Collecting Health History Information: The Accuracy of a Patient Self-administered Questionnaire in an Orthopedic Outpatient Setting

Background and Purpose. The utility of patient self-administered health history questionnaires has been extensively studied in physician practice settings, but little such research has been done in populations germane to physical therapist practice. The purpose of this study was to document the accuracy of a self-administered questionnaire for collecting patients’ history of illness, surgery, and medication use. Subjects. Outpatient orthopedic surgery candidates (n=100, 54% female, 46% male; mean age=46.9 years) with common orthopedic disorders were recruited. Methods. Using the same form, patient health history information was recorded separately by patient self-report and by an experienced health care practitioner. Patient questionnaire responses were compared for accuracy with responses generated by the practitioner and those found in the medical record. Results. The mean percentage of agreement across questionnaire items was 96% (range=57%–100%); the mean kappa value was .69 (range=.154–1.0). Of the total questionnaire responses across all patients (n=9,436), 2.55% (n=241) of the responses were noted “yes” on the practitioner questionnaire, but not on the patient questionnaire; 1.8% of the items (n=174) were noted “yes” on the patient questionnaire, but not on the practitioner questionnaire. Discussion and Conclusion. The results support the accuracy of patient self-administered health history questionnaires in reporting important health history information. [Boissonnault WG, Badke MB. Collecting health history information: the accuracy of a patient self-administered questionnaire in an orthopedic outpatient setting. Phys Ther. 2005;85:531–543.]

Key Words: Comorbidities, Examination, Health history, Medications, Orthopedic outpatients, Physical therapy.

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The Guide to Physical Therapist Practice\textsuperscript{a} (the Guide) describes the categories of patient examination data appropriate for the therapist to collect prior to the initiation of interventions. These categories of data from the history include “general patient demographics,” “medical and surgical history,” and “medication use.” This health history information can be vitally important for: (1) identification of health restoration and prevention needs, (2) development of a safe and effective intervention program, (3) establishment of an accurate prognosis, and (4) identification of possible problems that require consultation with another provider.\textsuperscript{1,2} Studies\textsuperscript{2,3} have shown that patients seen in outpatient physical therapist practices have extensive health histories. Common comorbidities in this population are hypertension, depression, asthma, and sinus infections. In addition, many patients have a surgical history, including orthopedic, gynecologic, and abdominal procedures. Medication use also is extensive in the outpatient population, with nonsteroidal anti-inflammatory drugs, narcotics, muscle relaxants, antihypertension drugs, and hormone replacement drugs being the most frequently reported medications.\textsuperscript{2,3}

Studies\textsuperscript{4–8} have shown that the presence of such comorbidities can affect rehabilitation outcome, and medication use patterns can place patients seeking care from physical therapists at increased risk for adverse health events. For example, Mossey and colleagues\textsuperscript{4,5} reported an association between persistent, unresolved depression and poorer recovery in patients following hip fracture. Jette and Jette reported that patients with spinal impairments\textsuperscript{6} and knee impairments\textsuperscript{7} who were depressed at the time they received physical therapy services had poorer outcomes in both the physical and psychologic domains than those who were not depressed. Boissonnault and Meek\textsuperscript{8} described patients seeking outpatient rehabilitation services, noting that of the 1,817 patients who were taking nonsteroidal anti-inflammatory drugs or aspirin, 13% had 2 or more additional risk factors for serious gastrointestinal complications. These results highlight the potential role physical therapists could play in detecting potentially serious medical conditions and drug safety issues. Therapist ease of access to patient comorbidity and medication information may vary depending on the clinical setting (hospital-based versus non–hospital-based clinic) or whether the patient accesses the therapy services directly or via a physician referral. Therapists working in a non–hospital-based clinic, seeing patients via direct access, will probably be the group faced with the most difficulty in getting patient health history information prior to the initial visit. The challenge for the busy clinician is in implementing a process that allows for these data to be collected in an effective and accurate way, yet in an efficient and timely manner—a challenge other health care professionals also have faced.

Prior to World War II, most physicians were general practitioners who were usually their patients’ only physician and, therefore, were very familiar with their patients’ health histories obtained via interview.\textsuperscript{9} After World War II, a proliferation of physician specialist clinics led to a “decentralization” of health care delivery, accompanied by a need to accurately and efficiently collect patient medical history information in multiple clinic settings.\textsuperscript{9} As a complement to the patient interview, self-administered health history questionnaires have since been advocated for use in physician ambulatory clinic settings.\textsuperscript{10–16} The addition of self-administered questionnaires to the patient examination has been associated with: (1) earlier and more active patient participation during the history-taking process, (2) more complete patient records, and (3) physician identification of additional medical problems not noted in the medical record or interview.\textsuperscript{17} Hall\textsuperscript{12} observed that patients often were willing to give information in writing that they were reluctant to impart face-to-face. Other postulated advantages include allowing for some standardization of the recording of patient information, uniformity of administration, and minimal interview bias.\textsuperscript{18} In addition, some authors\textsuperscript{12,19} have hypothesized that having patients complete a self-administered questionnaire prior to the interview would save time for the health care provider, allowing for a quicker focus on the major patient problems.

A variety of patient self-administered health history questionnaires have been shown to be clinical tools that

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Dr Boissonnault provided concept/idea/research design, data collection, and project management. Dr Badke provided data analysis. Both authors provided writing.

