HHS Public Access

Author manuscript

*J Health Dispar Res Pract*. Author manuscript; available in PMC 2016 February 24.

Published in final edited form as:

*J Health Dispar Res Pract*. 2014 ; 7(4): 23–32.

# The Association Between Distances Traveled for Care and Treatment Choices for Pelvic Floor Disorders in a Rural Southwestern Population

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## Abstract

**Objectives—**To determine if distance traveled for care influenced patient choice for conservative vs. surgical treatment for pelvic organ prolapse (POP) and/or stress urinary incontinence (SUI).

**Methods—**Retrospective chart review of all new patients seen in the Urogynecology clinic at the University of New Mexico Hospital (UNMH) from January 2007 through September 2011. Data collected included medical history, Pelvic Organ Prolapse Quantification (POPQ) examination, and validated quality of life questionnaires.

**Results—**1384 women were identified with POP and/or SUI. Women traveled an average of 50 miles to receive care at UNMH. After multivariable analysis, greater distance traveled was associated with increased likelihood of choosing surgery, OR 1.45 [1.18-1.76]. More advanced disease as measured by higher stage of prolapse, OR 3.43 [2.30-5.11], and positive leak with empty supine cough test, OR 1.94 [1.45-2.59] were also associated with choosing surgical management.

**Conclusions—**Women who travel further for care and women with more advanced pelvic organ prolapse and/or stress urinary incontinence are more likely to choose surgical management for pelvic floor disorders.

### Keywords

Distance Traveled; Healthcare Disparities; Patient Choices; Pelvic Organ Prolapse; Stress Urinary Incontinence

## Introduction

Why patients choose one treatment option over another for pelvic floor disorders is likely influenced by a variety of factors such as history of previous treatments (Heit et al., 2003), patient characteristics, and socioeconomic factors. Distance traveled influences treatment choices among women in other fields. For example, in the breast cancer literature, women who live further from treatment centers are more likely to choose invasive surgery over breast conserving surgery with radiotherapy treatment. The multiple appointments and follow-up care required for breast conserving surgery may represent a burden for women with excessive travel demands and can make conservative options less appealing (Celaya et al., 2006; Sauerzapf et al., 2008; Meden et al., 2002; Punglia et al., 2006). Similar to breast cancer treatment, current treatment options for stress urinary incontinence (SUI) and/or pelvic organ prolapse (POP) include non-surgical versus surgical options that require differing levels of follow-up care. The non-surgical options such as pessaries and physical therapy generally require more frequent visits and long term maintenance whereas surgery typically requires fewer long-term follow-up visits.

Rural populations have been identified as suffering from health disparity (Eberhardt et all, 2001). A possible contributing factor to this disparity may be the burden of increased travel distance needed to access health care resources. New Mexico is the fifth largest state in the US with the 36th smallest population (US Census Bureau, 2010). Women who live outside of the Albuquerque metropolitan area often travel long distances for specialist care. We aimed to investigate if the distance traveled to receive care was associated with treatment choices by women with SUI and/or POP. We hypothesized that distance traveled was positively associated with choosing surgical management of SUI and/or POP as compared to choosing non-surgical management.

## Methods

After obtaining approval from the Human Research Review Committee/Institutional Review Board at the University of New Mexico Hospital (UNMH), we performed a retrospective chart review of all new patients seen in the Urogynecology clinic at UNMH in Albuquerque, New Mexico, who were given a diagnosis of SUI and/or POP from January 2007 through September 2011. New patients were identified from an administrative database that the clinic maintains of all new patients. The patients in this university-based clinic represent a mix of primary care referrals, self-referrals, and referrals from obstetrician gynecologists and other subspecialists. There are 3 attending physicians in the clinic whose practice styles are similar in both patient counseling and surgical approaches. All women presenting for care at our clinic undergo a standardized intake history and physical exam, including a pelvic exam measuring POP stage using the Pelvic Organ Prolapse Quantification exam (POPQ) (Bump et al., 1996). In addition, all women complete a series of validated questionnaires of pelvic floor disorder symptoms and distress including the Pelvic Floor Distress Inventory-20 (PFDI-20) (Barber et al., 2001). Women who sought care with the Urogynecology Division are registered with a hospital administrative database that records the patient's home address and is confirmed to be correct at the time of their check-in. Study inclusion criteria included English-speaking patients with a diagnosis of symptomatic SUI

