2016

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HHS Public Access

Author manuscript

Am J Obstet Gynecol. Author manuscript; available in PMC 2016 May 01.

Published in final edited form as:

Am J Obstet Gynecol. 2016 May ; 214(5): 613.e1–613.e7. doi:10.1016/j.ajog.2015.11.038.

Functional Status in Older Women Diagnosed with Pelvic Organ Prolapse

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Abstract

Background—Functional status plays an important role in the comprehensive characterization of older adults. Functional limitations are associated with an increased risk of adverse treatment outcomes, but there is limited data on the prevalence of functional limitations in older women with pelvic floor disorders.

Objective—The aim of the study was to describe the prevalence of functional limitations based on health status in older women with pelvic organ prolapse.

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Paper Presentation: 2014 Scientific Meeting, the American Urogynecologic Society (AUGS) and the International Urogynecologic Association (IUGA), Washington DC, July 22–26, 2014

Disclosures:

Dr. Sanses is supported by K12 HD43489 Building Interdisciplinary Research Careers in Women's Health, National Institute of Child Health and Human Development

Dr. Schiltz is supported by KL2TR000440 Clinical and Translational Science Collaborative of Cleveland from the National Center for Advancing Translational Sciences (NCATS) component of the National Institutes of Health.

Dr. Couri has no conflict of interest to report

Dr. Mahajan is an Allergan, Inc. consultant and has a research grant; Pfizer, Inc. Consultant; Uptodate royalties.

Dr. Richter is a Pelvalon consultant and has research grant; Kimberly Clarke, consultant; Uptodate, royalties.

Dr. Warner is supported by a grant from the Agency for Healthcare Research and Quality (R21 HS023113).

Dr. Guralnik is supported by a grant from the National Institute of Aging (R01 AG048069)

Dr. Koroukian is supported a grant from the Agency for Healthcare Research and Quality (R21 HS023113) and by UL1TR000439 Clinical and Translational Science Collaborative of Cleveland from the National Center for Advancing Translational Sciences (NCATS) component of the National Institutes of Health.

Study Design—This pooled, cross-sectional study utilized data from the linked Health and Retirement Study and Medicare files between 1992 and 2008. The analysis included 890 women ≥65 years with pelvic organ prolapse. We assessed self-reported functional status, categorized in strength, upper and lower body mobility, activities of daily living, and instrumental activities of daily living domains. Functional limitations were evaluated and stratified by respondents self-reported general health status. Descriptive statistics were used to compare categorical and continuous variables, and logistic regression was used to measure differences in the odds of functional limitation by increasing age.

Results—The prevalence of functional limitations was 76.2% in strength, 44.9% in upper and 65.8% in lower body mobility, 4.5% in activities of daily living and 13.6% in instrumental activities of daily living. Limitations were more prevalent in women with poor or fair health status than in women with good health status, including 91.5% vs 69.9% in strength, 72.9% vs 33.5% in upper and 88.0% vs 56.8% in lower body mobility, 11.6% vs 0.9% in activities of daily living, and 30.6% vs 6.7% in instrumental activities of daily living, all $p<0.01$. The odds of all functional limitations also increased significantly with advancing age.

Conclusion—Functional limitations, especially in strength and body mobility domains, are highly prevalent in older women with pelvic organ prolapse, particularly in those with poor or fair self-reported health status. Future research is necessary to evaluate if functional status affects clinical outcomes in pelvic reconstructive and gynecologic surgery and whether it should be routinely assessed in clinical decision-making when treating older women with pelvic organ prolapse.

Keywords

activities of daily living; functional status; limitations; mobility; pelvic organ prolapse; strength

Introduction

Function is complex and comprised of physical, cognitive, sensory, psychological and social elements. Physical function encompasses domains in activities of daily living (ADLs), instrumental ADLs (IADLs), body strength and mobility. Functional limitations reflect gaps between the person's capabilities to perform in these domains and the demands of the environment.[1] They are associated with increased risk of adverse treatment outcomes, including post-operative complications such as delirium, slower recovery, prolonged hospital stay, in-hospital and long-term mortality.[2] Functional limitations occur more frequently in women than men affecting 42–50% of women 65 years and older.[3–5] Therefore, functional status may be a crucial determinant of clinical outcomes among older women, and a comprehensive characterization of function in this population is necessary.[1]