The study protocol was approved by the University of Wisconsin–Madison’s Health Sciences Human Subjects Committee.

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yield reliable and valid data.\textsuperscript{16,20–22} Factors influencing the accuracy of collecting health history information via a questionnaire, such as age, sex, and survey construct, also have been identified.\textsuperscript{18,23,24} In many studies,\textsuperscript{11,12,14,17,19,21} subjects were recruited during new-patient visits in physician (eg, internal medicine, family practice) ambulatory clinic settings, where the most common reasons for the visits include hypertension, acute upper-respiratory infections, allergic rhinitis, chronic sinusitis, diabetes mellitus, allergies, general medical examination, pregnancy, and health supervision of an infant or child.\textsuperscript{25} Sprains and strains of the back are the only disorders germane to physical therapist practice that fall within the top 10 reasons for patients being seen by family practice, internal medicine, or general practitioners. Other studies\textsuperscript{5,26–28} have consistently shown that the most frequently noted reasons for patients seeking outpatient physical therapy services include sprains, strains, and other conditions of the lumbar and cervical spine, sacral, shoulder, and knee regions.

Although the Guide\textsuperscript{1} contains a recommended patient self-administered documentation template for outpatients that is designed, in part, to collect health history information, we were unable to find studies that investigated the utility of this or any other patient self-administered health history questionnaire in populations germane to outpatient physical therapist practice. In addition, relatively poor accuracy of patient responses to open-ended questions, especially those investigating medication use, has been reported.\textsuperscript{21} The medication portion of the Guide’s template primarily consists of open-ended questions.\textsuperscript{1} The purpose of this study was to determine the accuracy of a patient self-administered questionnaire designed to collect health history information (illnesses, surgeries, and medication use) in outpatients with orthopedic conditions of the lumbar and cervical spine, shoulder, and knee. We hypothesized that the level of agreement between the questionnaire data and a reference standard, which included combined data from the patient interview and medical record, would be adequate to warrant the use of the questionnaire as an adjunct to the patient interview. Furthermore, we hypothesized that agreement between the patient self-administered questionnaire and the reference standard would be influenced by patient demographic factors.

Method

Participants

During the 6-month recruitment period, 263 consecutive patients who were attending their preoperative visit at the University of Wisconsin Hospital and Clinics’ (UWHC) Sports Medicine Clinic for shoulder or knee surgery or the UWHC’s Spine Clinic for lumbar or cervical spine surgery were approached for potential participation in the study by the clinics’ attending nurse practitioner (NP) and physician assistant (PA). Inclusion criteria for the study included being 18 years of age or older, having English as the primary spoken language, being scheduled for an orthopedic operative procedure with 1 of 4 collaborating orthopedic surgeons, and the patient permanent medical record being available for review at the approximate time of the preoperative visit. The patient permanent medical record is a compilation of all inpatient and outpatient medical reports (eg, operative, physical examination, specialty clinic, physical therapy reports) for individuals under the umbrella of health care plans associated with the hospital. All 100 of the patients who met the inclusion criteria agreed to participate and signed an informed consent form that was part of the study protocol approved by the University of Wisconsin–Madison’s Health Sciences Human Subjects Committee. Table 1 describes selected sociodemographic characteristics of the patient sample. The mean age of the patients was 46.9 years (SD=16.7). Of the participants, 54% were female and 46% were male, more than 60% were married, and 94% had at least a high school education. The most common surgical intervention was for the lumbar spine (68%). Eighty-three of the 100 participants had received physical therapy services prior to the scheduling of their surgery.

The remaining 163 patients were excluded and did not complete the health history questionnaire because their permanent medical record was not available at the time of the preoperative visit. Many of these patients had their day-to-day health care needs met through other institutions located in other cities and states, so their permanent medical record was not accessible to UWHC’s Sports Medicine Clinic or Spine Clinic. For others, the medical record was not delivered to the participating clinics in time for their preoperative visit. All 163 participants excluded from the study did agree to provide demographic information, including age, race/ethnicity, sex, and type of surgical procedure (Tab. 1). The participants and the nonparticipants were not different in terms of age (\(P=.36\)) or race/ethnicity (\(P=.55\)). They were dissimilar in the following areas: (1) the nonparticipants included a higher percentage of men compared with the participants (66% of the nonparticipants versus 46% of the participants), (2) only 9.8% of the nonparticipants were scheduled to have a lumbar spine procedure compared with 68% of the participants, and (3) the frequency of knee operative procedures was 56% for the nonparticipants and only 12% for the participants.

Patient Self-administered Health History Questionnaire

The primary author (WGB) and 3 other physical therapists, a team of 4 participating orthopedic surgeons, and
2 primary care family practice physicians employed by UWHC developed the 92-item patient health history questionnaire (Appendix). The UWHC’s standard preoperative history and physical examination form, the Guide’s documentation template for physical therapist patient/client management (outpatient form), and the patient health history questionnaire utilized by the UWHC Spine Physical Therapy Clinic were used as guides for the initial questionnaire development. The resultant general survey categories included illnesses, surgeries, non-physician-prescribed over-the-counter (OTC) medications, physician-prescribed medications, tobacco and alcohol use, and patient demographic information. The entire specific list of nonprescribed medications and 20 of the 26 illnesses and conditions listed under the “Medical/Surgery History” section of the Guide’s outpatient documentation form were included in the study’s survey questionnaire. The questionnaire was pilot tested on 10 patients who were seen for examination prior to spinal surgery to assess the ease of understanding of the survey items. These patients had been seen by a physical therapist for their orthopedic condition prior to the scheduling of the surgery. After the resultant minor questionnaire changes were made, a test-retest assessment of the questionnaire was completed.