and/or symptomatic POP as identified by the provider's dictated assessment. Only English speaking women were included because at the time period women were seen the PFDI-20 was only available in English. As we wanted to assess level of distress from symptoms and treatment choices we excluded patients that were unable to complete this questionnaire in English. Since all but 10% of our patients speak English, we felt that the exclusion of the small number of women who only speak Spanish would be unlikely to skew results. All women attending the Urogynecology Clinic are offered conservative management, which may include behavioral therapy with or without physical therapy and/or the use of pessaries, as well as surgery for treatment of POP and/or SUI as appropriate. For purposes of the analyses, women were dichotomized into those who chose surgery versus those who chose any of the conservative interventions. In addition to patient diagnoses and treatment choices, data collected included patient characteristics. Approximately half of the patients seen in our clinic are ethnically Hispanic. Therefore, ethnicity data, self-reported Hispanic versus non-Hispanic, was collected. Other patient characteristics collected included age, BMI, gravity, parity, as well as past medical, surgical, social and sexual history, medications, and pelvic examination findings. We specifically chose to collect antidepressant and anxiolytic medications as markers for depression and anxiety as these were felt to be potential confounders in treatment choice. Clinical diagnoses (SUI and/or POP) and treatment choices were determined by the treating physician, and recorded at the time of initial visit in a dictated note. The medical record was queried to determine if the patient underwent surgery for SUI and/or POP at a later date and was included for women who choose surgery. Distance traveled to care was determined by calculating the distance from the patient's home address at time of initial exam to UNMH using Google maps (http://maps.google.com), a method utilized by other researchers for similar purposes (Lin et al., 2010; Vuori et al., 2010). The patient's home address was taken from their encounter form from their initial visit that is verified by the patient as part of the check-in process.

We hypothesized that the greater the distance patients had to travel to seek treatment, the more likely they would be to choose a surgical treatment option for their SUI and/or POP. The primary outcome was defined as surgical or non-surgical treatment choice for SUI and/or POP. All women were eligible for both surgical and non-surgical management.

Data were analyzed using SAS v9.3 (Cary, NC). The log of the distance traveled was taken to normalize the distribution of women who traveled very long distances for care as this distribution was skewed to the right. Chi-squared and student t-tests were used where appropriate. Significant univariate variables were entered as candidate factors to determine the “best” stepwise logistic regression multivariable model for the choice of surgery vs. conservative treatment. There was no a priori power analysis performed, as this was a retrospective chart review of an existing database.

## Results

The chart review yielded a total of 1384 new patients. There were 716 women diagnosed with SUI alone, 325 diagnosed with POP alone, and 343 women with both diagnoses. Of these women, 931 chose conservative management and 453 chose surgery. The mean age of the population was 56.6 +/- 13.9 years old and the mean BMI was 30.5 +/- 7.4 kg/$m^2$. One

hundred and forty five women reported previous POP surgery and 123 women reported previous anti-incontinence surgery. Women are asked to describe their ethnicity as Hispanic or non-Hispanic as part of their standard social history intake, and 517 women self-described their ethnicity as Hispanic and 866 as non-Hispanic, this included 591 (42.7%) Non-Hispanic White women, 171 (12.4%) American Indian women, 22 (1.6%) African American women, and 82 (5.9%) women who described their ethnicity/race as “other”. There was no difference in age, BMI, history of prior prolapse or incontinence surgery, previous hysterectomy, or type of insurance between women who chose conservative treatment versus surgery (all $p>0.08$). Hispanic women were more likely to choose conservative management over surgery for treatment of POP and/or SUI than non-Hispanic women ($p<0.01$). Women who reported taking antidepressant medication were more likely to choose surgical management over conservative therapies ($p=0.03$). Patients with higher PFDI-20 scores, positive empty supine leakage on exam, and more advanced stages of prolapse were more likely to choose surgery (Table 1)

Women traveled an average of 50 miles to the Urogynecology Clinic from their home address. The distance traveled by individual patients ranged from 0.8 to 1950 miles, with a median of 9.3 miles. The distribution of the distances traveled was skewed to the right, thus we used the log of the distance traveled for further analyses. This log transformation allowed us to analyze data that were normally distributed. Patients who traveled further for care were more likely to choose surgery as expressed by the log of the distance traveled,, $Log_{10}$ distance traveled for conservative treatment, $1.11 \pm 0.58$ versus $Log_{10}$ distance traveled for surgical treatment, $1.29 \pm 0.67$, $p<0.001$. Another way to express this is with the geometric mean, patients that chose conservative treatment had a geometric mean of 12.9 miles versus those that chose surgery had a geometric mean of 19.5 miles ($p<0.001$), which in terms of a geometric mean is 50% more distance traveled.

