



Contents lists available at ScienceDirect

## Patient Education and Counseling

journal homepage: [www.elsevier.com/locate/pateducou](http://www.elsevier.com/locate/pateducou)



# Constructing post-surgical discharge instructions through a Delphi consensus methodology

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### ARTICLE INFO

#### Article history:

Received 28 June 2017

Received in revised form 27 November 2017

Accepted 8 December 2017

#### Keywords:

Thyroidectomy

Discharge instructions

Delphi consensus method

Patient education

### ABSTRACT

**Objective:** Patient education materials are a crucial part of physician-patient communication. We hypothesize that available discharge instructions are difficult to read and fail to address necessary topics. Our objective is to evaluate readability and content of surgical discharge instructions using thyroidectomy to develop standardized discharge materials.

**Methods:** Thyroidectomy discharge materials were analyzed for readability and assessed for content. Fifteen endocrine surgeons participated in a modified Delphi consensus panel to select necessary topics. Using readability best practices, we created standardized discharge instructions which included all selected topics.

**Results:** The panel evaluated 40 topics, selected 23, deemed 4 inappropriate, consolidated 5, and did not reach consensus on 8 topics after 4 rounds. The evaluated instructions' reading levels ranged from grade 6.5 to 13.2; none contained all consensus topics.

**Conclusion:** Current post surgical thyroidectomy discharge instructions are more difficult to read than recommended by literacy standards and omit consensus warning signs of major complications. Our easy-to-read discharge instructions cover pertinent topics and may enhance patient education. Delphi methodology is useful for developing post-surgical instructions.

**Practice implications:** Patient education materials need appropriate readability levels and content. We recommend the Delphi method to select content using consensus expert opinion whenever higher level data is lacking.

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## 1. Introduction

Successful communication between physicians and patients is critical to achieving optimal health outcomes [1] and high patient satisfaction [2]. Standardized written education materials provide patients with consistent information and immediate availability of answers to common questions. For patients undergoing surgery, clearly written and easily understandable discharge instructions may improve patient understanding of the recovery process and facilitate recognition of postoperative complications. As compliance is affected by comprehension [3], discharge instructions need

to address limitations in literacy and numeracy (the ability to understand and work with numbers). This requires materials to be written at or below the reading level of the population they target [4,5].

Beyond being easy to read, high quality patient education materials should also communicate important and actionable information [6]. In the case of surgical discharge instructions, anecdotal evidence suggests that content is often based on surgeon preferences or practices during training – rarely is information based upon best evidence in the literature. Despite numerous studies on the readability of surgical discharge instructions, there is a relative paucity of information on what content they should include.

With advent of improved minimally invasive surgical technique as well as enhanced loco-regional and general anesthetic practices, an ever-increasing number of procedures, including

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thyroidectomy, are commonly and safely performed as same day discharge or 23-h stay procedures [7]. Patients have limited time to learn about their post-operative course and self-care. Therefore, clear, patient-friendly discharge instructions are important for reminding patients how to perform self-care and understanding the signs and symptoms of potential complications.

In this study, we analyzed short stay surgery discharge instructions using thyroidectomy as a model procedure. We examined a broad cohort of providers' and institutions' discharge instructions to assess the readability and content of materials being offered to surgical patients. We hypothesized that current instructions would have poor readability and inadequate content. Our purpose was to develop a standardized discharge instruction template for use after thyroidectomy which covers consensus selected content at a literacy level appropriate for patients.

**2. Methods**

*2.1. Collection of current discharge instructions*

A convenience sample of surgeons at high volume endocrine surgery units in the USA, Canada, and Australia were invited to submit post-thyroidectomy discharge instructions and to participate in a Delphi panel. Invitations, submissions and organization of the Delphi panel were performed via email. Additional thyroidectomy information/instructions were also collected from the American Thyroid Association (ATA) and the American Association of Endocrine Surgery (AAES) websites.