For the purpose of examining test-retest reliability of the patient questionnaire responses, 38 patients completed the questionnaire while attending a preoperative orthopedic shoulder, knee, or spine visit at the UWHC Sports Medicine Clinic or Spine Clinic. The patients were then given a second survey form and asked to complete it 1 to 4 days later and return it in a self-addressed envelope. Thirty-three of the 38 patients returned the second survey form. Percentage of agreement and the Cohen kappa statistic were calculated to measure agreement between the first and second survey results. A majority of the items (n=53 [58%]) had 100% agreement. For the 33 survey items that did not have 100% agreement, the mean percentage of agreement was 95.4%, with a range of 90.6% to 96.9%. The mean kappa value for these 33 items was .855, with a range of .78 to .94. According to Landis and Koch, kappa values above .80 represent excellent agreement. Items 9, 16, 45, 56, 67, and 86 (the open-ended questions seeking data in the category of “other”) did not have an adequate response rate for this type of analysis.

**Procedure**

Once a patient’s written consent was received, the patient completed the self-administered health history questionnaire (patient questionnaire) and placed the survey form in an envelope that was kept in a locked cabinet. Afterward, the NP or PA carried out the routine preoperative oral history and physical examination. The participating NP and PA were long-standing permanent employees of the UWHC Sports Medicine Clinic and Spine Clinic. Completing the UWHC preoperative history and physical examination form just prior to the patients seeing the surgeon is their primary job responsibility. The UWHC preoperative history and physical examination form is designed to “guide” the practitioner.

<table>
<thead>
<tr>
<th>Table 1. Characteristics of Study Population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants</strong> (n=100)</td>
</tr>
<tr>
<td>Age [y]</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>SD</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Sex [%]</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Race/ethnicity</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Black</td>
</tr>
<tr>
<td>Hispanic</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Marital status</td>
</tr>
<tr>
<td>Married</td>
</tr>
<tr>
<td>Single</td>
</tr>
<tr>
<td>Education</td>
</tr>
<tr>
<td>Less than high school</td>
</tr>
<tr>
<td>High school</td>
</tr>
<tr>
<td>Beyond high school</td>
</tr>
<tr>
<td>Income</td>
</tr>
<tr>
<td>&lt;$20,000</td>
</tr>
<tr>
<td>≥$20,000</td>
</tr>
<tr>
<td>Surgical intervention (region)</td>
</tr>
<tr>
<td>Lumbar spine</td>
</tr>
<tr>
<td>Cervical spine</td>
</tr>
<tr>
<td>Knee</td>
</tr>
<tr>
<td>Shoulder</td>
</tr>
</tbody>
</table>

*The participants and nonparticipants were not significantly different in age (P=.36) or race/ethnicity (P=.55). A significant difference (P=.05) between the 2 groups was noted for proportion of men versus women and for surgical site.

Asterisks indicate data not collected from nonparticipants. n=162 for nonparticipants due to missing data.

Single includes: divorced/separated, never married, widowed.

n=99 for participants due to missing data.
through the preoperative oral history and physical examination. To determine patient comorbidities, lists of disorders specific to each of the body systems are included, and an open-ended question is used for documenting medications, their dose, and frequency of use. Within a 3- to 4-day period following the patients’ preoperative visits, the NP and PA, each using data from the UWHC preoperative history and physical examination form and the medical record of the patients they individually examined, completed a questionnaire (NP/PA questionnaire) identical to the one the patient had filled out during the preoperative visit. The NP and PA were blinded to the results of the patient questionnaire. The completed NP/PA questionnaire was placed in an envelope and locked in the cabinet. On a weekly basis, the primary author (WGB) collected the completed survey questionnaires from the clinics. Typically, the preoperative visit is the initial contact between these practitioners and the patients, and many times it is the only contact.

Data Analysis
To verify accuracy of the data entry, a complete data set was hand-entered into an Excel spreadsheet program by 2 independent research assistants. Inconsistencies noted between data entries from the 2 research assistants were resolved with a review of the hard copy of the survey questionnaire. For a comparison of participants’ and nonparticipants’ demographics, the Fisher exact test (2-tailed) was used for race, sex, and type of surgery, and the Wilcoxon 2-sample test was used for age to assess homogeneity between groups. For each questionnaire item, we assessed agreement between responses on the patient questionnaire and responses on the NP/PA questionnaire by calculating the percentage of agreement, as well as the kappa statistic, to adjust for the contribution of chance agreements. As suggested by Landis and Koch, we considered a kappa value of less than .40 as representing poor-fair agreement, a kappa value of .40 or greater but less than .60 as representing moderate agreement, a kappa value of .60 or greater but less than .80 as representing substantial agreement, and a kappa value greater than .80 as representing almost perfect agreement. In addition, the mean percentage of agreement and the mean kappa across all questionnaire items were calculated. The differences in percentage of agreement based on age (younger than 65 years versus 65 years and older), sex, education (less than high school versus high school or more), income (less than $20,000 versus $20,000 or more), and marital status were compared using rank-sum tests.

