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Shoulder Symptoms and Function in Geriatric Patients

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Abstract

Background and Purpose—Musculoskeletal problems including shoulder pain are common in the general population and are often cited as reasons for physician visits. Although many risk factors for shoulder pain are postulated, the effects of shoulder pain on functional level and perceived quality of life are poorly characterized in older adults. In this study, we set out to determine the prevalence and impact of shoulder symptoms and dysfunction in an older adult veteran population.

Methods—A chart review, cross-sectional survey, and examination were performed. A sample of 93 individuals, age >60, were recruited from a primary clinic outpatient waiting room at the Clement J. Zablocki VA Medical Center in Milwaukee, WI. Patients were asked about shoulder symptoms and self-assessed health (SAH), and completed the Stanford Modified Health Assessment Questionnaire (MHAQ). A series of 3 shoulder maneuvers were used to assess shoulder mobility and pain. The presence of diabetes and statin use was documented. A more thorough chart review was performed on individuals who reported shoulder pain and disability.

Results—Severe shoulder pain was common in the study group, reported by 31% of all participants. Functional limitation measured by the MHAQ and answering “yes” to greater difficulty performing daily tasks was associated with reduced internal rotation, which was present in almost 36% of all participants. Symptoms were often bilateral. No statistically significant risk factors emerged in this small sample, but suggestive trends were apparent. Interestingly, few patients reported discussing these problems with their providers, and shoulder-related problems were documented in only 10% of corresponding problem lists of symptomatic patients.

Conclusions—With an aging population, the high prevalence of shoulder pain may have considerable impact on public health. It will become increasingly important to define risk factors, delineate etiologies, and devise new management strategies for patients with symptomatic shoulder disease.

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The rights of all participants were protected throughout this entire study process.

Conflicts of Interest: None reported.

Keywords

shoulder pain; veterans; musculoskeletal pain

INTRODUCTION

Chronic painful musculoskeletal disorders are a common problem in older adults and are related to a general decline in health and reduced quality of life. After the knee, the shoulder joint is the most commonly cited painful appendicular joint in the US, being reported in 18.3 million individuals over 18.[1] The prevalence of shoulder pain in the general adult population ranges from 6.9-31%.[2] Although the consensus in the literature is that the peak prevalence of shoulder pain occurs in people aged 45-64,[2] this varies by definition and duration of pain.

While there is some understanding of risk factors for shoulder pain (obesity, diabetes, statin use, activity level),[6-8] it remains unclear how demographic trends and risk factors affect the prevalence of shoulder disease in older adults. In addition, little is known about the impact of shoulder pain and impaired function on older patients' quality of life, and the frequency with which they report this symptom to their health care provider. One wonders if older patients have come to accept shoulder pain as a long-standing symptom, and thus under-report this condition to their providers. Another possible explanation is that pain is more likely to resolve over time, and is thus not reported secondary to resolution of symptoms. The goal of this study was to describe shoulder pain and dysfunction and explore relationships among them, in a convenience sample of individuals over age 60 drawn from a large, VA outpatient primary care clinic.

METHODS

Subjects and Study Design

After approval by the local institutional review board, a cross-sectional survey, examination and chart review of 93 individuals were performed. Clinic schedules were reviewed to solicit participation from individuals aged >60, and these were randomly approached in the waiting room of an outpatient primary care clinic at the Clement J. Zablocki VA Medical Center in Milwaukee, WI. After informed consent was obtained, individuals were screened for exclusion criteria, including major shoulder injuries, shoulder surgery, inflammatory arthritis, and upper extremity neuropathy or myopathy. If patients indicated that shoulder problems were a reason for the visit, they were excluded. If not excluded, individuals were asked a series of questions including whether they had had shoulder pain for more than 3 months in the last year, the location of their pain, and whether it interfered with sleep (appendix 1). Participants then completed the Stanford Modified Health Assessment Questionnaire (MHAQ), a global assessment of function based on reported amount of difficulty with daily activities that has been validated in aging populations. [3,4] Categories include dressing and grooming, eating, and reaching, with each category scored separately. Each item was scored on a 4-point scale: 0 for no difficulty, 1 for some difficulty, 2 for much difficulty and 3 for unable to perform. Use of a device or the need for assistance added 1 point to each category score. Higher scores on the 20-point scale indicate worse overall

