communication [10].

Findings on the impact of comorbidities on hormone therapy adherence have been mixed. Some studies found that having one or more comorbidities was not a predictor of adherence [9,10]; while other findings indicated that the presence of a comorbidity was predictive of continuous use of hormone therapy [4]. In our study, women with at least one comorbidity were more likely to be adherent to the therapy than those without any comorbidities. Some researchers suggest that patients taking more than one prescription medication may have developed routines to promote adherence [8]. Also, patients with comorbidities might have more contact with the healthcare system and receive more support for taking medications as prescribed.

Interestingly, less acculturated Latinas were significantly more likely than whites to remain on hormone therapy 3 years after the BC diagnosis. This finding is in contradistinction to research indicating that racial/ethnic minority BC patients tend to have poorer medication adherence rates than whites [49,50,51]. Specific to hormone therapy, African Americans have been shown to have lower adherence rates [40]. Less acculturated Latinas have been found to be particularly fearful of BC recurrence compared to whites [52], and this may have driven adherence rates higher. Another possible explanation might be that healthcare providers may be more likely to spend time to discuss hormone treatment with patients or use culturally and linguistically competent approaches to communicate with patients when patients' language and cultural differences are apparent. In addition, patient beliefs about the risk and benefits of hormone use have been shown to be predictive of adherence [11,14].

Although we were unable to evaluate it in this study, there may be differences in these beliefs related to race/ethnicity. Further research is needed to explore the contributing factors to the ethnic variation in adherence found in this study.

Not surprising, health insurance status had a great impact on the continuity of therapy at 36 months after BC diagnosis. Having insurance, in general, is an important facilitator of access to healthcare. Our finding mirrors the previous literature findings on lack of insurance as a barrier for treatment adherence [53,54]. Indeed, the relatively high rate of adjuvant hormone treatment adherence in our population might reflect in part the facilitated access to care for un-or underinsured women by virtue of enrollment into the BCCTP program. However, our study raises key questions regarding the degree of patient-centered communication that is needed to improve cancer treatment adherence even in a safety-net healthcare system. Healthcare providers should be aware of the power that patient-centered communication has in enhancing hormone therapy adherence among vulnerable populations.

Several limitations to this study should be noted. Because the sample was comprised of low-income, medically underserved women in a specific Medicaid BC treatment program in California, generalizability of the findings to other low-income populations may be limited. Also, generalizability to other Latina populations other than Mexican Americans may be limited due to their predominance in the California Latino population [55]. Third, although we achieved a 61% response rate, the differences between responders and non-responders in terms of age and race/ethnicity might potentially have biased the observed results if non-responders were less likely to be adherent to hormone therapy. However, our response rate is comparable to other similar studies [56,57], and recent studies revealed that even if differences exist between respondents and non-respondents, lower response rates do not necessarily bias results [58,59]. Fourth, since adherence was measured by patient self-report, the high adherence rate may have been affected by social desirability response bias. However, a recent published paper on this study population reported that self-reporting of key treatment and prognostic information is relatively accurate among these low-income women with BC [60].

Taken together, this study's results suggest that adherence to hormone therapy among low-income, medically underserved women with BC could be enhanced by targeted interventions aimed at increasing patient-centered communication and by attention to side effects from the treatment. In addition, future research would be helpful in identifying the underlying cultural factors that contribute to ethnic variation in cancer treatment adherence.

Acknowledgments

This study was funded by the American Cancer Society (# TURSG-02-081), the California Breast Cancer Research Program (# 7PB-0070), and the National Cancer Institute (#R01CA119197-01A1). Dr. Maly was additionally supported by the National Cancer Institute (#R01CA140481-01A1).

References

1. Early Breast Cancer Trialists' Collaborative Group. Effects of chemotherapy and hormonal therapy for early breast cancer on recurrence and 15-year survival: an overview of the randomized trials. *Lancet*. 2005; 365:1687–1717. [PubMed: 15894097]
2. Winer EP, Hudis C, Burstein HJ, et al. American Society of Clinical Oncology technology assessment on the use of aromatase inhibitors as adjuvant therapy for postmenopausal women with hormone receptor-positive breast cancer: status report 2004. *J Clin Oncol*. 2005; 23:619–629. [PubMed: 15545664]
3. Bickell NA, Wang JJ, Oluwole S, et al. Missed opportunities: racial disparities in adjuvant breast cancer treatment. *J Clin Oncol*. 2006; 24:1357–1362. [PubMed: 16549830]