*2.2. Readability analysis*

We used computerized tools to measure the readability of the materials collected. Each set of materials were analyzed with a battery of formulas that measure readability based on various combinations of word length, sentence length, number of syllables, and/or word difficulty [8]. Readability scores utilized included the Flesch-Kincaid Grade Level [9], Index [10], Coleman-Liau Index [11], SMOG Index [12], the New Dale-Chall Readability Formula [13], and the ATOS Readability Formula [14]. Text dimensions measured by each readability formula are provided in Table 1. For formulas providing a non-grade level score, the score was converted to a grade level using tables provided by the formula's authors. Grade level readability scores were used to compare the discharge instructions analyzed with both national and local patient literacy levels. Level readability scores were used to compare the discharge instructions analyzed with both national and local patient literacy levels.

*2.3. Patient literacy levels*

We chose a maximum readability score based on international and local survey data as well as expert recommendations for the development of our new discharge template. International literacy level data were collected from the most recent National

Assessment of Adult Literacy (NAAL) and the International Adult Literacy and Life Skills Survey [15,16]. Literacy levels at the institutions contributing discharge summaries were estimated using postal code-level data from national surveys [17,18]. Postal codes were selected based on the location of the contributing institutions. Local literacy levels were estimated via surveys collected at our institution. Institutional review board approval was obtained for patient surveys. The survey covered a variety of socioeconomic and demographic factors and was administered to all non-trauma general surgery patients in our outpatient clinic over a three-week period. We used self-reported levels of educational attainment to estimate the reading ability of our local patient population. The target maximum readability score was selected by consensus among the authors.

*2.4. Content extraction*

We extracted content from the same discharge instructions previously analyzed for readability. Two coders (AS, CS) independently reviewed all discharge instructions and recorded the topics covered. Each coder sorted their topics into categories of related topics for organizational purposes during review. Three authors (AS, JS, CS) independently reviewed the two lists of topics and then met to discuss and agree upon a consolidated set of categories covered by the topics as well as ways in which the topics themselves could be consolidated.

After a focused literature review on post-thyroidectomy care and complications, authors (AS, JS) used the two lists of topics and prior discussion as a guide to select representative topics within each category for discussion by the Delphi panel. The topics selected frequently combined topics extracted from submitted discharge instructions (eg "you may feel like you have to cough after surgery" and "you may have a sore throat after surgery that causes you to cough" were combined into the topic "a sore throat, coughing, and difficulty swallowing can occur after surgery"). The same two authors also created patient-centered warning signs of complications for discussion by the panel. During the preliminary discussion with the panelists on how the Delphi process would be carried out, additional topics for discussion were solicited. The set of representative topics, patient-centered warning signs, and topics suggested by panelists were then combined to form the initial set of topics evaluated by the Delphi panel.

*2.5. Delphi method*

The Delphi method, a structured communication technique developed by the RAND Corporation, has developed into a robust method for determining appropriateness or consensus of expert opinion [19]. Using iterative rounds of voting, expert panelists were asked to evaluate the appropriateness of a variety of topics for inclusion in discharge instructions using a numeric rating scale with an additional space to provide comments on the topic. The numeric scale ranged from 1 to 9 and was anchored at 1 (not at all

**Table 1**  
 Text dimensions measured by each readability formula.

Formula	Factors Which Impact Score:
Flesch-Kincaid Grade Level	Words/Sentence, Syllables/Word
Gunning-Fog Index	Words/Sentence, Words with >3 Syllables/Total Words
Coleman-Liau Index	Words/Sentence, Letters/Word
SMOG Index	Words with >3 Syllables/Sentence
New Dale-Chall Formula	Words/Sentence, Difficult Words/Total Words <sup>a</sup>
ATOS Readability Formula	Words/Sentence, Letters/Word, Average Word Difficulty <sup>a</sup>

<sup>a</sup> Word difficulty defined by comparison to known list.

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