For questionnaire validity assessment, we described discordant responses between the patient questionnaire and the NP/PA questionnaire as false negatives (a “no” response on patient questionnaire; a “yes” response on NP/PA questionnaire) and false positives (a “yes” response on patient questionnaire; a “no” response on NP/PA questionnaire). For example, a false negative occurs when a patient indicates on the patient questionnaire that he or she does not have asthma, but then the patient reports during the interview with the NP or PA that he or she does have asthma or a history of asthma is found during the patient medical record review. All analyses were performed using Statistical Analysis System statistical software on a personal computer. A P value of less than .05 was considered to indicate statistical significance.

Results
Analysis of the individual items across all patients tested revealed from 57% to 100% agreement between responses on the patient self-report questionnaire and responses on the NP/PA oral interview/chart review questionnaire. The mean percentage of agreement across all items was 95.6%; the median percentage of agreement was 98%. Kappa values for each item ranged from +.154 to +1.0 (mean kappa = .69). Table 2 identifies those items that had kappa values of less than .40. The agreement was poor to fair primarily for open-ended items and for questions concerning OTC medications. Table 3 identifies those items that had kappa values of less than .60, indicating moderate agreement. Open-ended items and questions about medications made up the majority of items on the list.

The distribution of disagreements between the patient questionnaire and NP/PA questionnaire responses is shown in Table 4. Of the total questionnaire responses, 2.55% were noted as “yes” on the NP/PA questionnaire and were reported as “no” on the patient questionnaire (false negatives). A false positive response occurred in 1.84% of the replies. The false negative and false positive responses were not evenly distributed throughout the questionnaire. Eighty-eight percent of the false negatives and 56% of the false positives were medication-related items or open-ended questions.

Finally, we examined the agreement between the patient questionnaire responses and the NP/PA questionnaire responses within specific strata defined by patient age, educational attainment, income, sex, and marital status. There were too few nonwhite patients (n = 7) in the sample to determine whether race/ethnicity influenced the level of agreement. The results of the rank-sum tests showed that only age was related to mean percentage of agreement across all items. On average, the percentage

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*a* Microsoft Corp, 1 Microsoft Way, Redmond, WA 98052-8300. 

**1** SAS Institute Inc, PO Box 8000, Cary, NC 27511.
Table 2. Questionnaire Items With Kappa Values of Poor to Fair Agreement (Kappa < .40)

<table>
<thead>
<tr>
<th>Item (Survey No.)</th>
<th>Percentage of Agreement</th>
<th>Kappa</th>
<th>False Negative</th>
<th>False Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia (11)</td>
<td>95</td>
<td>.27</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Other illnesses (44AA)</td>
<td>57</td>
<td>.15</td>
<td>43</td>
<td>0</td>
</tr>
<tr>
<td>Other illnesses (44BB)</td>
<td>86</td>
<td>.19</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Other illnesses (44CC)</td>
<td>91</td>
<td>.17</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Other surgeries (55CD)</td>
<td>94</td>
<td>.26</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Laxatives (OTC(^a)) [60]</td>
<td>93</td>
<td>.34</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Decongestants/antihistamines (OTC) [61]</td>
<td>91</td>
<td>.28</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Herbal medicines (OTC) [63]</td>
<td>89</td>
<td>.26</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Tylenol(^b)/acetaminophen (prescribed(^e)) [67]</td>
<td>93</td>
<td>.20</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Water pills (diuretics) (prescribed) [73]</td>
<td>94</td>
<td>.37</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Other medications (prescribed) [83CC]</td>
<td>92</td>
<td>.25</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^a\) OTC=over-the-counter/not prescribed by a physician.

\(^b\) McNeil Consumer & Specialty Pharmaceuticals, Div of McNeil-PPC Inc, Camp Hill Road, Fort Washington, PA 19034.

\(^e\) Prescribed=prescribed by a physician.

Table 3. Questionnaire Items With Kappa Values of Moderate Level of Agreement (Kappa = .41–.60)

<table>
<thead>
<tr>
<th>Item (Survey No.)</th>
<th>Percentage of Agreement</th>
<th>Kappa</th>
<th>False Negative</th>
<th>False Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin cancer (5)</td>
<td>96</td>
<td>.58</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Other infection (15)</td>
<td>97</td>
<td>.56</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Anemia (22)</td>
<td>93</td>
<td>.50</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Tuberculosis (27)</td>
<td>98</td>
<td>.49</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Rheumatoid arthritis (33)</td>
<td>98</td>
<td>.49</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Headaches (42)</td>
<td>96</td>
<td>.40</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Other surgeries (55AA)</td>
<td>69</td>
<td>.40</td>
<td>29</td>
<td>2</td>
</tr>
<tr>
<td>Other surgeries (55BB)</td>
<td>87</td>
<td>.44</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Aspirin (OTC(^a)) [57]</td>
<td>94</td>
<td>.54</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Tylenol(^b) (OTC) [58]</td>
<td>89</td>
<td>.51</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Antacids (OTC) [59]</td>
<td>88</td>
<td>.48</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Tagamet(^c)/Zantac(^c)/Pepcid(^d) (OTC) [62]</td>
<td>95</td>
<td>.52</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Other medications [OTC] [64AA]</td>
<td>90</td>
<td>.48</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Antidepressent medications (prescribed(^e)) [78]</td>
<td>97</td>
<td>.56</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other medications (prescribed) [83AA]</td>
<td>77</td>
<td>.52</td>
<td>22</td>
<td>1</td>
</tr>
</tbody>
</table>

\(^a\) OTC=over-the-counter/not prescribed by a physician.