Recent research suggests that women with pelvic organ prolapse (POP) and impaired preoperative functional status have a longer length of hospitalization and increased probability of complications even after controlling for a variety of potential confounding factors.[6] The Institute of Medicine has identified the maintenance of functional status as a priority in older women receiving surgical care.[7] In addition, the Centers for Medicare and Medicaid Services are currently working on developing functional status quality measures.[8]

However, pelvic surgeons may not be inclined to evaluate functional status or promote functional independence in older women if they are not cognizant to how prevalent functional limitations are in women undergoing surgical treatment.

Using the linked Health and Retirement Study (HRS) data and Medicare files, the objective of the study was to describe the prevalence of functional limitations based on health status in women 65 years and older with POP, a prevalent pelvic floor disorder.[9] We hypothesized that functional limitations are common in older women with POP.

Material and Methods

Data sources

This is a pooled cross-sectional study utilizing data from the linked Health and Retirement Study (HRS) and Medicare files from the CMS between 1992 and 2008. This study was deemed exempt from Case Western Reserve University Institutional Board Review. HRS is a combined effort of the Institute for Social Research at University of Michigan and the National Institute on Aging and represents the largest ongoing prospective observational study of older persons' health in the U.S.[10] Data collection began in 1992 and nearly 30,000 Americans over the age of 50 have since been enrolled.[10] HRS was designed to assess the changes in labor force participation and health that individuals experience in later life. Comprehensive data was collected on physical health and functional status through in-depth interviews conducted every two years.[11] Validity and reliability of the HRS data collection has been studied extensively.[11] The HRS data have been used to evaluate mobility impairment and incontinence severity,[12] urgency urinary incontinence in older women,[13] and depression and urinary incontinence.[14] The HRS data was linked to Medicare files that contain International Classification of Diseases 9th Revision Clinical Modification (ICD-9) codes from inpatient admissions and outpatient or ambulatory surgery files. Medicare claims data were used to identify participating older women in HRS with POP.

Study Sample

There were 9,125 fee-for-service Medicare beneficiaries in the HRS with linked Medicare claims between 1992 and 2008. The analytic sample of 918 subjects was identified through the ICD-9 POP diagnosis code (618.XX), including 618.01, 618.02, 618.03 for anterior vaginal wall prolapse, 618.04, 618.05 for posterior, 618.2, 618.3, 618.4, 618.1, 618.5, 618.6 for uterovaginal or apical, and 618.00, 618.9, 618.09, 618.84 for unspecified POP. Participants for this study included women ≥ 65 years of age with POP identified by the linked prolapse ICD-9 code and with self-reported functional and health status data. Women (n=28) without data on self-reported health status or functional limitations were excluded. The HRS conducts the interviews every two years, which resulted in some of the 65 year old participants being surveyed 1–2 years before their POP first diagnosis. Thus, the final sample contained a small number (n=17) of women 63–64 years old.

Outcomes Variables

While proxy respondents are sometimes used in HRS when a subject is unable to complete the interview herself, in this study there were zero instances where a proxy respondent was

used. We used the data from the interviews immediately preceding the diagnosis of POP when it was first recorded in claims data, but before pessary or surgical treatment for POP was initiated. The strength questions were based on the Guttman Scale of physical health used in the examination of older adults' social participation.[15] Strength evaluation consisted of questions about sitting for two hours or longer, pulling/pushing large objects (like a living room chair), rising from a chair (after sitting for a long periods); upper and lower body mobility included evaluation of lifting 10 lbs (like a heavy grocery bag), picking up a dime from the table, lifting arms above shoulder level, walking 1 block, walking several blocks, climbing one flight of stairs, and climbing several flights of stairs, respectively. Mobility and ADL were reported by participants using questionnaires originally developed by Katz *et al.* that were utilized in all HRS interviews.[16,17] IADL measurement in the HRS was based on items from the inventory developed by Lawton and Brody.[18] ADLs included bathing, getting in/out of bed, dressing, eating, and crossing the room; IADLs included preparing meals, taking medications, managing money, using the telephone, and shopping. For each item, the participants were dichotomized into those with and without a limitation based on whether they reported any difficulty completing a task due to a health problem expected to last three months or more: "no" versus "yes", "can't do" or "don't do".

