

Patient comprehension of hip arthroscopy: an investigation of health literacy

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ABSTRACT

Several studies have demonstrated that patients have significant impairments in understanding their injury and appropriate course of management in orthopedic surgery. The purpose of this investigation is to determine if patients are able to obtain a fundamental understanding of the requisite care associated with hip arthroscopy. Any patient who elected to have hip arthroscopy was prospectively recruited to participate in the study. All patients were told they would be asked to complete a questionnaire about their surgery and post-operative instructions. The answers to each question of the questionnaire they would receive at the first post-operative visit were verbally given to each patient during the pre-operative visit. They were also given a post-operative instruction sheet on the day of surgery that contained answers to the questionnaire. At the first post-operative visit, all patients were then asked to complete a multiple-choice questionnaire prior to seeing the surgeon. A total of 56 patients (14 males, 42 females) were enrolled. All patients reported they had read the post-operative instruction sheet. The average number of correct answers was 6.5 ± 0.6 (95% CI 6 – 7) out of 11 questions (59% correct response rate $\pm 18\%$ [95% CI 52 – 66%]). Although we made significant pre-operative oral and written efforts to help patients achieve an elementary level of health literacy regarding their forthcoming hip arthroscopy, many patients did not achieve satisfactory comprehension. Even with instruction and information given verbally and physically (via post-operative instruction sheet) patients did not obtain satisfactory comprehension of their surgical procedure. New ways (through video, simplified cartoons or verbal explanations) must be considered in educating patients concerning surgical procedures to increase comprehension and health literacy.

INTRODUCTION

Health literacy incorporates a set of individual abilities that allow patients to acquire and integrate information, which promotes comprehension of their medical condition and any interventions available for potential management [1]. In addition to the patient's ability to read and comprehend information, health literacy often depends on the manner in which information is written and presented [1, 2]. The concept of health literacy has recently garnered attention, as it has been proposed to be influenced by the quality of the health care system, the provider's thoroughness and the complexity of the medical problem [1]. Additionally, there has been a marked increase of unvetted health

information readily available on the Internet, radio, television and printed media, leading to patient mis-direction and confusion [3].

Several studies have demonstrated that patients have significant impairments in understanding their injury and appropriate course of management in orthopedic surgery [2, 4–6]. Patients with inadequate health literacy have been shown to exhibit lower rates of compliance, resulting in poorer health outcomes, longer hospital stays and higher health care costs [7, 8]. These findings suggest that interventions taken by the patient, provider or health care system to improve health literacy may subsequently enhance patient compliance and overall outcomes [8, 9].

The purpose of this investigation was to determine the percentage of patients who were able to obtain a fundamental understanding of the pathology and requisite care associated with hip arthroscopy, after undergoing the process of informed consent and provision of a post-operative instruction document. We hypothesize that patients will have a better understanding of their hip problem and post-operative care instructions if they have some education above the high school level.

MATERIALS AND METHODS

After obtaining approval from our institutional review board, any patient who elected to have a hip arthroscopy was prospectively recruited to participate in the study. Patients who did not identify as fluent in English were excluded. All patients were told they would be asked to complete a questionnaire about their surgery and post-operative instructions. Enrolled patients were informed about the care and potential post-operative complications associated with their particular procedure during the informed consent process at the pre-operative visit. All answers to each question of the questionnaire they would later receive were verbally given to each patient during this visit, and they were also given a post-operative instruction sheet that contained written answers to all questions as well. This instruction sheet was written at an eighth grade level, corresponding to the average national reading level [8–12]. It also acted as a script for the surgeon to present all procedural information. At the first post-operative visit and prior to seeing the physician, all patients were then asked to complete a multiple-choice questionnaire. This questionnaire (Fig. 1) contains demographic questions and questions based on the post-operative instruction sheet. The clinician reviewed the questionnaire with each patient at the end of this post-operative visit to clarify any misunderstandings about post-operative care and expectations (Table I).

Data Availability

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its [supplementary material](#).

Statistical analysis

We performed a two-sample *t* test to compare the total number of correct answers between levels of education, age groups, sex and use of the post-operative instructions. A *P* values of <0.05 was considered significant. Confidence intervals (95%) were calculated for overall number and percentage of questions correctly answered. Statistical analysis was performed utilizing Microsoft Excel

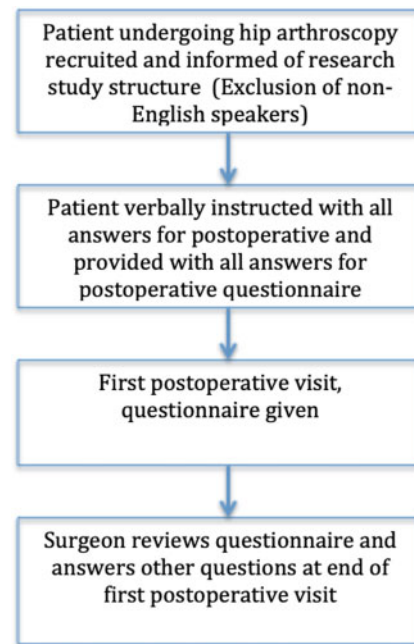


Fig. 1. Flow chart of information presentation to patients.