\(^c\) GlaxoSmithKline, Five Moore Drive, Research Triangle Park, NC 27709.

\(^d\) Merck & Co Inc, PO Box 4 WP39-205, West Point, PA 19486-0004.

\(^e\) Prescribed=prescribed by a physician.

Table 4. Distribution of Disagreements Between Self-administered Questionnaire Responses and Chart Review/Interview Responses

<table>
<thead>
<tr>
<th>Classification of Responses</th>
<th>No. of Responses</th>
<th>Percentage of Total Questionnaire Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>False negative</td>
<td>241</td>
<td>2.55</td>
</tr>
<tr>
<td>False positive</td>
<td>174</td>
<td>1.84</td>
</tr>
<tr>
<td>Total</td>
<td>415</td>
<td>4.4</td>
</tr>
</tbody>
</table>
of agreement was 92.7% for the participants aged 65 years or older versus 96.3% for the participants under 65 years of age \((P=.0001)\).

**Discussion**

The Guide\(^1\) clearly describes the patient medical history information that physical therapists should routinely collect as part of the patient examination. The onus is on the therapist to formulate an accurate picture of the patient’s medical history considering the effect this history may have on the delivery of safe and effective care. The results of this study suggest that the patient self-administered questionnaire can provide accurate information about patients’ health history in an orthopedic outpatient population germane to physical therapist practice. The mean percentage of agreement across items of 95.6%, and the mean kappa of .69 for our sample represents a substantial level of agreement.\(^{29}\) In addition, the percentages of false negative and false positive findings in our study were low (2.55% and 1.84%, respectively), providing confidence that the patient self-report is accurate. The health history information collected via the questionnaire and used as a supplement to the patient interview could improve the therapist’s efficiency and effectiveness and would direct the therapist to ask important follow-up questions. For example, if the patient acknowledges a history of heart problems, the therapist would follow with, “Describe your heart problem to me; how is the heart condition currently being managed?” and so on.

Our questionnaire’s level of agreement is very similar to the results reported by Pecoraro et al\(^{21}\) who noted a mean percentage of agreement of 92.4% and a mean kappa value of .713 in their study of the validity and reliability of data obtained with a self-administered questionnaire used with patients being seen at a Veterans Administration Medical Center general medicine clinic. The levels of false negative and positive findings in our data also are very close to the percentages noted by Pecoraro et al\(^{21}\) (false negative=2.8%, false positive=1.8%). As noted by these authors, these low levels of false negative and false positive findings have important clinical implications, including the clinician being confident that the patient self-report is accurate. Physical therapists could consider using questionnaires studied by Pecoraro et al\(^{21}\) and others, but patients seen at general medicine clinics often have conditions and needs that are unusual for most patients seeking services from physical therapists. This difference may result in the inclusion of questionnaire items not useful to the physical therapist’s clinical decision making and in the omission of other extremely important and relevant items from the questionnaire.

Despite the level of substantial agreement of individual survey items across all patients, our results identified individual questionnaire items that demonstrated poor to fair agreement (Tab. 2). Ten of the 11 items with this level of agreement were either open-ended questions about other illness, surgery, or medication reports other than those specifically listed on the questionnaire or questions regarding the use of specified medications. An additional 14 items with moderate agreement are listed in Table 3, and these items also were largely medication-related \((n=6)\) or open-ended \((n=4)\). Consistent with this pattern, 88% of our false negative findings and 56% of our false positive findings occurred in the open-ended and medication-related questionnaire items. Pecoraro et al\(^{21}\) also noted a lower response rate (less than 80%) for open-ended questions compared with responses to the “yes/no” questions. In addition, regarding accuracy of patient report of medication use, Pecoraro et al\(^{21}\) noted a relatively low degree of agreement \((65\% \text{ agreement}, \text{kappa}=.378)\) for the question regarding nonprescription medication use, and Scully and Boyle\(^{31}\) reported omissions in listing current medications. These results suggest the fewer open-ended questionnaire items, the better, especially when it comes to investigating patient medication use. The results also bring into question the medication portion of the Guide’s outpatient documentation form where very few specific OTC drugs and no prescriptive drugs are listed for the patient to choose.\(^1\) Some caution must be taken with interpreting Table 2 and 3 items marked by a high percentage of agreement and low kappa values, however, considering the effect that low prevalence of conditions may have on the kappa value. For example, pneumonia, skin cancer, tuberculosis, and rheumatoid arthritis all had high percentage of agreement totals, low kappa values, and low prevalence. The kappa values for these items may have been more in the range of those for the other diseases if the prevalence had been higher in our sample.