function. Participants rated their overall health as excellent, good, fair or poor (self-assessed health, SAH[5], questions 7 and 8, appendix 1). Self-assessments of whether one's health is excellent, very good, good ,fair ,or poor have been valid and powerful predictors of mortality in community-dwelling adults in over 300 studies over the past several decades.[5] A primary chart review was completed on each individual to obtain background information, including demographics, medical history, and number of prescription medications. In subjects with shoulder pain, a secondary chart review was performed, including a review of the problem list, progress notes, documented physical examination findings, referrals, and other management plans related to the shoulder complaint. A series of 3 simple physical maneuvers were used to assess shoulder mobility and pain with each movement (range of motion, ROM). Active abduction, external rotation and internal rotation were assessed by asking the participants to touch their hands to back of their neck, raise arms above their head and touch their upper, inner arms to their ears, and touch their thumbs to their shoulder blades. Each maneuver was assessed by observing and grading range of mobility on a 3-point scale (fully able, 3, partially able, 2, or unable, 1) and pain with movement (no pain, 1, some pain, 2, and lots of pain, 3). The right and left sides were scored separately. A sum score for all 3 maneuvers on each side and for pain on each side is also reported.

Statistical Analysis

Data analysis was performed using SPSS version 16 (SPSS Inc., Chicago, IL). Descriptive statistics are reported as frequencies, percentages, and mean ± S.D. as indicated. Chi Square comparisons were used to perform tests of significance between participants who did or did not report shoulder pain, and Pearson's correlations were used to explore relationships among specific measures. The sample size (n = 93) allowed detection of significant correlations ($p<.05$) with values greater than or equal to ± 0.28.

RESULTS

The demographics of the study population are shown in Table 1. Of the 93 participants, 90.3% were men and 9.7% women, 81.7% were Caucasian and 18.3% African American. The mean age was 74.7 ± 10 years. In this sample, 48.4 % had diabetes, and 58% were currently taking statin medications. Shoulder pain for 3 or more months in the last year was reported by 29 (31%) individuals. These symptoms were often bilateral (41.4%) and interfered with sleep (48% of participants answered yes when asked if the shoulder pain interfered with sleep). Furthermore, in those who reported chronic shoulder symptoms, 31% said their condition affected grooming activities (measured with the MHAQ).

Impairments in performing physical maneuvers were common among the study participants, with 37 individuals (39.8%) having difficulty in performing one or more of the maneuvers. Participants were most likely to have trouble with touching their scapulae with their thumbs (internal rotation, 94.6% of those having difficulty with shoulder ROM); 19 of these individuals had trouble with the other maneuvers, and typically both the right and left sides were involved. Abnormal abduction, as evidenced by the “arm-to-ear” maneuver, was the second most affected shoulder maneuver in this study population, noted in around 18.3%.