Respondent's self-reported functional status was evaluated and stratified by their general health status that was measured as "poor", "fair", "good", "very good", or "excellent". The primary outcomes were the prevalence of functional limitations in strength, upper and lower mobility, ADLs, and IADLs domains that were stratified based on self-reported health status "Good/Very Good/Excellent" versus "Poor/Fair".

We also examined the presence of comorbidities and geriatric syndromes. Participants were queried on whether "a doctor ever told" them they had a condition. The HRS measured chronic diseases and comorbidities prevalent among middle aged and elderly persons most likely to result in functional limitations.[10] Selected comorbidities included lifetime history of hypertension, diabetes, cancer, chronic lung disease, heart problems (e.g., angina, congestive heart failure), stroke, psychiatric illness, and arthritis. Geriatric syndromes were depression (≥ 4 symptoms on modified 8-item Center for Epidemiologic Studies Depression Scale [CES-D[19,20]]), urinary incontinence, falls in the last year, low cognitive performance (bottom tertile of 35 point scale measuring working memory, mental processing speed, etc.),[21] hearing impairment (self-rated "fair" or "poor" hearing, even when "using a hearing aid as usual"),vision impairment (self-rated "fair" or "poor" eyesight, even when wearing corrective lenses, or "legally blind") and severe pain (self-rated as whether patients are "often troubled" by moderate to severe pain).[22,23]

Statistical analysis

We conducted descriptive analysis for all study variables overall and by participants self-reported general health status. Comparisons of functional limitations between good and poor health self-rated health status were made using Pearson's chi-square test for categorical variables and Student's t-test for continuous variables. To measure differences in the odds of functional limitations by participants' categorized age (65–74, 75–84, and ≥ 85), logistic regression was used to model the probability of disability for each category of functional

limitations as the dependent variable conditional on age grouping. All analysis was performed using SAS version 9.3 for Unix (Cary, NC). In order to comply with the Medicare data users' agreement, we masked the small cells with n less than or equal to 10 in Tables 1 and 3. Additional cells were masked, as necessary, to prevent complementary disclosure.

Results

Descriptive Characteristics

The study sample included 890 women with POP. The majority (n=772; 86.7%) were White, while a smaller proportion were African-American (n=53; 6%) and Hispanic (n=58; 6.5%). The mean age of the cohort was 74.5 years (standard deviation [SD]: 6.5). The mean income of participants was $27,012 (SD: 37,705) and the majority (n=524; 59%) were married. Obesity (BMI≥30) was present in approximately one-fifth (n=171; 19.2%) of women, and comorbidities included arthritis (70%), hypertension (57%), heart disease (27%), stroke (11%), cancer (14%), COPD/Lung disease (10%), and psychiatric illness (15%). The mean number of comorbidities per person was 1.9 (SD: 1.2).

Self-Reported Health Status

The self-reported general health status was poor or fair in 29% of the sample. The majority of Caucasians reported good or excellent health status, whereas a larger proportion of African-Americans and Hispanics reported poor or fair health status.

Participants' demographics of women with POP by their self-reported general health status are shown in Table 1. There was no difference in the mean age between women reporting good or excellent health and those who reported poor or fair health (74.2±6.4 vs 75.2±6.6 years, respectively, p=0.06). Participants with worse health status were more likely to be obese compared to women with good or excellent health status (27.9% vs. 15.7%, respectively, p<0.01). Women with poor or fair health status were also less likely to be married and had lower income. In addition, those with poor or fair health status had a higher prevalence of all chronic comorbidities and geriatric syndromes, except falls (Table 2).