Table I. Number of correct responses to questionnaire questions

Question	N	%
When can I resume driving a car?	13	23
When do I expect to have fully recovered from the hip arthroscopy?	2	4
What was the initial setting of my CPM machine?	39	68
Although there are many different types of complications and having any one of them is rare in hip arthroscopy surgery, when one does occur what are some of the more common complications post-operatively?	23	40
Why am I taking aspirin or ecotrin?	46	81
Weight bearing restrictions?	53	30
Signs of surgical infection		
A. Fever >101.5 for 24 h	43	80
B. Chills/night sweats	27	50
C. Redness around incision site	46	85
D. Foul smelling drainage from wound'	40	74

(Microsoft Corporation, Redmond, WA, USA) and StatPlus: LE (AnalystSoft Inc., Walnut, CA, USA).

This study obtained ethics approval from IRB: HUMAN SUBJECTS PROTECTION - DETERMINATION OF EXEMPT STATUS FWA-00001230, 00003538 IRB Registration #: 0000396, 00000482, 00004624. All patients gave informed consent before taking part.

RESULTS

After obtaining approval from our institutional review board, 56 patients (14 males, 42 females) were enrolled. All patients (100%) reported they had read the post-operative instructions document prior to or after surgery. Eighty-two percent ($n = 46$) reported their preferred form of media for the post-operative instructions was a written handout, 1.8% of the cohort preferred a video ($n = 1$) and 17% preferred an on-line instructional alternative ($n = 8$). Eight patients were 17 years old or younger, 17 were 18–30 years old and 31 were 30–65 years old. Thirty-one (67%) patients previously had orthopedic surgery. All patients (100%) considered themselves fluent in English. Seventy-nine percent ($n = 44$) reported they had read the post-operative instructions pre-operatively and 91% ($n = 51$) read these instructions post-operatively. Ninety-five percent ($n = 53$) of the patients were satisfied with the education they received regarding the post-operative instructions.

The average number of correct answers was 6.5 ± 0.6 (95% CI 6–7) out of 11 questions (59% correct response rate $\pm 18\%$ [95% CI 52 – 66%]) and the results are shown in Table I. Twenty-three percent ($n = 13$) responded correctly to ‘When can I resume driving a car?’. Four percent ($n = 2$) responded correctly to ‘When do I expect to have fully recovered from the hip arthroscopy?’. Forty percent ($n = 23$) responded correctly to ‘What are signs of surgical site infection?’. Eighty-one percent ($n = 46$) of patients correctly identified aspirin as their deep vein thrombosis (DVT) prophylaxis, 68% ($n = 39$) of patients identified their weight-bearing protocol and 53% ($n = 30$) patients identified their weight-bearing restrictions. Fever $>101.5^{\circ}\text{F}$ for 24 h was correctly identified as a sign of surgical infection by 80% ($n = 43$) patients, chills and or night sweats were correctly identified by 50% ($n = 27$) of patients, redness around incision site was correctly identified by 85% ($n = 46$) of patients, and ‘Foul smelling drainage from wound’ was correctly identified by 74% ($n = 40$) of patients.

Patients who had a level of education greater than high school identified a significantly higher number of correct responses (6.9 versus 5.7, $P = 0.03$), and patients who

were greater than 30 years old had a higher number of correct responses compared with patients younger than 30 years old (7.0 versus 5.9, $P = 0.042$). Patients who reported reading the post-operative instructions document post-operatively had a significantly higher number of correct responses compared with those who reported not reading the instructions (6.6 versus 4.8, $P = 0.049$). There was no significant difference in the number of correct responses in males versus females ($P = 0.30$).

DISCUSSION

The mean correct response rate was 59%, and a majority of patients (82%) preferred written handouts over videos or online instructions [6, 8, 13]. This finding is contrary to other recent studies that have reported that patients commonly use the Internet to read and learn about their health conditions, especially considering the increase in mobile phones with Internet access [14]. Patients who had a level of education greater than high school, were over 30 years old, and read the post-operative instructions document again post-operatively had a significantly higher number of correct responses, which proves our original hypothesis. There was no significant difference in the number of correct responses in males versus females ($P = 0.30$). Four percent of patients answered correctly ‘When do I expect to have fully recovered from the hip arthroscopy’ which we believe is due to the number of answer choices given (see attached Questionnaire). Since the questionnaire and instruction sheet are comprehensive in covering facts concerning hip arthroscopy procedures, the clinical significance of answering one more or less question correctly or incorrectly lies in the nature of the question. If patients are not clear on whether or not their symptoms improve, how long they are to remain immobilize or even post-operative care, then it can be deduced that they will not be satisfied with whatever outcomes do not match their ‘own’ understanding of their procedures [15, 16].

