



Osteosarcoma Health Literacy:

A Quantitative Assessment Of Online Patient Education Material

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Introduction

The American Medical Association (AMA) and National Institutes of Health (NIH) recommend online health information to be written at a 6th grade or lower reading level in order to be fully understood by the average adult in the United States.

Previous studies have examined osteosarcoma patient resources to assess syntax reading level, quality of treatment options, and social reach of the materials

These analyses do not measure whether the text is written that readers can process key information (understandability) or identify available actions to take (actionability)

The Patient Education Materials Assessment Tool (PEMAT) is a valid and reliable method to measure the understandability and actionability

Objective

The purpose of this study was to evaluate the readability, understandability, and actionability of osteosarcoma online resources

Materials and Methods

Two independent online searches (Google.com™): “Osteosarcoma”

- **Inclusion:** Osteosarcoma-related patient education
- **Excluded:** Non-text material (audiovisual), articles (news/research/industry), and websites unrelated to osteosarcoma

Readability was quantified using valid objective algorithms. The readability measures report readability scores in terms of the average US school level that is required for a reader to comfortably understand the text

PEMAT-P form were performed by two independent authors.

- A PEMAT score of 70% or below is considered poorly understandable or poorly actionable.

Correlation between a website’s average Google search rank and its readability, understandability, and actionability was also determined.

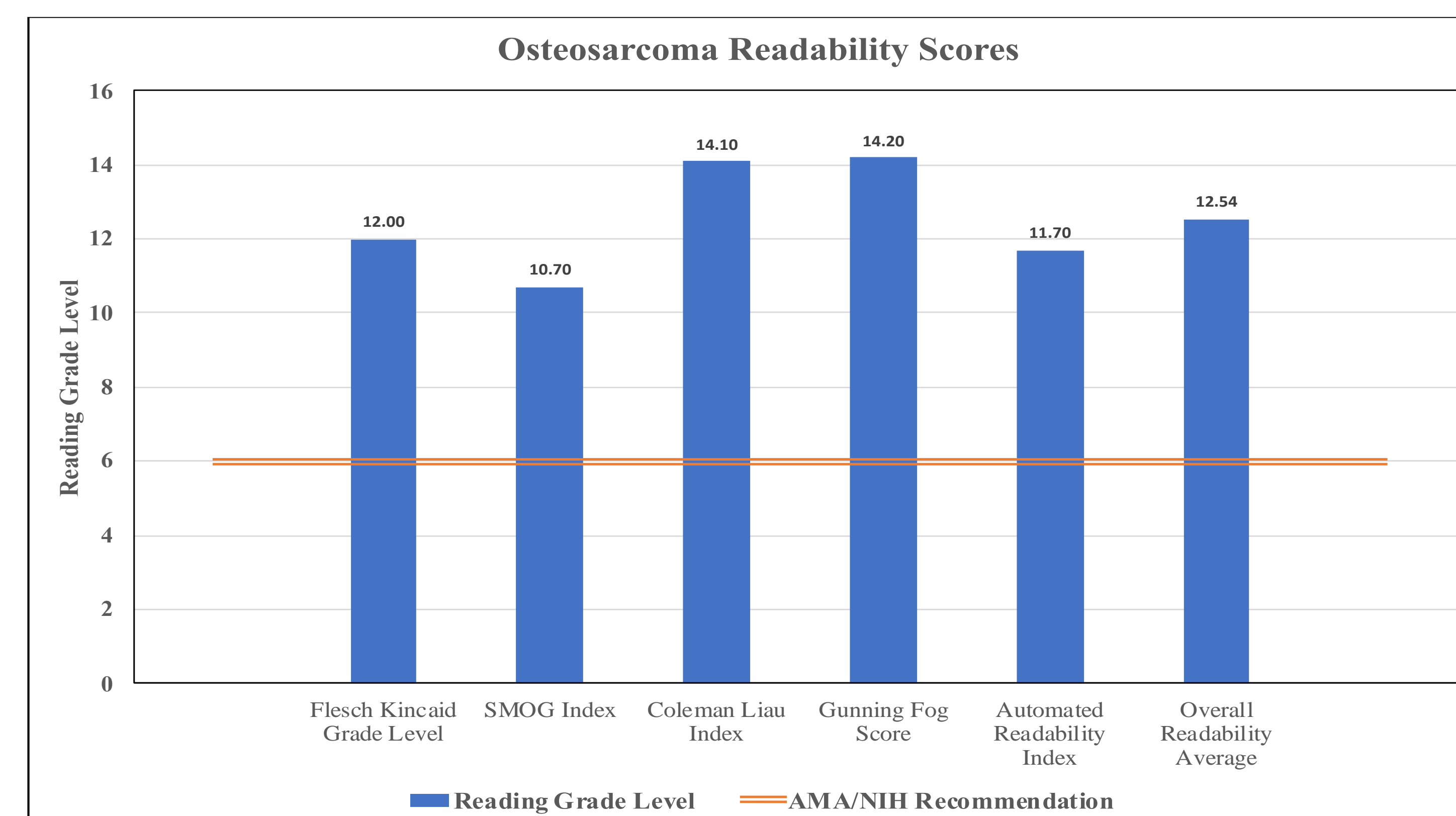
Results

Of 53 unique websites, 37 websites (69.81%) met inclusion criteria

Readability Scores (Grade Level):