Functional Limitations

Functional limitations were highly prevalent in our study sample (Table 3). The functional domains with the highest prevalence of limitations independent of self-reported health status were strength, upper body and lower body mobility: 76.2%, 44.9%, and 65.8%, respectively. The prevalence of functional limitations across all domains was significantly greater in women with poor or fair self-reported health status (as compared to women with good self-reported health, all p<0.01) and ranged from 91.5% for strength, 72.9% for upper body mobility, 88.0% for lower body mobility limitations, 11.6% for ADLs, and 30.6% for IADLs. Nonetheless, participants with good or excellent health status also reported a high prevalence of functional limitation in strength, upper body and lower body mobility domains: 69.9%, 33.5%, and 56.8%, respectively. The likelihood of functional limitations incrementally increased with advancing age (75 years and older) for every domain of disability except strength (Table 4).

Comment

Our study revealed a high prevalence of self-reported functional limitations independent of self-reported health status, particularly with respect to strength, upper and lower body mobility that affected 44.9%-76.2% of women ≥65 years with POP. However, few women reported limitations regarding ADLs and IADLs. Approximately one third of women in the sample reported fair or poor health status, and the prevalence of functional limitations in every domain was higher among those with fair or poor health status as compared to participants with good health status. The likelihood of all functional limitations increased significantly with advanced age. These results suggest that functional limitations, especially in the strength and mobility domains, are common among women with POP, yet the distribution of these impairments significantly differs by health status and age.

The results from this study are analogous to the high prevalence of functional limitations that has been estimated in the older female population based on another national database evaluation, the Medicare Current Beneficiary Survey. According to this 2011 survey, of the total of 23.6 million women who are 65 years old and over, approximately 11.9 million (50.4%) have mobility limitations and 9.9 million (42%) present with limitations to the upper extremities.[5] Given even higher prevalence rates for strength and lower body mobility functional limitations in our sample, we postulate that women experiencing POP have an appreciably greater level of functional limitations compared to similar aged women in the general population. Future studies need to decipher whether POP could be a contributing factor in the development of functional limitations, especially in strength and lower body mobility domains.

The findings contribute to research regarding the functional status in older women with POP. A study by Greer and colleagues demonstrated that women with impaired preoperative functional status had a 2.13-day longer length of stay (95% CI 0.57—3.70, $p<0.01$) and higher rates of complications (OR = 2.18; 95% CI = 1.04–4.56) even after controlling for potential confounding factors.[6] The authors used the American Society of Anaesthesiologists physical status classification, which incorporates comorbidities with physical activity measures: climbing stairs and walking city blocks; and thus, implies that impairments in lower body mobility could lead to worse surgical outcomes. Given our results indicating high prevalence (62%) of self-reported limitations in climbing stairs, it may be possible to improve surgical outcomes and shorten inhospital stays in many older women with POP if their lower body mobility is assessed and strategies are taken to improve it prior to surgery. Richter *et al.* evaluated ADLs and IADLs in older women undergoing surgery for POP,[24] and their findings indicated a low prevalence (3.1%) of limitations in both domains; although, the majority of subjects (63%) in the study sample were less than 75 years old. Our current study yielded similarly low prevalence estimates on functional limitations in ADLs and IADLs. However, the results from our study demonstrate that the likelihood of ADLs and IADLs limitations significantly increases in women age 75 years and older with highest in those ≥ 85 years. From a clinical standpoint, women 75 years and older with POP and with the highest prevalence of functional limitations are at highest risk to have worse surgical outcomes associated with worse functional status.

The strengths of our study include the large databases representing the Medicare population with detailed self-reported data on functional status. Currently, functional status is not routinely evaluated in older women undergoing surgical treatment, but may be an important outcome and measure, as the preservation of functional independence is a cornerstone in geriatric medicine and the priority identified by the Institute of Medicine. All participants completed interviews without any use of proxies, eliminating the potential for measurement bias. Further, our study leverages the expertise and resources of a large prospective cohort evaluating older men and women. The HRS uses well validated survey measurement methods and strategies. The linkage of Medicare claims files to survey assessments from HRS constitutes a unique resource of self-reported and claims-based data with a major advance in quality and enhancement of data to conduct comparative research.[25,26] The availability of diagnosis codes linked to surveyed participants in the HRS-Medicare data allowed us to investigate the functional status in older women with POP. This study displays a comprehensive summary of functional limitations categorized by several physical function domains (strength, mobility, ADLs, IADLs) and stratified by self-reported health status with very little missing data.

