Accuracy of Self-Reported Healthcare Use in Patients with Osteoarthritis

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ABSTRACT. ***Objective.*** To assess the accuracy of self-reports of use of healthcare services by comparing patient reports to the patients' medical records kept by the health agency.

Methods. The participants were 213 members of a large health maintenance organization (HMO) who were 60 years of age or older and had a diagnosis of osteoarthritis. Participants were asked to keep medical logs for 6 months; these data were collected after 3 and 6 months. Agency reported healthcare data were collected for the same 6 month period.

Results. The average number of contacts reported by the HMO was 6.42, while the average number of self-reported contacts was 3.79. The mean absolute discrepancy score between self and agency reported contacts was 3.45. More salient contacts (i.e., days in hospital) were more accurately reported than routine doctor visits, but 70% of the participants underreported their total use of the medical care system.

Conclusion. Accurate and unbiased information is a fundamental necessity basis for making decisions about healthcare issues, and self-reports may not provide such information. (J Rheumatol 2002;29:2181–4)

Key Indexing Terms:
OSTEOARTHRITIS   HEALTHCARE USE   SELF-REPORT   ACCURACY

Documenting patterns of healthcare use is becoming increasingly important as the healthcare crisis continues in the US. Studies assessing contact with the medical system typically rely on survey data, as such data are relatively simple to obtain, and obtaining them is inexpensive. However, several studies have suggested that the accuracy of patients' retrospective reports of use of the healthcare system is less than perfect[1-5]. Questions about validity and reliability plague self-report measures. However, a patient's reports of healthcare use can be checked against another source, namely, the medical records that are kept by the agency. While errors can occur in agency records, they are far less susceptible to forgetting, social desirability, or interviewing conditions.

Although many studies have reported averaged correlations between self and agency reported use as moderate to high, ranging from 0.78 to 1.0[6,7], using aggregate numbers is problematic. Because there are patterns of high users underreporting and low users overreporting, the averaged discrepancy may appear much smaller than it is[1,2,4]. For example, in a study by Glandon and colleagues[2] the mean reporting error was 0.35 visits per person, but the absolute reporting error was nearly 2 visits. Further, in a majority of the studies, relatively healthy people were asked to report on a short time period (i.e., 6 months or less), a period during which many people accurately report no contact with a healthcare provider; conclusions about accuracy in these samples are driven primarily by people reporting no visits. Thus the average reports may seem reasonably accurate, but there may be systematic errors that appear to validate or invalidate models predicting healthcare contacts.

In general, inaccuracy in reported use has been associated with age (older adults and children are less accurate), low income, low education, poor health status, greater disability, and high levels of use[2,4]. Specifically, reporting more visits to health providers than actually occurred (overreporting) is more common among people who are infrequent users of the system[1] and among children[3]. Conversely, underreporting is more characteristic in individuals with high usage, for example, older adults, and people with more acute or chronic illnesses[2]. Underreporting has also been found among Caucasians, people with prepaid plans, and people with both low[1] and high[2] incomes.

This study investigated the accuracy of self-reported use in a sample of adult health maintenance organization (HMO) members diagnosed with osteoarthritis (OA). Because the participants were older and had a chronic disease, we hypothesized that they would underreport their medical contacts.

MATERIALS AND METHODS

Participants. Participants were 213 members (64% female) of a large HMO with an average age of 69 years (SD 5.6 yrs). Most participants were Caucasian (93%), married (76%), and retired (75%). The sample was

primarily educated, with 68% having attended some college or graduated; only 2.3% of the participants had not graduated from high school. The median income range for the participants in 1992 was US$20,000 to $30,000 annually. Fifty-two percent of the participants reported no medical conditions other than arthritis, 31% reported one other condition, and 17% reported 2 or more additional conditions including high blood pressure (30%), heart problems/disease (13%), diabetes (6%), cancer (6%), lung disease (8%), kidney disease (2%), and stomach problems/ulcers (7%).