Kadokia *et al.* [2] sought to assess the health literacy of orthopedic trauma patients through a post-operative questionnaire given to 146 patients at their first visit to a Level I trauma center. Comparable to the results of our investigation, they found that trauma patients exhibited poor health literacy. In their cohort, 47.9% of patients correctly knew which bones they had fractured, 66.7% knew how their bones were fixed, 74% recognized the correct medical treatment they were prescribed for DVT prophylaxis, and only 18.5% knew their expected healing times. The study also concluded that patients with an education greater than high school level were associated with a 2.5 times higher likelihood of correctly identifying the bone that was fractured and the medication they were prescribed for DVT

prophylaxis, and nearly four times more likely to know the estimated recovery time. Accordingly, our study found that patients who had a level of education greater than high school identified a significantly higher number of responses correctly (6.9 versus 5.7, $P = 0.03$).

Cosic *et al.* [17] similarly conducted a study to establish the baseline health literacy and influence of educational intervention in orthopedic trauma patients at an academic Level 1 trauma center. The investigation included 190 consecutive surgical patients treated for lower extremity fractures allocated into two experimental groups. The first group included 99 patients receiving 'usual care', which entailed the established standard treatment, discharge and follow-up in the office in 2 weeks. The second, intervention group, included 91 patients who received additional information prior to discharge, including a handout with an X-ray of the initial injury, an X-ray of the post-operative fixation and short written document describing the injury and further management. At the 2-week follow-up appointment, each patient group completed a 9-question survey, either before or after discussion with an orthopedic surgeon to assess the comprehension of their medical care. Similar to our investigation, the study also demonstrated low overall health literacy within orthopedic trauma patients, with mean scores of 4.67 and 5.42 in the 'usual care' group pre- and post-meeting with their surgeon, respectively. Statistical analysis found significantly improved health literacy in the intervention group, with mean scores of 6.70 and 7.08 both pre- and post-consultation at 2 week follow up, with ~ 3.5 times increased odds of improved health literacy in the intervention group ($P < 0.001$). Additionally, further stratification of patient demographics concluded younger age, higher level of education and employment status were associated with improved health literacy. These findings verify a general lack of comprehension within orthopedic surgery patients and suggest the utility of targeting specific subsets of patients to improve health literacy.

Tsahakis *et al.* [5] also demonstrated that providing patients with a supplemental post-operative document increased health literacy among patients. Of the 299 patients included, 146 patients received standard post-operative instructions, while 153 were given a supplemental document that further explained the patient's treatment and post-operative instructions. Patients who received the supplemental document post-operatively were 1.3 times more likely to know which bones they fractured, and 1.1 times more likely to correctly identify the DVT prophylaxis they were prescribed [5]. Similarly, we demonstrated patients who read the post-operative instructions document post-operatively had a significantly higher number of

correct responses compared with those who did not (6.6 versus 4.8, $P = 0.049$).

There are several limitations to our study. First, we sought to determine the percentage of patients able to demonstrate a rudimentary understanding of their medical condition after providing a supplemental instruction document and using statistical analysis to identify specific patient factors associated with correct responses. A study design that includes a control versus an intervention group may have been better able to measure the effect of standardized post-operative instructions on patient comprehension of hip arthroscopy and compare the data to prior investigations. Second, our questionnaire was generated at an eighth grade reading level, as this is the reported national average by the National Association of Adult Literacy [8–12]. The American Medical Association and the National Institute of Health have, in contrast, suggested that patient education material should be written at the sixth grade level [2, 6, 18]. Therefore, the reading level of our survey could have contributed to the low rate of correct responses. Third, we did not collect information regarding ethnicity, race or socioeconomic background, which could potentially play a role in health literacy and comprehension. This inherently places a selection bias to our results because it excludes those that do not speak English well. Fourth, we did not collect data to correlate incorrect responses to post-operative non-compliance or poor clinical outcomes. Finally, because all of the patients included in the study did not have any post-operative complications, our study did not take into account when changes in post-operative instructions occur with complications such as infections or wound dehiscence.

CONCLUSION

Orthopedic surgery patients have demonstrated low health literacy, particularly in those with a high-school education or less. A lack of health comprehension poses a risk for poor compliance, post-operative complications and increased medical costs. Although we made significant pre-operative oral and written efforts to help patients achieve an elementary level of health literacy regarding their forthcoming hip arthroscopy, we found many continued to lack a baseline level of acceptable comprehension regarding numerous pertinent components of perioperative care and outcome. The notion of health literacy advancement remains an ongoing topic of study, which requires further investigation to develop effective methods to target those at highest risk.

SUPPLEMENTARY DATA

Supplementary data are available at *Journal of Hip Preservation Surgery* online.

PATIENT AND PUBLIC INVOLVEMENT

This research was done without patient involvement. Patients were not invited to comment on the study design, help with writing, editing or to interpret results.

AUTHORS' CONTRIBUTIONS

G.W. and J.S. planned the project and contributed for the final approval of version published. G.W., J.G. and J.S. participated in data collection. L.K. and D.C. analyzed the data. G.W., J.G., L.K., D.C. and J.S. prepared and revised the manuscript.

CONFLICT OF INTEREST STATEMENT

None declared.

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