There are, however, also limitations of the research. First, there was a lack of clinical data on the severity of prolapse, pelvic floor symptoms, and quality of life evaluation. More bothersome symptoms of prolapse are more likely to cause a woman to limit her walking or lifting and, therefore, more likely lead to impairments in these domains. Although we cannot evaluate this hypothesis in this study, the impact of POP on quality of life has been well documented in past studies and has led to the development of standardized and validated questionnaires intended for clinical use.[27–29] In addition, the cross-sectional design does not allow us to evaluate the changes in POP and functional status and how these conditions affect each other. Despite these limitations, our study is an initial step in the evaluation of functional status in older women. The results emphasize the high prevalence of functional limitations in older women with POP, and provide a background for further research on functional status measures in older women with pelvic floor disorders. Our research represents an initial study in a series of trials evaluating outcomes of POP-related procedures across gradients of functional limitations.

The evaluation of functional status consists of assessment in strength, upper and lower body mobility, ADLs, and IADLs. However, it is presently unknown whether the evaluation of preoperative functional status in older women with pelvic floor disorders using objective measures of physical and functional performance will allow pelvic surgeons to improve safety and quality of surgical care for their older patients.[30–34] Furthermore, it is not clear if (1) there is a relationship between functional limitations and the severity of pelvic floor symptoms and (2) whether functional limitations would improve with the treatment of POP because women do not need to restrict their activities due to symptomatic POP. Our research group is currently conducting a prospective cohort study to evaluate functional status in older women with pelvic floor disorders before and after POP treatment utilizing subjective and objective measures. This information is paramount to the preoperative counselling of our older female patients and will be used to provide additional evidence-based recommendations to enhance their understanding of the maintenance of, and improvement in their functional status after pelvic floor surgery.

Pelvic floor surgeons will invariably face rising numbers of older women in their surgical practices because our nation faces an impending increase in health care demand due to the greater number of older patients with more complex medical needs.[35,7] Our study describes a comprehensive summary of functional limitations in older women with POP, a condition that is a common indication for surgery in older women. The high prevalence of functional limitations in strength and mobility suggest that these domains warrant further evaluation as predictors of surgical outcomes and measures to promote functional independence.

Acknowledgments

Financial support: AUGS Surgical Award Grant 2013, Division of Female Pelvic Medicine and Reconstructive Surgery, University of Hospitals Case Medical Center, Clinical & Translational Science Collaborative of Cleveland, UL1TR000439 and KL2TR000440 from National Center for Advancing Translational Sciences (NCATS)

References

1. Guralnik, JM.; Patel, K.; Ferrucci, L. Assessing functional status and disability in epidemiologic studies. In: Newman, AB.; Cauley, JA., editors. The Epidimiology of Aging. E-book. Springer Science+Business Media; Dordrecht: 2012. p. 91-117.
2. Chiang S, Gerten K, Miller KL. Optimizing Outcomes of Surgery in Advanced Age—Perioperative Factors to Consider. Clin Obstet Gynecol. 50(3):813–825. [PubMed: 17762428]
3. Leveille SG, Penninx BWJH, Melzer D, Izmirlian G, Guralnik JM. Sex Differences in the Prevalence of Mobility Disability in Old Age: The Dynamics of Incidence, Recovery, and Mortality. Journal of Gerontology: SOCIAL SCIENCES. 2000; 55B(I):S41–S50.
4. Guralnik, JM.; Ferrucci, L. Demography and Epidemiology. In: Halter, JB.; Ouslander, JG.; Tinetti, ME.; Asthana, S.; High, K.; Studenski, S., editors. Hazzard's Principles of Geriatric Medicine and Gerontology. 6. New York: McGraw-Hill Co; 2009. p. 45-67.
5. http://www.cms.gov/Research-Statistics-Data-and-Systems/Research/MCBS/Data-Tables-Items/2011CharAndPerc.html?DLPage=1&DLSort=0&DLSortDir=descending
6. Greer JA, Northington GM, Harvie HS, Segal S, Johnson JC, Arya LA. Functional Status and Postoperative Morbidity in Older Women with Prolapse. The Journal of Urology. Sep.2013 190:948–952. [PubMed: 23473899]
7. Institute of Medicine. [Accessed August 2014] 2008 report: Retooling for an aging America: Building the Health care Workforce. http://www.iom.edu/~/media/Files/Report%20Files/2008/Retooling-for-an-Aging-America-Building-the-Health-Care-Workforce/RetoolingforanAgingAmericaBuildingtheHealthCareWorkforce.pdf
8. [Accessed July 3, 2015] http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/LTCH-Quality-Reporting/Downloads/Summary-of-Feedback-from-TEP-on-the-Development-of-Cross-Setting-Functional-Status-Quality-.pdf
9. Nygaard I, Bradley C, Brandt D. for the Women's Health Initiative (WHI). Pelvic Organ Prolapse in Older Women: Prevalence and Risk Factors. Obstet Gynecol. 2004; 104:489–97. [PubMed: 15339758]
10. Wallace RB, Herzog AR. Overview of the Health Measures in the Health and Retirement Study. The Journal of Human Resources. 1995:S84–S107.
11. [Accessed April 7, 2015] http://hrsonline.isr.umich.edu/index.php
12. Rahrig Jenkins KR, Fultz NH. Functional Impairment as a Risk Factor for Urinary Incontinence Among Older Americans. Neurourol Urodynam. 2005; 24:51–55.
13. Komesu YM, Schrader RM, Rogers RG, Ketai LH. Urgency urinary incontinence in women 50 years or older: incidence, remission, and predictors of change. Female Pelvic Med Reconstr Surg. 2011 Jan; 17(1):17–23. [PubMed: 22453668]

