

Appropriateness of online resources for home blood pressure measurement: alignment with guideline recommendations, readability, and end-user involvement.

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Appropriateness of online resources for home blood pressure measurement: alignment with guideline recommendations, readability, and end-user involvement.

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Abstract

Background: High blood pressure (>140/90mmHg) is the most important risk factor for death worldwide. Home blood pressure measurement (HBPM) is recommended for BP management. HBPM is most effective to improve BP management when delivered with patient education. It is unknown if online resources are appropriate for patient education for HBPM. Patient education should provide accurate, evidence-based information, communicate at a grade eight reading level, and involve end-users in development to meet the needs of adults of all health literacy levels.

Objective: Using these criteria, this study aimed to determine the appropriateness of online HBPM resources.

Methods: None of the identified resources (n=24) aligned with all 23 of the guideline recommendations. All resources aligned with the recommendation to measure BP when seated, while few aligned with the recommendation to use a validated BP device (n=9, 38%). All resources exceeded the recommended grade-eight reading level (mean: 11.8, range: 8.8-17.0) and none reported evidence of patient end-user involvement in development.

Results: None of the identified resources (n=24) aligned with all 23 of the guideline recommendations. All resources aligned with the recommendation to measure BP when seated, while few aligned with the recommendation to use a validated BP device (n=9, 38%). All resources exceeded the recommended grade-eight reading level (mean: 11.8, range: 8.8-17.0) and none reported evidence of patient end-user involvement in development.

Conclusions: None of the online resources met the criteria for appropriate education to support adults to measure BP at home. Resources should be developed with end-users using health literacy tools and multi-modal communication methods to ensure they are appropriate to meet the needs of patients.

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Abstract

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Background:

High blood pressure (>140/90mmHg) is the most important risk factor for death worldwide. Home blood pressure measurement (HBPM) is recommended for BP management. HBPM is most effective to improve BP management when delivered with patient education. It is unknown if online resources are appropriate for patient education for HBPM. Patient education should provide accurate, evidence-based information, communicate at a grade eight reading level, and involve end-users in development to meet the needs of adults of all health literacy levels. Using these criteria, this study aimed to determine the appropriateness of online HBPM resources.

Methods:

Environmental scan of online resources for HBPM on Google (October 2022) using search terms developed with consumers (n=6). Resources were included if identified on the first page of results, not paywalled and in English. Resource appropriateness was appraised based on three criteria: 1) alignment of resource content to 23 recommendations for HBPM from six international guidelines; 2) appropriate grade reading level as calculated by health literacy assessment software; and 3) evidence of end-user involvement in resource development.

Results:

None of the identified resources (n=24) aligned with all 23 of the guideline recommendations. All resources aligned with the recommendation to measure BP when seated, while few aligned with the recommendation to use a validated BP device (n=9, 38%). All resources exceeded the recommended grade-eight reading level (mean: 11.8, range: 8.8-17.0) and none reported evidence of patient end-user involvement in development.

Conclusions:

None of the online resources met the criteria for appropriate education to support adults to measure

BP at home. Resources should be developed with end-users using health literacy tools and multi-modal communication methods to ensure they are appropriate to meet the needs of patients.

Keywords:

Readability, online resources, blood pressure guidelines, end-user, patient education, home blood pressure measurement



Introduction

High blood pressure (BP; hypertension, $\geq 140/90$ mmHg) is the leading risk factor for death worldwide [1, 2]. High BP can be controlled ($< 140/90$ mmHg) via medication and lifestyle changes to reduce the risk of heart attack and stroke [3]. Home BP measurement (HBPM) is widely recommended to inform hypertension diagnosis and to monitor the control and ongoing management of BP [4-7]. HBPM provides accurate, standardised BP readings which have greater prognostic value for cardiovascular disease when performed according to guideline recommendations [8]. Adults who measure BP at home are more engaged in BP management and achieve greater BP control [9]. Further, several studies, including a recent meta-analysis, highlight that HBPM is only effective for improving BP management when accompanied by appropriate patient education on how to measure HBPM accurately and act on BP readings [7, 10, 11]. However, there is a lack of guidance and standardised resources to provide effective education for HBPM in clinical settings [11, 12].