4. Kimmick G, Anderson R, Camacho F, et al. Adjuvant hormonal therapy use among insured, low-income women with breast cancer. *J Clin Oncol.* 2009; 27:3445–3451. [PubMed: 19451445]
5. Gotay C, Dunn J. Adherence to long-term adjuvant hormonal therapy for breast cancer. *Expert Rev Pharmacoecon Outcomes Res.* 2011 Dec; 11(6):709–715. [PubMed: 22098287]
6. Ziller V, Kalder M, Albert US, et al. Adherence to adjuvant endocrine therapy in postmenopausal women with breast cancer. *Ann Oncol.* 2009; 20(3):431–436. [PubMed: 19150950]
7. Partridge AH, Wang PS, Winer EP, et al. Nonadherence to adjuvant tamoxifen therapy in women with primary breast cancer. *J Clin Oncol.* 2003; 21:602–660. [PubMed: 12586795]
8. Lash TL, Fox MP, Westrup JL, Fink AK, Silliman RA. Adherence to tomoxifen over the five-year course. *Brea Res and treatment.* 2006; 99:215–220.
9. Hershman DL, Shao T, Kushi LH, et al. Early discontinuation and non-adherence to adjuvant hormonal therapy are associated with increased mortality in women with breast cancer. *Breast Cancer res Treat.* 2011; 126(2):529–537. [PubMed: 20803066]
10. Kahn KL, Schneider EC, Malin JL, Adams JL, Epstein AM. Patient centered experiences in breast cancer: predicting long-term adherence to tamoxifen use. *Med Care.* 2007; 45(5):431–439. [PubMed: 17446829]
11. Fink AK, Gurwitz J, Rakowski W, Guadagnoli E, Silliman RA. Patient beliefs and tomoxifen discontinuance in older women with estrogen receptor-positive breast cancer. *J Clin Oncol.* 2004; 22(16):3309–3315. [PubMed: 15310774]
12. Demissie S, Silliman RA, Lash TL. Adjuvant tamoxifen: Predictors of use, side effects, and discontinuation on older women. *J Clin Oncol.* 2001; 19(2):322–328. [PubMed: 11208822]
13. Barron TI, Connolly R, Bennett K, Feely J, Kennedy MJ. Early discontinuation of tamoxifen: A lesion for oncologists. *Cancer.* 2007; 109(5):831–839.
14. Grunfeld EA, Hunter MS, Sikka P, Mittal S. Adherence beliefs among breast cancer patients taking tomoxifen. *Patient Educ Couns.* 2005; 59(1):97–102. [PubMed: 16198223]
15. Piette JD, Heisler M, Krein S, Kerr EA. The role of patient-physician trust in moderating medication nonadherence due to cost pressures. *Arch Intern Med.* 2005; 165(15):1749–1755. [PubMed: 16087823]
16. Pellegrini I, Sarradon-Eck A, Soussan PB, et al. Women's perceptions and experience of adjuvant tamoxifen therapy account for their adherence: breast cancer patients' point of view. *Psychooncology.* 2010; 19(5):472–479. [PubMed: 19507263]
17. Kirk MC, Hudis CA. Insight into barriers against optimal adherence to oral hormonal therapy in women with breast cancer. *Clin Breast Cancer.* 2008 Apr; 8(2):155–161. [PubMed: 18621612]
18. Levenstein JH, McCracken EC, McWhinney IR, Stewart MA, Brown JB. The patient-centered clinical method. 1. A model for the doctor-patient interaction in family medicine. *Fam Pract.* 1986; 3:24–30. [PubMed: 3956899]
19. Mead N, Bower P. Patient-centeredness: A conceptual framework and review of the empirical literature. *Soc Sci Med.* 2000; 51:1087–1110. [PubMed: 11005395]
20. Epstein RM, Franks P, Shields CG, et al. Patient-centered communication and diagnostic testing. *Annals of Family Medicine.* 2005; 3(5):415–421. [PubMed: 16189057]
21. Epstein, RM.; Street, RL. Patient-centered communication in cancer care: promoting healing and reducing suffering. National Cancer Institute; Bethesda, MD: 2007. NIH Publication No. 07–6225
22. Little P, Everitt H, Williamson I, et al. Observational study of effect of patient centeredness and positive approach on outcomes of general practice consultations. *Brit Med J.* 2001; 323(7318): 908–911. [PubMed: 11668137]
23. Maly RC, Umezawa Y, Leake B, Silliman RA. Determinants of participation in treatment decision-making by older breast cancer patients. *Breast Cancer Res Treat.* 2004; 85(3):201–209. [PubMed: 15111757]
24. Joslyn SA. Racial differences in treatment and survival from early-stage breast carcinoma. *Cancer.* 2002; 95(8):1759–1766. [PubMed: 12365025]
25. Hershman D, McBride R, Jacobson JS, et al. Racial disparities in treatment and survival among women with early-stage breast cancer. *J Clin Oncol.* 2005; 23(27):6639–6646. [PubMed: 16170171]