Self-reported healthcare use. Participants were asked to keep a medical log of their contacts within the HMO. They were asked to record the type of visit (i.e., appointment, emergency room visit) and type of provider (i.e., nurse, nurse practitioner, physician's assistant, primary care physician, urgent care physician, or specialist) for each contact on a "Medical Care Activity Log" provided by project personnel. Logs were collected during participant assessments at 3 and 6 months. During the assessments, a trained staff member reviewed the log sheets with the participant to ensure its completeness.

Agency reported healthcare utilization. The number of healthcare contacts within the HMO was determined by having a medical chart reviewer examine the participants' medical records to document healthcare contacts during the same 6 month period.

Procedure. Participants in this study were part of a larger study examining the effects of social support and/or education about OA[8,9]. To be eligible, members had to have a physician's diagnosis of OA, be at least 60 years old, and be willing and able to attend 10 weekly and 10 monthly meetings over the course of a year. HMO members over the age of 60 were randomly selected and contacted by mail. Given the prevalence rate of OA (roughly 50%), we estimated the participation rate to be 25%. A medical history was obtained through verbal interviews by trained staff members.

At the end of the initial interview participants were given a Medical Care Activity Log and told to record every healthcare visit. Participants were shown how to complete the log and asked whether they had any questions about the task. All participants were told that as part of their participation in the study we would access their medical records to assess changes that occurred over time and to record information about their OA. Patients were not specifically told that their medical log data would be compared to the agency recorded data. When the participants were assessed after 3 and 6 months, the interviewer reviewed the logs and asked whether there were any healthcare contacts that were not recorded. If the participant had not recorded some of his or her contacts, the interviewer helped the participant to complete the log.

After the initial interview, volunteers were randomly assigned to one of 3 treatment groups or to a no-meeting control group. Treatment groups underwent interventions in patient education and/or social support, consisting of 10 weekly meetings followed by 10 monthly meetings. Agency reported medical data were collected at 6 months by a trained employee of the HMO.

RESULTS

The categories of contact examined included (1) doctor and nurse visits, (2) emergency room and urgent care visits, (3) days in the hospital, (4) other visits (i.e., physical therapy), and (5) total contacts (a sum of all categories).

Frequencies of each category of contact, as reported by the agency and patients, are presented in Table 1. The average number of contacts over a 6 month period, according to the HMO records, ranged from 0 to 38, with an average of 6.43 (SD 6.68). The average number of self-reported contacts ranged from 0 to 27, with an average of 3.79 (SD 4.59). Discrepancy scores were computed by subtracting the agency tallies from the self-reported tallies. Thus, a negative score indicated underreporting, a positive score indicated overreporting, and a zero indicated that the self-reported and agency records had perfect agreement. When these scores were averaged, participants underreported by 2.63 contacts; however, when the absolute value of these scores was used, the average absolute difference between self and agency reported visits was 3.45 (SD 4.95) contacts. The differences in costs based on the data from the agency and patient reports for each type of visit, as well as costs based on the overall reported utilization, are presented in Table 1. In each case, the agency reported costs are higher than those reported by the patients. The overall costs based on the agency reports are almost double those based on the patients' self-reports.

Before examining discrepancy scores in the sample as a whole, analyses were conducted to determine whether there were differences in accuracy of reporting as a function of participating in the interventions. The discrepancy scores of the 3 intervention groups were compared to those of the no-

Table 1. Frequency of contacts as reported by agency (n = 213).