In the absence of effective in-clinic education and with the increased use of telehealth, online resources are commonly used by adults who seek health-related information for self-education [13]. In addition, recent work in Australia has shown that $>35\%$ of adults would prefer to access information about high BP online [14]. With this evolution of health care and patient education delivery, government bodies have emphasised the need for online resources to provide health information that is evidence-based and understandable [15]. More specifically, several systematic reviews on eHealth, mHealth and other digital strategies to improve BP management also suggest a growing need to ensure appropriate education is available online to support adults to undertake HBPM [16-18].

Online educational resources that are appropriate to support adults to perform HBPM should deliver evidence-based information in a manner which meets the health literacy and learning needs of most adults. To do this, information should be presented at a grade eight reading level, with the use of visual aids such as graphics to support understandability [19, 20]. The use of co-design methods

involving target end-users during resource development is an effective method to ensure resources meet the needs of end-users for effective patient education [21-24]. However, previous research has shown that online educational resources for cardiovascular disease risk management do not provide appropriate information or meet the usability or readability needs of adults [18, 25-29], and co-design involving end-users (such as community members and medical professionals) is an underutilised method during resource development [24]. Due to the importance of patient education for HBPM to achieve improved BP control and patient self-efficacy in BP management, patient education resources for HBPM should be appropriate for use by adults who self-monitor BP.

The aim of this study was to determine if online resources are appropriate for HBPM education based on three research questions, do online resources 1) provide evidence-based information that aligns with guideline recommendations, 2) communicate at an appropriate reading level, and 3) involve end-users in their development.

Methods

Study design.

Environmental scan of online resources on HBPM was conducted through a Google search designed to emulate the approach taken by adults with lived experience of HBPM when seeking online materials about HBPM [27]. The resources were characterised according to basic identifying features, such as publishing organisation and year. Resources were assessed for alignment to 23 recommendations common across six international guidelines which encompass HBPM activities including acquiring the BP measurement device, scheduling and preparing for HBPM, fitting the cuff, BP measurement conditions, and recording and reporting BP reading (Table 1, Supplementary Table S1) [6, 30-34]. The grade reading level of resource content was calculated using the health literacy assessment software Sydney Health Literacy Lab Editor (SHeLL Editor) [35, 36]. The recommended reading level for maximum comprehension for adults is grade eight or below [19]. Involvement of community member and/or medical professional end-users in resource development

was assessed according to whether this was reported within each resource. Data extraction and resource appraisal was undertaken by two independent researchers (EC & SC) using a coding framework hosted on the secure online platform Research Electronic Data Capture (REDCap) [37].

Search Strategy.

The search engine Google Australia (www.google.com.au) was used to identify online resources addressing HBPM. Seven search terms were developed with trained research consumer advisors who have lived experience of BP management and using Google Trends (Supplementary Table S2). Consumer advisors (n=6) identified the search engine and top five search terms they would use to find information online about HBPM. Google Trends was used to identify the search queries related to the term “home blood pressure measurement” that had the highest probability of use worldwide on Google from 1/1/2012 to 7/10/2022. Search terms suggested by consumer advisors that also had high probability of use on Google according to Google Trends and were relevant to HBPM were used and included: “How to take your blood pressure”, “How to check blood pressure at home”, “How to take blood pressure at home”, “Home blood pressure monitoring”, “How to measure blood pressure at home”, “How to monitor blood pressure at home” and “Home blood pressure measurement”.

Data extraction of online resources.

Data extraction was undertaken independently by two investigators (EC and SC) on 17/10/2022 (duplicate search). To avoid potential bias attached to the reviewers' Google history, each reviewer conducted the search using the default Google search settings within the incognito browser of Google Chrome and clearing the cache before each search term. The results of each search term that were presented on the first page of Google were exported, excluding advertisements. After completing all searches, the resources extracted by each reviewer across all search terms were combined and duplicate resources removed (i.e. resources identified across >1 search term).

Inclusion criteria for online resources.

HBPM resources were included if they met the following inclusion criteria: 1) free to access by the

public (e.g. no paywalls), 2) available in English language, and 3) contained content relevant to HBPM (e.g. resource mentions “home blood pressure measurement” or “self-measured blood pressure”) (Supplementary Table S3). The resources extracted from Google were independently analysed against inclusion criteria by EC and SC, and discrepancies were resolved by third and fourth independent reviewers according to the same criteria (NC and DP), see Supplementary Figure S1. All resources that met the inclusion criteria were included for analysis. Resources were not excluded due to criteria regarding publication date, publication location, or resource format (i.e. video, graphic, blog).