14. Nygaard I, Turvey C, Burns TL, Crischilles E, Wallace R. Urinary Incontinence and Depression in Middle-Aged United States Women. Obstet Gynecol. 2003; 101:149–56. [PubMed: 12517660]
15. Rosow I, Breslau N. A Guttman health scale for aged. Journals of Gerontology. 1966; 21:556–559. [PubMed: 5918309]
16. Katz S. Assessing Self-Maintenance: Activities of Daily Living, Mobility, and Instrumental Activities of Daily Living. Journal of the American Geriatrics Society. 1983; 31(12):721–7. [PubMed: 6418786]
17. http://hrsonline.isr.umich.edu/sitedocs/userg/dr-008.pdf
18. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist. 1969; 9:179–86. [PubMed: 5349366]
19. Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Appl Psycholog Measure. 1977; 1:385–401.
20. Okura T, Heisler M, Langa KM. Association between cognitive function and social support with glycemic control in adults with diabetes mellitus. J Am Geriatr Soc. Oct; 2009 57(10):1816–1824. [PubMed: 19682129]
21. Langa KM, Larson EB, Karlawish JH, et al. Trends in the prevalence and mortality of cognitive impairment in the United States: is there evidence of a compression of cognitive morbidity? Alzheimers Dement. 2008 Mar; 4(2):134–44. [PubMed: 18631957]
22. Inouye SK, Studenski S, Tinetti ME, Kuchel GA. Geriatric syndromes: clinical, research, and policy implications of a core geriatric concept. J Am Geriatr Soc. 2007 May; 55(5):780–91. [PubMed: 17493201]
23. Koroukian SM, Warner DF, Owusu C, Given CW. Multimorbidity Redefined: Prospective Health Outcomes and the Cumulative Effect of Co-Occurring Conditions. Prev Chronic Dis. 2015; 12:140478. http://dx.doi.org/10.5888/pcd12.140478.
24. Richter HE, Redden DT, Duxbury AS, Granieri EC, Halli AD, Goode PS. Pelvic Floor Surgery in the Older Woman: Enhanced Compared With Usual Preoperative Assessment. Obstet Gynecol. 2005; 105:800–7. [PubMed: 15802408]
25. Acumen LLC; Burlingame CA: Available at: http://hrsonline.isr.umich.edu/sitedocs/rda/cmsdocs/MedRICdocumentation.pdf
26. Ayanian JZ, Meara E, McWilliams JM. Potential Enhancements to Data on Health Insurance, Health Services, and Medicare in the Health and Retirement Study. Forum for Health Economics and Policy. 2011; 14(3) Article 3.
27. Fritel X, Varnoux N, Zins M, Breart G, Ringa V. Symptomatic pelvic organ prolapse at midlife, quality of life, and risk factors. Obstet Gynecol. 2009 Mar; 113(3):609–16.10.1097/AOG.0b013e3181985312 [PubMed: 19300324]
28. Jelovsek JE, Barber MD. Women seeking treatment for advanced pelvic organ prolapse have decreased body image and quality of life. Am J Obstet Gynecol. 2006; 194:1455–61. [PubMed: 16647928]
29. Barber MD, Kuchibhatla MN, Pieper CF, Bump RC. Psychometric evaluation of 2 comprehensive condition-specific quality of life instruments for women with pelvic floor disorders. Am J Obstet Gynecol. 2001 Dec; 185(6):1388–95. [PubMed: 11744914]
30. Guralnik JM, Ferrucci L, Simonsick EM, Salive ME, Wallace RB. Lower-extremity function in persons over the age of 70 years as a predictor of a subsequent disability. N Engl J Med. 1995; 332:556–562. [PubMed: 7838189]
31. Piva SR, Fitzgerald GK, Irrgang JJ, Bouzubar F, Starz TW. Get up and go test in patients with knee osteoarthritis. Archives of Physical Medicine and Rehabilitation. 2004; 85:284. [PubMed: 14966715]
32. Klein BE, Klein R, Knudtson MD, Lee KE. Frailty, morbidity and survival. Arch Gerontol Geriatr. 2005; 41(2):141–149. [PubMed: 16085065]
33. Dite W, Temple VA. A clinical test of stepping and change of direction to identify multiple falling older adults. Arch Phys Med Rehabil. 2002; 83:1566–1571. [PubMed: 12422327]