26. Maly R, Liu Y, Kwong E, Thind A, Diamant A. Breast reconstructive surgery in medically underserved women with breast cancer: The role of patient-physician communication. *Cancer*. 2009 Oct 15; 115(20):4819–1827. [PubMed: 19626696]
27. Maly RC, Liu Y, Leake B, Thind A, Diamant AL. Treatment-related symptoms among underserved women with breast cancer: the impact of physician-patient communication. *Breast Cancer Res Treat*. 2010; 119(3):707–716. [PubMed: 19449101]
28. Maly RC, Stein JA, Umezawa Y, Leake B, Anglin MD. Racial/ethnic group differences in breast cancer outcomes among older patients: effects of physician communication and patient empowerment. *Health Psychol*. 2008; 27(6):728–736. [PubMed: 19025268]
29. Davidson B, Vogel V, Wickerham L. Oncologist-patient discussion of adjuvant hormonal therapy in breast cancer: results of a linguistic study focusing on adherence and persistence to therapy. *J Support Oncol*. 2007; 5(3):139–143. [PubMed: 17410813]
30. Livaudais JC, Hwang ES, Karliner, et al. Adjuvant hormonal therapy use among women with ductal carcinoma in situ. *J Womens Health (Larchmt)*. 2012; 21(1):35–42. [PubMed: 21902542]
31. Chen JY, Diamant AL, Thind A, Maly RC. Determinants of breast cancer knowledge among newly diagnosed, low-income, medically underserved women with breast cancer. *Cancer*. 2008; 112(5): 1153–1161. [PubMed: 18189306]
32. Hargraves JL, Hays RD, Cleary PD. Psychometric properties of the Consumer Assessment of Health Plans Study (CAHPS) 2.0 Adult Core Survey. *Health Serv Res*. 2003; 38(6 pt 1):1509–1527. [PubMed: 14727785]
33. Hurtado MP, Angeles J, Blahut SA, Hays RD. Assessment of the equivalence of the Spanish and English versions of the CAHPS Hospital Survey on the quality of inpatient care. *Health Serv Res*. 2005 Dec; 40(6 Pt 2):2140–2161. [PubMed: 16316442]
34. Maly RC, Frank JC, Marshall GN, DiMatteo MR, Reuben DB. Perceived efficacy in patient-physician interactions (PEPPI): validation of an instrument in older persons. *J Am Geriatr Soc*. 1998; 46:889–894. [PubMed: 9670878]
35. Katz JN, Chang LC, Sangha O, Fossel AH, Bates DW. Can comorbidity be measured by questionnaire rather than medical record review? *Med Care*. 1996; 34(1):73–84. [PubMed: 8551813]
36. Marin G, Sabogal F, Marin B, et al. Development of a short acculturation scale for Hispanics. *Hisp J Behav Sci*. 1987; 9:183–205.
37. Bernstein, R. Hispanic Population Passes 40 million: Census Bureau Reports. U.S. Census Bureau News, U.S. Department of Commerce; Washington, D.C: Released June 9, 2005. <http://www.census.gov/population/www/cen2000/briefs.html>
38. Partridge AH, LaFountain A, Mayer E, Taylor BS, Winer E, Asnis-Alibozek A. Adherence to initial adjuvant anastrozole therapy among women with early-stage breast cancer. *J Clin Oncol*. 2008 Feb 1; 26(4):556–62. [PubMed: 18180462]
39. Kahn KL, Schneider EC, Malin JL, Adams JL, Epstein AM. Patient centered experiences in breast cancer: predicting long-term adherence to tamoxifen use. *Med Care*. 2007 May; 45(5):431–439. [PubMed: 17446829]
40. Hershman DL, Kushi LH, Shao T, et al. Early discontinuation and nonadherence to adjuvant hormonal therapy in a cohort of 8,769 early-stage breast cancer patients. *J Clin Oncol*. 2010; 28(27):4120–4128. [PubMed: 20585090]
41. Balogh EP, Ganz PA, Murphy SB, Nass SJ, Ferrell BR, Stovall E. Patient-centered cancer treatment planning: improving the quality of oncology care. Summary of an institute of medicine workshop. *Oncologist*. 2011; 16(12):1800–1805. [PubMed: 22128118]
42. Karliner LS, Hwang ES, Nickleach D, Kaplan CP. Language barriers and patient-centered breast cancer care. *Patient Educ Couns*. 2011; 84(2):223–228. [PubMed: 20685068]
43. Roundtree AK, Giordano SH, Price A, Suarez-Almazor ME. Problems in transition and quality of care: perspectives of breast cancer survivors. *Support Care Cancer*. 2011; 19(12):1921–1929. [PubMed: 21140173]
44. Anderson R, Barbara A, Feldman S. What patients want: A content analysis of key qualities that influence patient satisfaction. *J Med Pract Manage*. 2007; 22(5):255–261.