Frequency	Dr. or Nurse Visit Agency N (%)	Dr. or Nurse Visit Patient N (%)	ER or Urgent Care Agency N (%)	ER or Urgent Care Patient N (%)	Days in Hospital Agency N (%)	Days in Hospital Patient N (%)	Other Visits Agency N (%)	Other Visits Patient N (%)	Total Agency N (%)	Total Patient N (%)
0	17 (8)	50 (24)	167 (78)	184 (86)	203 (95)	208 (98)	164 (77)	201 (94)	12 (6)	49 (23)
1	28 (13)	32 (15)	32 (15)	15 (7)	3 (1)	2 (1)	24 (11)	2 (1)	25 (12)	30 (14)
2	23 (11)	40 (19)	8 (4)	5 (2)	2 (1)	1 (< 1)	11 (5)	3 (1)	24 (11)	35 (16)
3	23 (11)	23 (11)	4 (2)	5 (2)	0 (0)	0 (0)	3 (1)	1 (< 1)	19 (9)	23 (11)
4	29 (14)	17 (8)	1 (0.5)	2 (1)	1 (0.5)	0 (0)	2 (1)	1 (< 1)	24 (11)	16 (8)
5	21 (10)	9 (4)	0 (0)	1 (< 1)	0 (0)	0 (0)	1 (0.5)	1 (< 1)	22 (10)	9 (4)
6	20 (9)	8 (4)	0 (0)	1 (< 1)	0 (0)	1 (< 1)	1 (0.5)	2 (1)	23 (11)	9 (4)
7+	52 (24)	34 (16)	1 (0.5)	0 (0)	4 (2)	1 (< 1)	8 (4)	2 (1)	64 (30)	42 (20)
Range	0–25	0–21	0–12	0–6	0–9	0–7	0–19	0–9	0–38	0–27
Mean (SD)	5.12 (4.67)	3.20 (3.6)	0.36 (1.05)	0.28 (0.86)	0.21 (1.18)	0.08 (0.65)	0.74 (2.32)	0.23 (1.13)	6.43 (6.68)	3.79 (4.59)
Average Cost ($) (standard deviation)	271.36 (247.51)	169.00 (190.80)	147.88 (428.40)	114.24 (350.88)	447.30 (2,513.40)	170.40 (1,384.50)	76.96 (241.28)	23.92 (117.52)	943.50 (857.65)	477.56 (510.93)

treatment control group through a multivariate analysis of variance. There were no significant differences between the groups, $F (4, 208) = 1.82$, $p = 0.13$. Thus, the groups were combined for further analyses.

As shown in Table 2, 70% of the participants in this study underreported their total contacts. The best agreement between the participants' self-reported medical use and the medical records was for days in the hospital (95% accurate, $r = 0.65$), followed by emergency room (ER) and urgent care visits (79% accurate, $r = 0.18$), and other types of visits (76% accurate, $r = 0.47$). The poorest agreement was for doctor and nurse visits, with only 18% of the sample reporting the same number of contacts as the agency ($r = 0.61$).

To investigate the degree of inaccuracy, frequencies of the discrepancy scores were examined (Table 3). When people were inaccurate, the discrepancy was often only one or 2 contacts. For example, when considering ER/urgent care, days in hospital, or other visits, 93–99% of the participants reported their use within 2 contacts. However, for doctor and nurse visits, only 61% of the participants reported their use within 2 contacts. For total contacts, 45% of the sample was within one contact, 56% within 2 contacts, and 22% of the sample underreported contacts by 5 or more visits. On average, the sample underreported doctor and nurse visits by 1.92 contacts, ER and urgent care visits by 0.08 of a contact, days in the hospital by 0.13 of a day, and other visits by 0.51 of a contact, for a total averaged

underreporting of healthcare use by 2.63 contacts.

DISCUSSION

Although moderate to high correlations between self-reported and agency reported use have been reported in previous studies[6,7], the absolute mean difference between self and agency reported contacts in this study was 3.45, with 70% of the participants underreporting their healthcare contacts. This is consistent with research suggesting that aggregate scores may overestimate accuracy, as over and underreporters cancel each other out[4]. It is also consistent with the finding that older adults and those with chronic conditions have a tendency to underreport their medical use[2,3]. The correlations found in this study between agency and patient reports ranged from 0.18 to 0.65. Similar ranges in correlations have been reported by other investigators[5]. One factor that may affect the reporting of healthcare use is social desirability. Behaviors perceived as socially undesirable are often underreported[10]. Participants who use the healthcare system frequently may have a tendency to underreport their use because they do not want to appear dependent or wasteful. Other factors that may affect self-reports are related to the physical and mental health of the subjects. Problems with memory, and the complexity of their health problems, might have affected the subjects' recall of the amount of their use of the healthcare system[2]. However, in this study, participants were provided with medical activity logs ahead of time to complete when they had contact with the healthcare system. This should have reduced the difficulties older people may have with recall. Overall, less than half the participants reported their medical use within one contact of agency records. However, it is important to note that the degree of inaccuracy depended on the type of contact. Participants were reasonably accurate when reporting the number of days in the hospital, ER and urgent care visits, and other medical visits. These types of visits are more salient and thus easier to remember. Although the discrepancy between the agency reports and self-reports of these visits was low, any discrepancy is important because

Table 2. Percentage of participants in each reporting category: accurate, underreporting, and overreporting (n = 213).