34. Enright PL, McBurnie MA, Bittner V, et al. The 6-minute walk test: a quick measure of functional status in elderly adults. Chest. 2003; 123:387–398. [PubMed: 12576356]

35. Miller KL, Baraldi CA. Geriatric gynecology: promoting health and avoiding harm. Am J Obstet Gynecol. 2012 Nov; 207(5):355–67. [PubMed: 22607665]

Table 1

Demographic characteristics of women with prolapse based on health status

	Health Status				
Demographic variables	**Poor/Fair**		**Good/Very Good/Excellent**		**p-value***
Total	258		632		
Race, n (%)					<.001
White	192	74.4%	580	91.8%	
African-American	26	10.1%	27	4.3%	
Hispanic	39	15.1%	19	3.0%	
Age, years					.09
63–64	17	6.6%	30	4.7%	
65–69	46	17.8%	147	23.3%	
70–74	68	26.4%	194	30.7%	
75–79	64	24.8%	138	21.8%	
80–84	40	15.5%	89	14.1%	
85+	23	8.9%	34	5.4%	
Prolapse, n (%)					0.59
Anterior	49	19%	128	20.3%	
Posterior	21	8.1%	77	12.2%	
Uterine/Apical	133	51.6%	345	54.6%	
Other	96	37.2%	218	34.5%	
BMI, n (%)					<.001
Normal/Over (18.5–29.9)	174	67.4%	523	82.8%	
Obese (≥30)	72	27.9%	99	15.7%	
Married (%)	125/255	49.0%	399/630	63.3%	<.001
Mean Income, $ SD	$15,821±14,232		$31,581±42,992		<.001

*Chi-square test

SD standard deviation

Table 2

Comorbidities and geriatric syndromes in women with prolapse based on health status

	Health Status				
Clinical conditions	**Poor/Fair**		**Good/Very Good/Excellent**		**p-value**
Comorbid Condition N (%)					
Arthritis	213/257	82.8%	407/632	64.4%	<.001
Hypertension	181/257	70.4%	327/632	51.7%	<.001
Heart Disease	117/258	45.3%	123/632	19.5%	<.001
Prior Stroke	30/169	17.8%	38/440	8.6%	0.001
Prior Cancer	47/257	18.3%	77/632	12.2%	0.017
COPD/Lung Disease	43/257	16.7%	42/632	6.7%	<.001
Psychiatric Illness	63/257	24.5%	71/632	11.2%	<.001
Geriatric Syndromes					
Depression	90/238	37.8%	61/617	9.9%	<.001
Urinary Incontinence	97/249	39.0%	168/611	27.5%	0.001
Falls	71/221	32.1%	142/541	26.1%	0.09
Cognitive Impairment	106/229	46.3%	162/601	27.0%	<.001
Hearing Impairment	80/255	31.4%	95/630	15.1%	<.001
Vision Impairment	92/255	36.1%	87/630	13.8%	<.001
Severe Pain	42/249	16.9%	18/625	2.9%	<.001