To potentially strengthen our questionnaire, we recommend adding items associated with open-ended question responses reported by 5% or more of the subjects. The 14 patient responses to items 44, 55, and 83 by 5% or more of our sample are summarized in Table 5. Adding these items to the list of specific illnesses, surgeries, and medications (“yes/no” questions) may improve the overall level of accuracy of the questionnaire. To improve the level of agreement for items related to the use of certain medications we suggest providing specific examples of commonly utilized medications for each of the listed survey items. For example, specific medications were listed for the item querying the use of anti-inflammatory...
Table 5.
Items Recorded in the Open-Ended Questions (Survey Questions 44, 55, and 83) Reported by 5% or More of the Sample

<table>
<thead>
<tr>
<th>Survey Items</th>
<th>No. of Participants (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illnesses/disorders</td>
<td></td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>19</td>
</tr>
<tr>
<td>Gastroesophageal reflux disease</td>
<td>8</td>
</tr>
<tr>
<td>Seasonal allergies</td>
<td>6</td>
</tr>
<tr>
<td>Diverticulitis</td>
<td>5</td>
</tr>
<tr>
<td>Surgeries</td>
<td></td>
</tr>
<tr>
<td>Female gynecological surgery</td>
<td>16</td>
</tr>
<tr>
<td>Eye surgery</td>
<td>9</td>
</tr>
<tr>
<td>Oral surgery</td>
<td>6</td>
</tr>
<tr>
<td>Breast procedures</td>
<td>6</td>
</tr>
<tr>
<td>Peripheral vascular procedures</td>
<td>5</td>
</tr>
<tr>
<td>Medications (specific drugs listed by participants)</td>
<td></td>
</tr>
<tr>
<td>Antihyperlipidemic (Zocor, Lipitor, Mevacor)</td>
<td>15</td>
</tr>
<tr>
<td>Mineral supplements (iron, potassium)</td>
<td>9</td>
</tr>
<tr>
<td>Neurontin</td>
<td>8</td>
</tr>
<tr>
<td>Biphosphonates (Fosamax, Didronel)</td>
<td>8</td>
</tr>
<tr>
<td>Oral hypoglycemicics (Orinase)</td>
<td>5</td>
</tr>
</tbody>
</table>

* Merck & Co Inc, PO Box 4 WP59-205, West Point, PA 19486-0004.
* Parke-Davis, Div of Warner-Lambert Co LLC (a Pfizer company), 235 E 42nd St, New York, NY 10017-5755.
* Proctor & Gamble Pharmaceuticals Inc, Health Care Research Center, 8700 Mason Montgomery Rd, Mason, OH 45404-9462.
* Pharmacia & Upjohn, a division of Pfizer, 235 E 42nd St, New York, NY 10017-5755.

In addition to survey construct, other issues must be considered when using a patient self-administered questionnaire to collect health history information. Donovan et al demonstrated that an individual’s self-assessment of health is affected by factors other than health concerns. Studies of self-reported and documented medical conditions have shown that some respondent-related characteristics affect the sensitivity and specificity of the 2 information sources. Some authors have postulated that respondent-related differences may be due to the nature of the diseases. Colditz et al noted a lower agreement level for reports of diseases that are diagnosis more complex and when strict diagnostic criteria are required to define the condition. These observations point out the importance of using the questionnaire as an adjunct to the oral interview and not as a stand-alone information collection tool. Lastly, the use of specific responses by patients in answering health-related questions may also vary by age, sex, education, ethnicity, and social circumstances.

In our sample, of the demographic factors analyzed, only age was related to the level of agreement between the patient questionnaire responses and the NP/PA questionnaire responses. Although this finding is consistent with those of Haapanen et al, we must question whether a difference in percentage of agreement of less than 4% between the 2 groups is clinically important. Conflicting data exist regarding the effect of sex of the subject on level of agreement. Linet et al reported that agreement was greater for men than for women, whereas Collen et al reported that women were more consistent than men with their answers. Linet et al also reported that race/ethnicity was a factor, with whites being more accurate than blacks. Katz et al found a lower correlation between chart review and questionnaire findings in less educated subjects. The limited variability of race/ethnicity and education level in our sample impaired our ability to analyze the relationship of race/ethnicity and education level to the level of agreement. It would be beneficial to study the use of this questionnaire in physical therapy outpatient clinics serving more diverse patient populations.

The use of a convenience sample of patients attending a preoperative physician visit may limit the ability to generalize our results to physical therapy outpatients. The study’s inclusion criteria included patients scheduled for an orthopedic surgical procedure, but only those with lumbar or cervical spine, shoulder, or knee conditions—the most common patient conditions seen in outpatient physical therapy clinics. In addition, more than 80% of the study participants had been seen by a physical therapist for their orthopedic condition.
with the remainder of the subjects having recently had a serious orthopedic injury. Lastly, all of the patients participating in the reliability assessment of the survey questionnaire had been seen by physical therapists for their preoperative condition. The choice to use patients attending a preoperative visit was made because the clinics that the patients attended had a standardized and detailed patient medical history intake process in place, including an oral interview, completion of the UWHC preoperative history and physical examination form, and a medical record review by a qualified health care practitioner who routinely collected such information. This process presented us with a strong reference standard for comparison with the patient questionnaire. Although it is possible patients may be prone to provide more detailed medical histories preoperatively compared with a visit with a physical therapist, the opposite may be true. The routine UWHC orthopedic preoperative lumbar fusion schedule includes the patient having up to 8 appointments, with several different health care practitioners, in 2 different locations within the same day. This hectic and at times confusing schedule (to the patient unfamiliar with the various facilities) may not be conducive to accurate recall of health history details. We believe that the results may be similar when the patient questionnaire is administered in a physical therapy outpatient orthopedic practice setting.