Statistically significant correlates of impaired shoulder ROM were HAQ scores, pain on the side of impairment, and limited function and pain of the contralateral shoulder (Table 2). A "sum" function score of each shoulder was associated with a "sum" pain score on each side, i.e. worse function/lower score of right shoulder correlated to greater pain (higher pain score) for the right shoulder ($r=-.391$, $p<.001$), and same for the left shoulder ($r=-.423$, $p<.001$). Overall impaired function on one side was correlated to overall poor function on the other ($r=.849$, $p<.001$), and pain on one side was correlated to pain on the other side ($r=.554$, $p<.001$). Decreased ability to perform daily activities as measured by the HAQ (higher HAQ score) was correlated to worse SAH (lower categorical score) ($r=-.410$, $p<.001$), worse L shoulder function ($r=-.340$, $p=.001$), more pain in both shoulders ($r=.315$, $p=.002$ right; $r=.469$, $p<.001$ left), and experience of pain for 3 or more months ($r=.410$, $p<.001$). In other words, those individuals with difficulty performing shoulder movements were more likely to experience pain, to have pain on both sides, and to have worse functional scores as measured by the HAQ scale. In this small sample there was not a statistically significant relationship between reports of shoulder pain and a history of type 2 diabetes, or current use of statin medications.

Less than half of the 29 individuals (N=14, 48%) reporting pain for 3 or more months in the last year also recalled speaking to their medical providers about their shoulder pain. When asked about possible causes of their shoulder pain, patients most commonly attributed it to "arthritis" (24%), injury (24%), or some other cause, such as "sleeping on it" or "age" (21%). The remainder was unsure as to the cause. 38 % reported taking medications for their condition, and 17% reported "exercise" as their treatment of choice. 28% reported taking no action for their shoulder symptoms.

Secondary chart review was performed on the 29 participants reporting shoulder pain for 3 or more months within the past year (Table 3). Only 10% (3 of the 29) had a shoulder issue noted on the problem list, and 45% (13 of the 29) had a shoulder problem documented in a progress note over the past year. In just over half of these individuals (7 out of 13) a shoulder exam was documented. Four notes described abnormal findings (decreased ROM, pain with ROM, gross weakness), and 3 "normal" shoulder exams were noted. Imaging was obtained in 10 of the 29 participants during the previous year (Table 3). Pharmacologic treatment to address these individuals' shoulder pain was specifically recommended in 9 of 29. Treatments included NSAIDs, acetaminophen, narcotics, and topical agents among others. Specialty referrals were requested for 8 individuals, including physical therapy, occupational therapy, orthopedics, rheumatology, and physical medicine and rehabilitation.

DISCUSSION

We found a 31% prevalence of self-reported shoulder pain among this group of older, mostly male veteran individuals, even after excluding those with a prior history of shoulder injury or possibly confounding comorbid condition. Additionally, 41% of these individuals reported bilateral shoulder pain for 3 or more months over the past year. This prevalence is at the highest end of the rates reported in younger adults. [2] Participants with shoulder pain reported significantly more functional limitation. Worse SAH was significantly correlated to worse function measured with the HAQ.

Risk factors for shoulder pain and other musculoskeletal conditions have been studied by others. Bjelle mentions age, female gender, surrounding muscle strength, and diabetes as risk factors for shoulder problems.[6] Hill and colleagues also noted female gender, age over 50, smoking history and obesity as risk factors for shoulder pain and stiffness.[7] Others have suggested waist circumference, waist-to-hip ratio, metabolic syndrome, diabetes, carotid intima-media thickness, as well as C-reactive protein level as factors associated with shoulder pain and rotator cuff tendinitis.[8] Other studies suggest an association between diabetes and musculoskeletal disease.[9] Statin use has been implicated as a possible risk factor for tendon disease, including tendon rupture and tendinitis, and shoulder stiffness.[10,11] The extent of this risk and the influence of gender is not clear.[12] Many of these risk factors for shoulder problems were present in a significant proportion of the study group, and we observed a high rate of shoulder pain despite the predominantly male gender of the subjects. The sample size was likely too small to detect statistically significant relationships between shoulder pain and some of these risk factors, despite the high prevalence of statin use (58%), and diabetes (50%). We are conducting a larger study to confirm these trends, and corroborate the growing body of evidence supporting these putative shoulder pain risk factors.

