

### Evaluation of reading level of online patient education materials discussing dermatologic care for patients undergoing dialysis



*To the Editor:* Dialysis for end-stage renal disease is associated with dermatologic conditions, including xerosis and uremic pruritus.<sup>1</sup> Patient education materials (PEMs) for chronic kidney disease are often presented above the average patient's literacy level.<sup>2</sup> Moreover, the readability of PEMs addressing cutaneous symptoms in patients undergoing dialysis is unknown. The National Institutes of Health recommends that PEMs should not surpass a sixth-grade level in readability,<sup>3</sup> and dermatologic PEMs often fail to meet this recommendation.<sup>4</sup> Because the progression to end-stage renal disease is associated with low socioeconomic status,<sup>5</sup> it is of particular importance that PEMs pertaining to dialysis skin care are presented at an adequate reading level. Our aim was to describe the readability of online PEMs related to dermatologic issues for patients undergoing dialysis.

We conducted a Google search in February 2022 using the term “dialysis skin care” and extracted texts from PEMs available from the first 5 search pages. To mitigate bias, the search was conducted using incognito mode. Journal articles and records not in English were excluded. Eligible texts were entered on the software [www.readabilityformulas.com](http://www.readabilityformulas.com), which uses the following validated tools to determine readability by grade level: the Flesch-Kincaid grade level, the Coleman-Liau index, simple measure of Gobbledygook index, automated readability index, and Linsear Write formula. If a tool provided an output of “college” (ie, readability at the college level), the coded grade level for analysis was “13.” Word and character counts, topics discussed, and visual aids were also analyzed.

A total of 40 records were identified; 22 met the inclusion criteria, of which 18 were from the nonacademic sources (Table I). All records discussed either dialysis-induced xerosis or pruritus, and 8 records examined additional cutaneous manifestations such as pigmentation and nail changes. A total of 19 articles discussed pharmacologic and/or nonpharmacologic interventions, and 18 articles explained the possible underlying causes of dialysis-associated pruritus. The mean grade reading levels ranged from

**Table I.** Characteristics of included articles

Characteristic	No. of studies (%)
Source of information	
Academic organization	4 (18.2)
Nonacademic organization	18 (81.8)
Use of visual aids	6 (27.3)
Skin conditions discussed	
Xerosis	15 (68.2)
Pruritus	21 (95.5)
Other	8 (36.4)
Laboratory values discussed	18 (81.8)
Therapies discussed	
Pharmacologic	17 (77.3)
Nonpharmacologic	18 (81.8)

**Table II.** Summary of tools used to assess readability across study articles

Tool	Mean grade level
The Flesch-Kincaid grade level	10.09
The Coleman-Liau index	10.95
Simple measure of Gobbledygook index	9.36
Automated readability index	9.48
Linsear Write formula	10.01
Overall grade level	9.98

6 ( $n = 1$ ) to 13 ( $n = 3$ ), with an overall mean of 9.98 (Table II). The mean number of words and characters were 903.7 and 5627.3, respectively, with an average of 6.18 characters per word. A direct relationship between the average characters per word and the overall mean grade-level readability across texts ( $r = 0.67$ ,  $r^2 = 0.44$ ) suggests that texts with longer words are associated with increased reading difficulty. Six records used visual aids, including photos and symbols describing therapeutic recommendations (eg, a thermostat, bathtub), and their mean readability was 10.9. The mean grade reading level of the academic sources was 7.5 and that of the nonacademic sources was 10.59. The mean remained within the ninth-grade level across all search pages.

Except for 1 record, all texts in this study were written beyond the sixth-grade standard, thus suggesting that PEMs on skin care for patients receiving dialysis are not targeted to the general population's literacy level. Pruritus and xerosis were widely discussed in PEMs, but other skin manifestations associated with dialysis may require increased visibility. A limitation of readability assessment tools is their inability to evaluate in-text visual aids, which may be an underutilized strategy to improve patient

comprehension; however, they should be paired with texts written at an appropriate level. With patients increasingly consulting the internet for health information, online PEMs must be understandable. We recommend dermatologists to contribute high-quality and understandable PEMs that inform people about skin care in the setting of dialysis.

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**Conflicts of interest**

None disclosed.

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