Potential interviewer bias in our study also should be mentioned. In this study, interviewers may have tended to probe subjects more intensely for information due to their knowledge of the study. We assume that this increased intensity may have promoted a more accurate collection of patient data. Use of the standardized interview survey combined with training for even-handed probing should have minimized or reduced interviewer bias and promoted a more consistent gathering of patient data between the participating NPs and PAs. Bias also may have resulted from limiting the sample to those patients who had a medical record available. We believe, however, that our participants were representative of the outpatient orthopedic patients typically seen at UWHC. There were no differences in the age, race, education level, and income between those who participated and those who did not participate. The difference between the participants and nonparticipants related to the frequency of lumbar and knee surgical procedures can be explained by the inability of the Sports Medicine Clinic staff, compared with the Spine Clinic staff, to consistently obtain permanent medical records for many patients. Despite the study limitations, our results provide information relevant to physical therapist practice not previously reported, adding to the body of knowledge describing the validity of using a self-administered questionnaire to collect patient medical history information as an adjunct to the patient interview.

Conclusions

This study supports the use of a patient self-administered medical history questionnaire in orthopedic outpatient populations commonly seen by physical therapists. The accuracy of the questionnaire has been supported, and suggested changes in the questionnaire construct have been provided that may further enhance the accuracy of patients’ self-reports of illnesses, surgeries, and medication use. These changes may be most important for populations such as elderly people, whose accuracy is slightly less than that noted in younger populations. Self-administered questionnaires have been noted to be a valuable adjunct to the patient interview and the physical examination. Patient responses may direct the physical therapist to ask important health history follow-up questions, leading to the development of safe and effective interventions and accurate prognoses. Considering that the patient interview can be susceptible to biased patient recall or faulty memory, the use of 2 different modes of data collection such as the oral interview and a questionnaire is recommended.

References


### Appendix

**Patient Survey**

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**For Clinic Use ONLY**

Patient ID #  

Patient Name:  

Dx:  

---

### I. Have you ever been diagnosed as having any of the following conditions? FILL IN THE APPROPRIATE CIRCLES.

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
<th>YES (Diagnosed more than 12 months ago)</th>
<th>NO</th>
<th>YES</th>
<th>YES (Diagnosed more than 12 months ago)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Diagnosed within the last 12 months)</td>
<td>(Diagnosed within the last 12 months)</td>
<td>(Diagnosed more than 12 months ago)</td>
<td>(Diagnosed more than 12 months ago)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Lung cancer</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>7. Leukemia cancer</td>
<td>O</td>
</tr>
<tr>
<td>2. Breast cancer</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>8. Lymphoma cancer</td>
<td>O</td>
</tr>
<tr>
<td>4. Colon cancer</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>5. Skin cancer</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>6. Bone cancer</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td>O</td>
</tr>
</tbody>
</table>

---

### NO | YES

10. Chronic urinary tract/bladder infection (3 episodes or more during the past 12 months) | O | O |
11. Pneumonia | O | O |
12. Bone or joint infection | O | O |
13. Pelvic inflammatory disease | O | O |
14. Kidney infection | O | O |
15. Other infection. Please list: | O | O |

---

### NO | YES

16. Heart attack | O | O | 33. Rheumatoid arthritis | O | O |
17. Heart valve problems | O | O | 34. Degenerative osteoarthritis or | O | O |
18. Deep venous thrombosis (blood clots in the legs) | O | O | wear-and-tear arthritis | O | O |
19. Arterial blockage of the legs | O | O | 35. Gout | O | O |
20. High blood pressure | O | O | 36. Ankylosing spondylitis | O | O |
21. Stroke (including transient ischemic attacks or ministrokes) | O | O | 37. Hepatitis | O | O |
| | | | 38. Stomach/duodenal ulcers | O | O |
22. Anemia/low blood levels | O | O | 39. Epilepsy/seizures | O | O |
23. Asthma | O | O | 40. Headaches (more than 1 per week) | O | O |
24. Emphysema | O | O | 41. Endometriosis | O | O |
25. Chemical dependency (eg, alcoholism) | O | O | 42. Urinary incontinence | O | O |
26. Depression | O | O | 43. Osteoporosis | O | O |
27. Tuberculosis | O | O | 44. Other illnesses diagnosed by a physician. | O | O |
28. Hypothyroid (low) | O | O | Please list: | O | O |
29. Hyperthyroid (high) | O | O | | O | O |
30. Diabetes (diagnosed before age 18 years) | O | O | | O | O |
31. Diabetes (diagnosed after age 18 years) | O | O | | O | O |
32. Multiple sclerosis | O | O |

---

*Continued*
## II. Surgeries

<table>
<thead>
<tr>
<th>NO</th>
<th>YES (Surgery within last 12 months)</th>
<th>YES (Surgery more than 12 months ago)</th>
<th>NO</th>
<th>YES (Surgery within last 12 months)</th>
<th>YES (Surgery more than 12 months ago)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45.</td>
<td>Cesarian section</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>52. Carpal tunnel surgery</td>
</tr>
<tr>
<td>46.</td>
<td>Hysterectomy</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>53. Hernia repair</td>
</tr>
<tr>
<td>47.</td>
<td>Heart surgery (bypass)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>54. Tonsillectomy</td>
</tr>
<tr>
<td>48.</td>
<td>Prostate surgery</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>55. Other surgeries. Please list:</td>
</tr>
<tr>
<td>49.</td>
<td>Appendectomy</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>50.</td>
<td>Gall bladder surgery</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>51.</td>
<td>Bone/joint surgery (total joint replacement, knee or shoulder surgery)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
</tbody>
</table>