Type of Contact	Accurate, %	Underreport, %	Overreport, %
Doctor or nurse visit	18	68	14
ER or urgent care visit	79	14	7
Days in hospital	95	4	1
Other visits	76	21	3
Total contacts	16	70	14

Table 3. Discrepancies between self-reported and agency reported contacts (n = 213).

Frequency	Dr. or Nurse Visits N (%)	ER or Urgent Care N (%)	Days in Hospital N (%)	Other Visits N (%)	Total N (%)
−5+	34 (16)	1 (0.5)	2 (1)	8 (4)	45 (22)
−4	19 (9)	1 (0.5)	1 (0.5)	2 (1)	19 (9)
−3	19 (9)	1 (0.5)	0 (—)	2 (1)	17 (8)
−2	24 (11)	5 (2)	2 (1)	10 (5)	21 (10)
−1	48 (23)	22 (10)	4 (2)	23 (11)	47 (22)
0	39 (18)	168 (79)	202 (95)	162 (76)	35 (16)
1	16 (8)	6 (3)	2 (1)	1 (0.5)	14 (7)
2	3 (1)	5 (2)	0 (—)	1 (0.5)	3 (1)
3	5 (2)	1 (0.5)	0 (—)	2 (1)	6 (3)
4	1 (0.5)	1 (0.5)	0 (—)	1 (0.5)	2 (1)
5+	5 (2)	2 (1)	0 (—)	1 (0.5)	4 (2)

these types of visits are typically much more costly than routine doctor or nurse visits. Thus, underreporting even one day in the hospital ($2,130[11]) or one ER visit ($408; based on the University of California San Diego Hospital's average for the 1998-99 fiscal year) could have large effects. National policy decisions may be based on estimates of the absolute levels of usage; systematic errors could lead to misguided policies. Thus, researchers should consider comparing agency and self-reported use over a reasonable interval in order to make corrections for the population under study.

A limitation of this study is the specific population considered: older adults diagnosed with OA from a single HMO. In addition, all of the participants volunteered for a study. It is possible that the large discrepancies we found are a function of the population studied and may not be applicable to other populations. However, patterns of use within older populations who have chronic conditions are of prime concern, as such populations are typically high users of the healthcare system, and increasing numbers of people are members of HMOs. Studies of the accuracy of self-reported healthcare use should always precede other studies that are based on such data to determine whether the self-reports of interest are valid for the population in the study. In this study, the participants were provided with forms and asked to complete them as they had contacts with the healthcare system. This procedure should have produced better reporting than asking patients after 3 months to recall their contacts with the healthcare system. Thus, our findings may be conservative estimates of the discrepancies between self-report and actual healthcare use. Another limitation of the present study is that there was a relatively small sample size and in some categories of healthcare contacts, there were few visits.

Overall, we found that only 16% of the sample studied accurately reported use of the medical system. Because participants were asked to keep a medical activity log over a relatively short period (3 months at a time), it appears that at least in an older, chronically ill population, self-reports of healthcare use should be regarded with some skepticism. If agency records cannot be consistently obtained for a particular study, researchers may consider "correcting" self-reported data based on comparisons by other researchers between agency and self-reports for the population under study. Another possibility is to provide people with medical activity logs ahead of time and instruct them to complete the form each time they meet with a provider. To increase the likelihood that they will complete the form, researchers may be well advised to schedule weekly reminder calls to the participants. Other methods for increasing the accuracy of self-reported information may be developed and tested.

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