- Flesch-Kincaid Grade-Level (FKGL): 12.01 ± 2.40
- Simple Measure of Gobbledygook (SMOG): 10.74 ± 1.90
- Coleman-Liau Index (CLI): 14.07 ± 1.96
- Gunning-Fog Index (GFI): 14.19 ± 2.72
- Automated Readability Index (ARI): 11.56 ± 2.59

No (0%) websites scored \leq 6th grade reading level



PEMAT Score

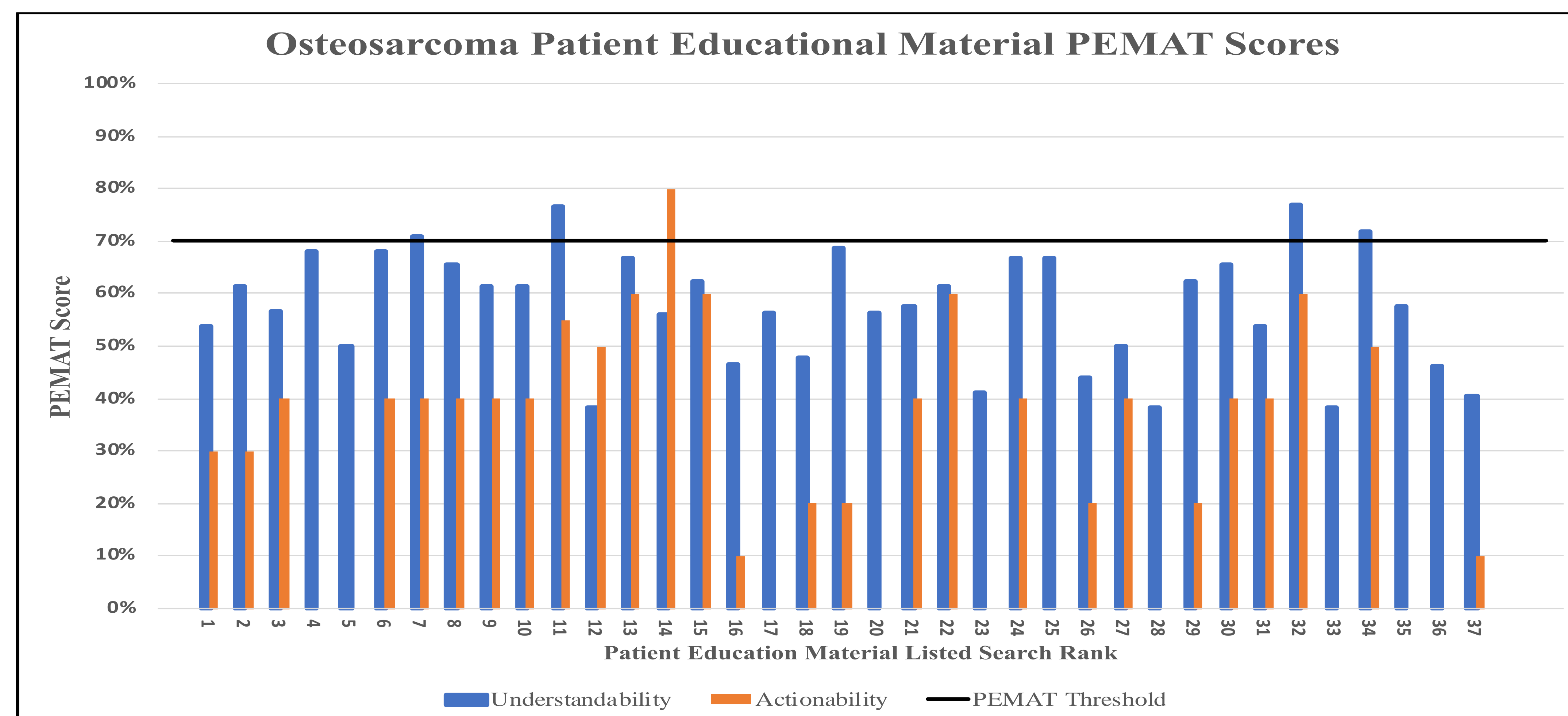
(mean \pm SD)

Understandability:

57.21 ± 10.69

Actionability:

28.03 ± 22.64



10.81% (n=4) scored with the acceptable threshold (>70%) for understandability

- 3 (75%) academic websites, 1 (25%) government agency (NIH)

Only 1 website (2.70%) scored above the acceptable threshold (>70%) for actionability

No websites scored above the threshold for both actionability and understandability

There was no association between readability (p=0.15), understandability (p=0.20) nor actionability (p=0.31) scores and Google™ rank

Discussion and Conclusions

Osteosarcoma online patient educational materials scored poorly with respect to readability, understandability, and actionability.

None of the online resources scored at the AMA and NIH recommended reading level. Only 4 scored above the threshold for to be considered understandable by the general public with 75% of those consisting of academic institutions.

Optimization of the most accessible osteosarcoma websites is necessary. Future efforts by musculoskeletal oncology leaders should be made to improve online resources in order to optimize patient knowledge and facilitate informed decision-making.