## III. During the past week, have you taken any of the following medications not prescribed by a physician?

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>56. Advil, Motrin, Aleve, ibuprofen</td>
<td>O</td>
</tr>
<tr>
<td>57. Aspirin</td>
<td>O</td>
</tr>
<tr>
<td>58. Tylenol/acetaminophen</td>
<td>O</td>
</tr>
<tr>
<td>59. Antacids (eg, Tums, Rolaid)</td>
<td>O</td>
</tr>
<tr>
<td>60. Laxatives</td>
<td>O</td>
</tr>
</tbody>
</table>

## IV. During the past week have you taken any of the following PHYSICIAN-prescribed medications?

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>65. Aspirin</td>
<td>O</td>
</tr>
<tr>
<td>66. Anti-inflammatories (eg, Motrin, Naprosyn, Relafen, Orudis)</td>
<td>O</td>
</tr>
<tr>
<td>67. Tylenol/acetaminophen</td>
<td>O</td>
</tr>
<tr>
<td>68. Muscle relaxers (eg, Valium)</td>
<td>O</td>
</tr>
<tr>
<td>69. Prescribed pain relievers (Darvocet, Darvon, Percocet, Vicodin, Tylenol with codeine)</td>
<td>O</td>
</tr>
<tr>
<td>70. Birth control pills</td>
<td>O</td>
</tr>
<tr>
<td>71. Hormone replacement therapy (estrogens/progesterones)</td>
<td>O</td>
</tr>
<tr>
<td>72. High blood pressure medications</td>
<td>O</td>
</tr>
<tr>
<td>73. Water pills (diuretics) for reasons other than high blood pressure</td>
<td>O</td>
</tr>
<tr>
<td>74. Stomach ulcer medications</td>
<td>O</td>
</tr>
<tr>
<td>75. Heart medications (other than for high blood pressure)</td>
<td>O</td>
</tr>
<tr>
<td>76. Antibiotics</td>
<td>O</td>
</tr>
<tr>
<td>77. Thyroid medication</td>
<td>O</td>
</tr>
<tr>
<td>78. Asthma medication</td>
<td>O</td>
</tr>
<tr>
<td>79. Antidepressant medication</td>
<td>O</td>
</tr>
<tr>
<td>80. Insulin</td>
<td>O</td>
</tr>
<tr>
<td>81. Seizure medication</td>
<td>O</td>
</tr>
<tr>
<td>82. Decongestants/antihistamines for sinus or allergy problems</td>
<td>O</td>
</tr>
<tr>
<td>83. Other medications. Please list:</td>
<td>O</td>
</tr>
</tbody>
</table>

## V. #84. How many packs of cigarettes do you currently smoke each day on average? Please choose only ONE of the following:

- Do not smoke | O |
- Less than 1 pack per day | O |
- More than 1 pack per day | O |
VI. #85. How many cups of caffeinated beverage do you drink each day?

1 cup of coffee equals 1 cup; 2 cups of tea equals 1 cup; 3 cans of soda equals 1 cup. Please choose only ONE of the following answers:

Zero to 2 cups O
2 cups or more O

VII. #86. How many days per week do you drink alcohol? Please choose only ONE of the following answers:

Zero O
Less than 1 day O
1 – 2 days O
3 – 4 days O
5 – 7 days O

**IF YOU DRINK**, how much do you drink during an average day? One drink equals one beer or one glass of wine or one shot of hard liquor or mixed drink.

Zero 1 – 3 drinks 4 drinks 5 or more drinks O O O O

VIII. Demographic Information

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Female O</td>
<td>Asian O</td>
<td>Under $5,000/year O</td>
</tr>
<tr>
<td>Male O</td>
<td>Black O</td>
<td>$5,000–$6,999 O</td>
</tr>
<tr>
<td>Hispanic O</td>
<td></td>
<td>$7,000–$14,999 O</td>
</tr>
<tr>
<td>American Indian O</td>
<td></td>
<td>$15,000–$19,999 O</td>
</tr>
<tr>
<td>White O</td>
<td></td>
<td>$20,000–$24,999 O</td>
</tr>
<tr>
<td>Other O</td>
<td></td>
<td>$25,000–$34,999 O</td>
</tr>
<tr>
<td>Unknown O</td>
<td></td>
<td>$35,000–$49,999 O</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$50,000 or more O</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unknown O</td>
</tr>
</tbody>
</table>

92. Please provide your age: __________ years

90. Marital Status:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Married O</td>
<td></td>
</tr>
<tr>
<td>Divorced/separated O</td>
<td></td>
</tr>
<tr>
<td>Single (never married) O</td>
<td></td>
</tr>
<tr>
<td>Widowed O</td>
<td></td>
</tr>
</tbody>
</table>

THANK YOU!

---

*Bayer Consumer Care Division, 56 Columbia Rd, PO Box 1910, Morristown, NJ 07962-1910.
*GlaxoSmithKline, Five Moore Drive, Research Triangle Park, NC 27709.
*Pfizer Inc, 235 E 42nd St, New York, NY 10017-5755.
*Merck & Co Inc, PO Box 4 WP39-205, West Point, PA 19486-0004.
*Roche Pharmaceuticals, Roche Laboratories Inc, 340 Kingsland St, Nutley, NJ 07110-1199.
*AI Pharma, 2320 Scientific Park Dr, Wilmington, NC 28405.
*Endo Pharmaceuticals, 100 Painters Dr, Chadds Ford, PA 19317.
*Abbott Laboratories, 100 Abbott Park Rd, Abbott Park, IL 60064.