Multivariable analysis was performed using a stepwise regression model in which all significant factors on univariate analysis were entered as candidate factors for analysis. The “best” logistic regression model was then created with distance traveled, Hispanic ethnicity, positive empty supine leak test, stage of prolapse, PFDI-20 score, and use of antidepressant entered for analysis. This multivariable analysis was used to generate odds ratios for the significant factors. The log of the distance traveled was positively associated with choice of surgical therapy (OR 1.45, [1.18-1.76]). In other words, the further people had to travel, the more likely they were to choose surgery after controlling for other differences between groups. As mentioned above, the log of the distance traveled was used to normalize the data. Patients had an odds ratio of 1.45 for each $log_{10}$ order of magnitude traveled, i.e. a one unit increase in distance traveled is a factor of 10 increase in absolute distance traveled. A positive empty supine leak test, more advanced stages of prolapse and higher PFDI-20 scores (which represents higher bother from their pelvic floor disorder) were also all found to be positively associated with choice of surgery. Hispanic ethnicity was negatively associated with choice of surgery. (Table 2)

## Discussion

We found that women seeking treatment for SUI and/or POP are more likely to choose surgical management when they travel further to receive care. PubMed searches using combinations of the terms POP, SUI, pelvic floor disorders, and distance yielded no results. However our results are similar to findings from studies of other disease processes. For example, increased travel distance from treatment centers was associated with decreased receipt of chemotherapy for both lung and colon cancers (Jones et al., 2008). In addition there have been several studies investigating treatment choice in women with breast cancer that demonstrate decreased rates of breast conserving surgery among patients that live further from treatment centers (Celaya et al., 2006; Sauerzapf et al., 2008; Meden et al., 2002; Punglia et al., 2006). These studies exemplify the burden of travel distance on receipt of any medical care. It appears that patients who have to travel further to receive care typically choose treatment modalities with fewer follow-ups, despite the potential improved safety and possible superiority of the less invasive, but more intensive options. This is consistent with our finding that longer travel distance was associated with selection of surgery for treatment of POP and/or SUI, despite patients being offered conservative management, which is associated with less risk.

The reasons for these choices are likely similar to those observed for other disease processes; conservative treatments often require multiple visits over the longer term, and the greater the distance traveled, the more burden it may pose on the patient seeking care. At our institution a typical pelvic floor physical therapy treatment plan consists of weekly visits for a minimum 6 to 8 weeks with the possibility of a long term but less frequent maintenance schedule. Pessary use, particularly for elderly patients who cannot care for their pessary themselves, often also carries a commitment to long term follow up, when distant community providers may not feel comfortable with pessary management. One provider survey found that practitioners recommend several closely spaced visits while fitting the pessary then maintenance visits every 3 months for the life of the device (Pott-Grinstein et al., 2001). For women who cannot care for their pessary, this is also our standard practice at UMNH. In contrast, for surgical management, especially for our patients with long travel distances we are often able to condense new patient visits and preoperative preparation in 1 or 2 visits, with only 1-2 more visits for surgical follow up in uncomplicated cases.

As described in the result section, the distances traveled were skewed with a few women travelling great distances for care. Distance traveled was $\log_{10}$ transformed so that meaningful comparisons could be made. Patients had an OR of 1.45 for each $\log_{10}$ order of magnitude traveled. An alternative way to visualize this, is that the first $\log_{10}$ distance traveled was approximated to within the city limits of Albuquerque, the second $\log_{10}$ distance was roughly equal to travel to the state border of New Mexico. The third order of $\log_{10}$, corresponded to distances outside the state of New Mexico, with patients who traveled from out-of-state with the highest odds of choosing surgery. Use of the geometric mean also demonstrates the clinical significance of this finding. Those that chose conservative treatments had a geometric mean of 12.9 miles, which roughly corresponds to a distance within the Albuquerque area whereas those that chose surgical treatment had a geometric mean of 19.5 miles which represents travel outside the metropolitan area. Not

surprisingly, markers of increased severity of disease (higher PFDI-20 score, positive empty supine cough test, prolapse stage 2 or greater) were also predictive of choice for surgical management. This is consistent with prior work that found women with increased stage of prolapse and poorer questionnaire scores were more likely to choose surgery for their pelvic organ prolapse (Chan et al., 2012). Nonetheless, we found that increased travel distance and treatment choice were associated with distance traveled independent of severity of disease.