Table 3

Functional limitations in women with prolapse based on self-reported health status

Functional Limitation	Total *		Self-Reported Health				p-value**
			Poor/Fair#		Good/Very Good/Excellent†		
	N	%	N	%	N	%	
Strength							
Sitting for two hours or longer	210	23.6	101	39.2	109	17.3	<.001
Stooping, knelling, crouching	490	55.1	194	75.2	296	46.8	<.001
Moving large objects	373	42.0	168	65.1	205	32.4	<.001
Rising up from a chair	426	47.9	177	68.6	249	39.4	<.001
Any strength limitation	678	76.2	236	91.5	442	69.9	<.001
Upper Body Mobility							
Lifting 10lbs	336	37.8	170	65.9	166	26.3	<.001
Picking up a dime	80	9.0	41	16.0	39	6.2	<.001
Reaching over shoulder	165	18.5	99	38.4	66	10.4	<.001
Any upper body limitation	400	44.9	188	72.9	212	33.5	<.001
Lower Body Mobility							
Walking 1 block	107	12.0	65	25.3	42	6.6	<.001
Walking several blocks	191	21.5	86	33.3	105	16.6	<.001
Climbing stairs	547	61.5	210	81.4	337	53.3	<.001
Climbing 1 flight of stairs	233	26.2	134	51.9	99	15.7	<.001
Any lower body limitation	586	65.8	227	88.0	359	56.8	<.001
Activities of Daily Living (ADL)							
Bathing	15	1.7	≤15	—	≤10	—	<.001
Getting in/out of bed	20	2.2	≤20	—	≤10	—	<.001
Dressing	20	2.2	≤20	—	≤10	—	<.001
Eating	≤10	—	≤10	—	≤10	—	0.01
Difficulty crossing room	40	4.5	30	11.6	≤10	—	<.001
Any ADL	40	4.5	30	11.6	≤10	—	<.001

Functional Limitation	Total *		Self-Reported Health				p-value **
			Poor/Fair #		Good/Very Good/Excellent †		
	N	%	N	%	N	%	
Instrument ADLs							
Difficulty preparing meals	42	4.7	≤42	—	≤10	—	<.001
Diff. taking med	20	2.2	≤20	—	≤10	—	<.001
Diff managing money	38	4.3	23	9.0	15	2.4	<.001
Diff use telephone	25	2.8	≤25	—	≤10	—	<.001
Diff shopping	90	10.1	63	24.4	27	4.3	<.001
Any IADL	121	13.6	79	30.6	42	6.7	<.001

* Total out of 890 subjects

258 subjects

† 632 subjects

** Chi-square test, compares functional limitations stratified by self-reported general health status

— Cells with frequency less or equal to 10 have been masked and percentages are not reported. Adjacent cells within the same row are also masked to prevent complementary disclosure with the frequency reported as ≤ the row total and percentages not reported.

Table 4

Odds of functional limitations in women with pelvic organ prolapse by age category.

Functional Limitations	Age, years		
	65–74	75–84	≥ 85
		OR (95% CI)	OR (95% CI)
Strength	Ref	2.11 (1.50–2.96)	1.78 (0.92–3.47)
Upper Body Mobility	Ref	1.57 (1.18–2.09)	4.58 (2.47–8.51)
Lower Body Mobility	Ref	2.26 (1.66–3.07)	3.61 (1.78–7.32)
ADLs	Ref	2.66 (1.11–6.35)	13.4 (5.12–34.9)
IADLs	Ref	1.96 (1.28–3.02)	4.93 (2.61–9.31)