45. Cleary PD, Edgman-Levitan S, Roberts M, et al. Patients evaluate their hospital care: a national survey. *Health Aff (Millwood)*. 1991; 10(4):254–267. [PubMed: 1778560]
46. Cluze C, Rey D, Huiart L, et al. Adjuvant endocrine therapy with tamoxifen in young women with breast cancer: determinants of interruptions vary over time. *Ann Oncol*. 2012; 23:882–890. [PubMed: 21788360]
47. Gradishar WJ. Safety considerations of adjuvant therapy in early breast cancer in postmenopausal women. *Oncology*. 2005; 69(1):1–9. [PubMed: 16088229]
48. Henry NL, Azzouz F, Desta Z, et al. Predictors of aromatase inhibitor discontinuation as a result of treatment-emergent symptoms in early-stage breast cancer. *J Clin Oncol*. 2012; 30(9):936–942. [PubMed: 22331951]
49. Zeber JE, Miller AL, Copeland LA, et al. Medication Adherence, Ethnicity, and the Influence of Multiple Psychosocial and Financial Barriers. *Adm Policy Ment Health*. 2011; 38(2):86–95. [PubMed: 20549327]
50. Yang Y, Thumula V, Pace PF, Banahan BF 3rd, Wilkin NE, Lobb WB. Predictors of medication nonadherence among patients with diabetes in Medicare Part D programs: a retrospective cohort study. *Clin Ther*. 2009 Oct; 31(10):2178–2188. [PubMed: 19922889]
51. Gellad WF, Haas JS, Safran DG. Race/ethnicity and nonadherence to prescription medications among seniors: results of a national study. *J Gen Intern Med*. 2007; 22(11):136–145.
52. Janz NK, Hawley ST, Mujahid MS, et al. Correlates of worry about recurrence in a multi-ethnic population-based sample of women with breast cancer. *Cancer*. 2011; 117(9):1827–1836. [PubMed: 21445916]
53. Chen NE, Meyer JP, Avery AK, et al. Adherence to HIV treatment and care among previously homeless jail detainees. *AIDS Behav*. 2011 Nov 8. [Epub ahead of print].
54. Rahman SM, Dignan MB, Shelton BJ. Factors influencing adherence to guidelines for screening mammography among women aged 40 years and older. *Ethn Dis*. 2003; 13(4):477–484. [PubMed: 14632267]
55. Grieco, EM.; Cassidy, RC. US Census Bureau, Census 2000 Brief (issued March 2001): Census 2000 Redistricting (Public Law 94–171) Summary File, Tables PL1 and PL2. U.S. Department of Commerce; Washington, D.C: Overview of race and Hispanic origin. <http://www.census.gov/population/www/cen2000/briefs.html>
56. Malin JL, Schneider E, Epstein A, et al. Quality of care for breast cancer and colorectal cancer: Results of the National Initiative for cancer Care Quality. *J Clin Oncol*. 2006; 24:626–634. [PubMed: 16401682]
57. Kahn KL, Adams JL, Weeks JC, et al. Adjuvant chemotherapy use and adverse events among older patients with stage III colon cancer. *JAMA*. 2010; 303:1037–1045. [PubMed: 20233821]
58. Der Wiel AB, Van Exel E, De Craen AJ, et al. A high response is not essential to prevent selection bias: Results from the Leiden 85-plus study. *J Clin Epidemiol*. 2002; 55(11):1119–1125. [PubMed: 12507676]
59. Keeter S, Miller C, Kohut A, et al. Consequence of reducing nonresponse in a national telephone survey. *Public Opinion Quarterly*. 2006; 70:759–779.
60. Liu Y, Diamant AL, Thind A, Maly R. Validity of self-reports of breast cancer treatment in low-income medically underserved women with breast cancer. *Breast Cancer Res Treat*. 2010; 119:745–751. [PubMed: 19551500]