We also found that Hispanic women were more likely to choose conservative management than non-Hispanic women in our study population. The finding that women who self-identified as Hispanic were more likely to choose conservative management for their pelvic floor disorder was unexpected. Previous work on ethnicity and its relationship to treatment choice has shown that Hispanics are more likely to place treatment decision-making in the hands of their providers (Katz et al., 2011). In our clinic the 3 attending physicians have similar practice styles and emphasize conservative measures as a treatment option as well as surgery. This likely represents a bias for our populations and these patients may have been simply following their physicians' advice. Another possibility is that there are cultural beliefs or factors associated with ethnic Hispanics in New Mexico, which impart negative associations with surgical treatments. Hispanic women have been found to increase concern about loss of fertility and sexuality after hysterectomy. They may also have more concern about their partners' perception of them after hysterectomy, which is often performed as part of prolapse repairs (Galavotti et al., 2000). Future projects should work to identify specific barriers to treatment choice in this population.

Strengths of our study include the large sample size as well as a large number of women traveling long distances for care. In addition the use of a standardized history and physical form over the study period allowed for more complete data collection that an unstructured chart review. This allowed us to control for many potential confounders in our analysis and reduce recall bias. In addition, all of our patients completed validated quality of life questionnaires, allowing us to control for the degree of bother, which also may influence treatment choice.

The weaknesses of our study include the weakness inherent of any retrospective analysis. We can only report associations and drawing more definite conclusions will require prospective analysis of these issues. We were also unable to capture or control for biases in physician counseling. Although the attending physicians in this group have similar practice patterns and counseling style, given this retrospective nature of this study we cannot comment on differences found that may be secondary to differences in the counseling that patients received. Although we collected information on prior surgical treatment for SUI and/or POP, we did not collect data on if patients had tried prior conservative therapies as prior pessary use or physical therapy was inconsistently recorded. However, as we offer specialized pessary and pelvic floor physical therapy clinics, all patients are still offered conservative therapies regardless of what they have tried in the past. It is possible that women who had failed conservative treatment in the past were more likely to choose surgery, regardless of the distance they traveled. However, this would be expected to skew our data towards surgery, and we found the majority of women in the data set still choose conservative treatment over surgery. Another important limitation of this study is that were

unable to control for source of referrals. It is quite possible that women referred to a tertiary care center might have been referred specifically for surgery after already undergoing prior treatment. However, we found that groups did not differ in rates of prior surgical treatment. The decision to proceed with surgery is between the treating provider and the patient. Even though the referral may be for surgery, often patients may still chose conservative management if offered specialized care. These patients represent a broad mix of referral sources, which have implications for the severity of symptoms, as well as the prior treatment failures, both of which influence treatment choice. The referral source remains an important confounder in the relationship between distance traveled and treatment choice, and it may be that the observations that greater distance traveled predicted a choice for surgical treatment may be a result of referral patterns. Another important consideration is that while we did control for socioeconomic status based on insurance status, the retrospective nature of the study did not allow us to analyze specific socioeconomic factors which may affect treatment choice, such as independent living, transportation limitations, and partner support factors. In addition, the demographics of New Mexico are unique in that this is a minority majority state with a relatively large rural population. According to 2011 United States Census Bureau, 46.7% of persons of people in living in New Mexico are of Hispanic or Latino origin and 40.2% are non-Hispanic White (US Census Bureau, 2011). Both of these factors may limit the applicability of these results to the general populous. In addition, we only included English-speaking women in this study as they needed to have completed the PFDI-20 questionnaire that was only available in English during the time that women presented for care. This means we cannot comment on the important group of non-English speaking women and their treatment choices. It is also possible that women that speak English as a second language experience communication or language barriers that may have affected their treatment choices that we are unable to capture in this study.