We also observed a significant association between SAH and function measured by the HAQ, and suspect the presence of shoulder pain and dysfunction likely contributes to worse ratings of health and quality of life. In fact, the majority of the symptomatic individuals (69%) in our study group reported disruption in their activities of daily living as measured by the MHAQ. With an aging population, the overall impact of shoulder pain is likely to be considerable. Restricted ROM has been associated with the aging process[13] and our results suggest decreased internal rotation of the shoulder joint is the most common impairment, and one which we suspect negatively impacts perceived quality of life.

The chart review of the subset of patients reporting shoulder pain for 3 or more months in the past year gives an interesting glimpse into the variability of documentation and approach to management for this problem in the primary care setting. In the small proportion of patients whose pain was actually documented, treatment regimens varied widely. Only 31% had documented recommendation of pain medications, and only 28% were referred to other providers, including physical therapy. This referral rate is low considering the large amount of data suggesting physical therapy to be an important and effective treatment option.[14-18] Further studies regarding management of shoulder pain are warranted, and may help inform consistent treatment guidelines in this population. These studies are currently lacking. Although 34 % of symptomatic patients underwent some type of imaging, including MRI, it's unclear that this had any effect on management and treatment. The cost effectiveness of imaging painful shoulders in older adults also warrants careful examination.

Taken together, these data suggest that shoulder problems in the older adult are under-reported. Thus, prior studies showing the peak prevalence of shoulder problems in middle age may not be capturing the high prevalence of this condition in the geriatric population. There is, to date, very little research addressing the prevalence and causes for underreporting shoulder pain in older adults. Prior literature suggests that many older individuals accept pain as a part of the normal aging process, or are concerned that their health will be

adversely affected by using pain medications.[19] Other factors to consider are short appointment durations where other health issues are given higher priority, greater longevity amongst the older adult population while maintaining higher levels of function and thus increasing the prevalence of shoulder pain in this demographic. Further studies are necessary to explore these hypotheses. Our results also suggest that reliance upon patient problem lists as a way to identify affected individuals greatly underestimates the prevalence of this significant health problem, and thus large studies using databases, such as the national VA database, may capture only a fraction of patients with shoulder symptoms.

This study was limited by a number of factors, first of which is its restriction to a VA population which included few women. The sample size only provided power to detect correlations between measures of r=.28 or greater. Because there was limited time to spend with each participant, we did not assess current or past history of “repetitive use” vocational or recreational activity that might increase the risk of shoulder impairment.[20] A much larger sample would be needed to determine if activity supersedes other risk factors in the geriatric population. It was also not possible within the confines of the current study to accurately describe history of statin use. Some of this difficulty is because many patients seen at the VA clinics follow with multiple “outside” or community-based providers. This might also contribute to the observed low rates of diagnostic and treatment documentation in the electronic medical record at the VA.

CONCLUSION

In conclusion, this study identified shoulder pain and dysfunction as a common problem within an older adult, predominantly male, veteran population, and suggests a significant disease burden with regard to functionality and quality of life. This problem appears to be frequently overlooked and therefore undertreated. Further studies regarding incidence, prevalence, risk factors, and appropriate evaluation and management of these shoulder conditions are warranted.

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Table 1

Demographic and Descriptive Characteristics of 93 Participants

Participant Characteristic	Value
Age (mean ± SD)	74.7 ± 10.0 years
Male Gender [N (%)]	84.0 (90.3)
Race	
Caucasian [N (%)]	76.0 (81.7)
African American [N (%)]	17.0 (18.3)
BMI Kg/M^2 **(mean ± SD)**	30.0 ± 5.6
# Medications (mean ± SD)	8.9 ± 4.6
On statins [N (%)]	54.0 (58.1)
T2DM [N (%)]	45.0 (48.4)
SAH Excellent [N (%)]	12.0 (12.9)
Good [N (%)]	46.0 (49.5)
Fair [N (%)]	28.0 (30.1)
Poor [N (%)]	7.0 (7.5)
Pain for ≥ 3 months [N (%)]	29.0 (31.2)
Bilateral shoulder pain [N (% of those with pain)]	12.0 (41.4)
Interferes with Sleep [N (% of those with pain)]	14.0 (48.3)
Interferes with grooming [N (% of those with pain)]	9.0 (31.0)
HAQ (mean ± SD)	7.8 ± 7.8