Table 1

Descriptive statistics of the study sample (N=303)

	Value
Hormone Use at 36 Month After BC Diagnosis, N (%)	
Yes	268 (88.4)
Age (years)	
Mean (SD)	51.2(9.4)
Range	25.0–85.0
Race/Ethnicity, N (%)	
White	103 (34.0)
Less-acculturated Latina	149(49.2)
More-acculturated Latina	15(5.0)
African-American	6(2.0)
Asian/Pacific Islander	25(8.3)
Other	5(1.6)
Education, N (%)	
<High School	125(41.3)
Married/Partnered, N (%)	
Yes	158(52.2)
Comorbidity, N (%)	
Any	84(27.7)
Financial Adequacy, N (%)	
No	183(60.4)
Insurance Status, N (%)	
None	28(9.2)
Stage, N (%)	
I	90(29.7)
II/III	213(70.3)
BC Treatment, N (%)	
Mastectomy (Yes)	135(44.6)
Radiation Therapy (Yes)	88 (29.0)
Chemotherapy (Yes)	230(75.9)
Discussion of Hormone Therapy, N (%)	
Yes	221(72.9)
Hormone Therapy Side Effects, N (%)	
Yes	110(36.3)

	Value
PEPPI *	
Mean (SD)	37.6(12.1)
Range	0 – 50.0
Patient-Centered Communication	
Mean (SD)	13.9(2.9)
Range	4.0 – 16.0

* Perceived efficacy in physician-patient interactions

Table 2

Multivariate Logistic Regression Model – Factors Associated with Hormone Use at 36 Month after Breast Cancer Diagnosis (N=303)

	AOR	P-value	Adjusted Adherence Rate %* (95% C.I.)
Age	1.04	0.13	
40			86.7 (86.1, 87.3)
50			90.6 (90.2, 91.1)
60			93.4 (93.2, 93.8)
70			97.0 (96.8, 97.1)
Comorbidity (Any)	3.14	0.03	97.0 (91.8, 98.9)
Partnership (No)	0.84	0.71	89.5 (77.4, 95.5)
Race/Ethnicity			
Less-acculturated Latina	9.08	0.001	98.9 (96.1, 99.7)
More-acculturated Latina	3.42	0.28	97.2 (78.6, 99.7)
Other	3.74	0.06	97.4 (90.6, 99.3)
High School Graduated (Yes)	0.94	0.91	91.5 (77.9, 97.1)
Health Insurance (No)	0.12	0.001	55.8 (26.0, 82.0)
Stage(I)	1.00	0.99	91.1 (78.0, 96.7)
Radiation Therapy (Yes)	0.47	0.18	82.7 (61.8, 93.4)
Chemotherapy (Yes)	1.59	0.44	91.0 (76.0, 97.0)
Mastectomy (Yes)	0.79	0.61	88.9 (76.8, 97.0)
Hormone Side Effects (Yes)	0.26	0.003	72.7(52.4, 86.6)
Financial Adequacy (Yes)	0.97	0.95	90.8 (80.3, 96.0)
Discussion of Hormone Therapy (Yes)	0.95	0.92	96.7 (90.8, 98.8)
PEPPI ** (Range=0–50)	1.04	0.04	
0			71.6 (70.9, 72.3)
10			78.5 (77.9, 79.1)
20			84.1 (83.6, 84.6)
30			88.5 (88.1, 88.8)
40			91.2 (90.9, 91.4)
50			91.2 (90.9, 91.4)
Patient Centered Communication (Range=4–16)	1.22	0.006	
4			59.1 (55.6, 62.5)
8			76.0 (73.4, 78.5)
12			87.5 (85.8, 87.5)
16			93.8 (93.0, 94.6)

* Adjusted adherence rate is calculated based on multivariate logistic regression while holding all the other continuous covariates at their mean values and categorical covariates at the most common responses of the sample (reference group adjusted adherence rate:91%).

** Perceived efficacy in physician-patient interactions.