## Conclusion

People living in rural areas have been identified as suffering from health disparity (Eberhardt et al., 2001). Based on the US census, 12.5% of New Mexico's population is rural. Rural populations have a disproportional burden of traveling lengthy distances to receive specialized health services and this may represents a significant barrier to seeking treatment for pelvic floor dysfunction. Investigating barriers to treatment choices is an important step to improving quality of care for women in rural settings. Our findings indicate that distance traveled to receive care influences treatment choice, with women who travel longer distances tending to select more invasive treatment. There are several possibilities that explain this finding including the possibility that the patients traveling increased distances have been specifically referred for surgery or have failed prior conservative treatment. We feel an important possibility for this finding are the less frequent visits required for follow up from surgical treatments over other conservative therapies. Therefore, patients may choose surgery over other treatments because of the increased burden of traveling to the treatment center for multiple visits. This highlights the importance of improving access to care for rural communities where higher levels of medical treatments are not readily available. This could be achieved through provider training to create resources for conservative treatment options within rural communities. In addition,

specialized care could be made more accessible through either telemedicine or by traveling to outreach clinics in rural communities. These data highlight the need for further research to help identify all the factors that can affect the relationship between distance traveled and treatment choices, including language barriers and reasons for referral, including both referral source and was as referral specifically for surgical treatment. This would include further investigation of non-English speaking women and treatment choices. Future research should also focus on identifying specific needs of rural communities and investigating the feasibility of potential programs to improve access to care. In this preliminary work we found that women who travel further for care and women with more advanced POP and/or SUI are more likely to choose surgical management for pelvic floor disorders.

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## Table 1

### Patient Characteristics

| Patient Characteristics | Conservative Treatment N=931 | Surgery mean ± SD N=453 | P |
|---|---|---|---|
| Age (years) | 56.5 ± 14.4 | 56.8 ± 13.1 | 0.62* |
| BMI (kg/m$^2$) | 30.6 ± 7.6 | 30.4 ± 6.9 | 0.67* |
| Hispanic | 370 (39.7) | 147 (32.5) | 0.01† |
| Prior Prolapse Surgery | 91 (9.8) | 54 (11.9) | 0.23† |
| Prior Anti-Incontinence Surgery | 74 (8.0) | 49 (10.8) | 0.08† |
| Previous Hysterectomy | 357 (38.4) | 172 (38.0) | 0.89† |
| Antidepressant Use | 235 (25.4) | 91 (20.1) | 0.03† |
| Anxiolytic Use | 111 (12.0) | 51 (11.3) | 0.71† |
| Insurance Status | | | 0.87† |
| Uninsured | 23 (2.5) | 13 (2.9) | |
| Public | 561 (36.6) | 276 (35.6) | |
| Private | 337 (60.9) | 160 (61.5) | |
| PFDI-20 (mean scores) | 112.6 ± 61.5 | 122.4 ± 62.2 | 0.006* |
| POPDI-6 | 34.7 ± 24.4 | 41.5 ± 26.5 | <0.001 |
| CRADI-8 | 26.7 ± 24.1 | 27.5 ± 24.0 | 0.53 |
| UDI-6 | 52.3 ± 25.9 | 55.2 ± 88.8 | 0.055 |
| Positive Empty Supine Cough | 169 (19.3) | 114 (26.1) | 0.005† |
| Prolapse Stage | | | <0.001† |
| Stage 0-1 | 175 (19.2) | 168 (11.3) | |
| Stage ≥ 2 | 735 (80.8) | 393 (88.7) | |

Note: Table value formats are either mean ± SD, or frequency (%)

*Student t test

†Chi Square

≠Wilcoxon's rank sum

## Table 2
## Multivariable Analysis for Surgical Treatment

| Significant Variables | Odds Ratio | 95% CI |
|---|---|---|
| Log of distance traveled | 1.45 | 1.18 - 1.76 |
| Prolapse > Stage 2 | 3.43 | 2.30 - 5.11 |
| Positive Empty Supine Leak | 1.94 | 1.45 - 2.59 |
| PFDI-20 (per 100 points) | 1.29 | 1.06-1.57 |
| Hispanic Ethnicity | 0.74 | 0.57 – 0.96 |

* Stepwise logistic regression multivariable model

Note that the OR for PFDI-20 is presented for an increase of 100 points rather an increase of 1 point in order to have a meaningful OR value.