Abbreviations: BMI=Body Mass Index; SAH=Self-Assessed Health; HAQ=Health Assessment Questionnaire

Table 2

Correlations Between Measures

	Statin	BMI	R Func*	L Func*	R Pain*	L Pain*	3 Mo. Pain	SAH	HAQ
Age	.080 (.450)	**−.206† (.047)**	−.017 (.870)	−.087 (.410)	−.025 (.810)	−.049 (.640)	.120 (.250)	.111 (.290)	.181 (.083)
Statin	---	−.104 (.320)	.030 (.780)	.051 (.630)	−.112 (.280)	−.115 (.270)	−.149 (.155)	.043 (.680)	−.05 (.652)
BMI		---	−.101 (.340)	−.100 (.340)	.035 (.740)	.109 (.300)	.074 (.480)	−.060 (.560)	−.022 (.837)
R Func			---	**.849† (<.001)**	**−.391† (<.001)**	**−.235† (<.001)**	−.093 (.370)	.004 (.970)	−.166 (.112)
L Func				---	**−.338† (.001)**	**−.423† (<.001)**	**−.254† (.014)**	.087 (.400)	**−.340† (.001)**
R Pain					---	**.554† (<.001)**	**.471† (<.001)**	−.055 (.600)	**.315† (.002)**
L Pain						---	**.522† (<.001)**	−.172 (.100)	**.469† (<.001)**
3 Mo Pain							---	−.107 (.310)	**.410† (<.001)**
SAH									**−.410† (<.001)**

Abbreviations: BMI=Body Mass Index; R Func=physical maneuvers with R shoulder; L Func=physical maneuvers with L shoulder; SAH=Self-Assessed Health; HAQ=Health Assessment Questionnaire

Numbers represent Pearson Correlation statistic with 2-tailed p value in parentheses. Bold values marked with † are statistically significant: e.g. greater age is associated with lower BMI (negative Pearson statistic), functional impairment on L side is positively associated with functional impairment on the R side; better SAH is correlated with lower (better) function measured by HAQ.

*Ability to perform each of three maneuvers on each side was scored as fully able (3), partially able (2) or unable (1), and summed for each side to obtain a function score for right and left. Pain with performing each maneuver was scored in a similar (reverse) fashion: no pain (1), some pain (2), lots of pain (3), and summed to obtain a pain with maneuver score. Higher function scores equate with greater range of motion, higher pain scores equate with more pain. Higher HAQ scores equate with worse function.

Table 3

Clinical Documentation in Patients Reporting ≥ 3 Months of Shoulder Pain in the Past Year

Shoulder issue on problem list	3
Shoulder issue in primary care progress notes	
Total patients	13
Documented shoulder exams	7
Positive findings	4
"normal" exam	3
Approach to management	
Medications (n=9):	
NSAIDs	3
Acetaminophen	5
Narcotic	2
Other Rx(oral, topical)*	14
Other modality**	10
2 or more treatments	9
Referral to other disciplines (n=8):	
Physical Therapy	6
Occupational Therapy	2
Orthopedics	1
Rheumatology	2
Physical Medicine and Rehab	2
Total referred to alternate provider†	8
Imaging (n=10):	
X-Ray	6
MRI	3
Other (u/s, CT)	2

*Other = hydroxychloroquine, prednisone, vitamin D and calcium, topical lidocaine, glucosamine, Neuragen, nortryptyline, Botox, topical capsaicin, Flexeril, IASI injections

**Exercise, chiropractor, acupuncture, TENS, ice/heat

†Some patients referred to more than one alternate provider