Appraisal of online resources.

A coding framework hosted on REDCap was used by EC and SC to independently and systematically appraise resources according to three criteria: 1) alignment of resource information to HBPM guideline recommendations, 2) grade reading level of resource text, and 3) end-user involvement in resource development. The REDCap appraisal framework captured resource characteristics (type of publishing organisation, authorship, year of publication or last review, location of publication and language/s), communication methods used (categorised as written text, visual, video or audio), the alignment of resource content against HBPM recommendations and the grade reading level of resource content (Supplementary Table S3). Independent reviewers were trained on how to undertake the search, extract data and appraise resources. During training the appraisal data of a subset of resources (n=3) was compared to ensure the correct process was taken by both independent reviewers. All data was captured in a framework housed on REDCap. All content (including audio, text, video and graphical content) included within each HBPM resource was appraised according to three main criteria detailed in full below. Any discrepancies in appraisal were resolved in adjudication sessions where blinded discrepancies were presented to adjudicators (NC and DP) and resolved via discussion until consensus was reached.

1) Alignment of resource information to HBPM guideline recommendations.

Twenty-three recommendations that encompass activities for HBPM from six international guidelines were used to determine alignment of resource content to guidelines (Table 1) [6, 30-34]. Resource content was marked against each recommendation and categorised as 'aligned with' if the resource correctly stated the recommendation, 'incorrectly stated' if the resource incorrectly or incompletely stated the recommendation, or 'not mentioned' if the resource did not include the recommendation (Supplementary Table S3). Where resources 'incorrectly stated' a guideline recommendation, the incorrect information provided by the resource was recorded on REDCap (Supplementary Table S4).

Table 1. Twenty-three key guideline recommendations for home blood pressure measurement

<i>Acquiring the BP device</i>
Use a validated BP measurement device for HBPM.
Finger cuff BP measurement devices should not be used for HBPM.
<i>Scheduling HBPM</i>
On a day that HBPM is being conducted, BP should be measured in the morning and the evening.
<i>Preparing for HBPM</i>
Do not measure BP if uncomfortable, stressed or in pain.
Measure BP before medication.
Measure BP before eating or 30 minutes or 2 hours after eating.
Measure BP after emptying the bladder.
Measure BP before exercise, or 30 minutes after exercise.
Measure BP before caffeine, or 30 minutes or 1 hour after caffeine.
Measure BP before smoking, or 30 minutes or 1 hour after smoking.
Have 5 minutes, or at least 5 minutes of seated rest before measuring BP.
<i>Selecting and fitting the cuff</i>
Use an appropriately sized arm cuff for HBPM.
The arm cuff should fit the arm within the accepted range indicated on the cuff.
Fit the upper arm BP cuff to a bare arm.
<i>Measurement conditions</i>
Measure BP in a room at a comfortable temperature.
Measure BP with the arm fitted with the cuff supported, or supported at heart level.
Measure BP in a seated position.
Measure BP with both feet flat on the floor.
Measure BP with legs uncrossed.
Measure BP with back supported.
Take two readings one minute apart at each HBPM sitting.
<i>Recording and reporting BP</i>
Average the BP readings taken over a seven-day period, discarding the first day.
Take a copy of home BP readings to a doctor

2) Grade reading level of resource text.

The grade reading level of each resource was calculated using the 'SheLL Editor', which is a health literacy assessment tool that calculates the school grade reading score of text according to the Simple Measure of Gobbledygook, and reports other measures such as complex language, uncommon English words and use of passive voice [35, 36]. All text presented within each resource (including written text, image captions, and audio and video transcripts when available) was entered into the SheLL Editor and the grade reading level and associated measures were recorded in the REDCap framework (Supplementary Table S3).

3) End-user involvement in resource development.

End-user involvement in resource development was recorded in the REDCap framework as stated within the resource. End-users were defined as adults who seek information to measure BP at home (e.g. patient, health consumer, service user, carer, community advisor) or medical professionals, due to their role in delivering education for HBPM to adults or directing adults to educational resources for HBPM [38, 39].

Data Analysis.

Data were analysed on Stata version 17 (StataCorp, USA). Resources were assigned an identifying number for analysis and presentation of results (Table S2). Categorical data is presented as n (%).

Data Availability.

The data that support the findings of this study are available from the corresponding author (NC) upon reasonable request. NC had full access to all data in the study and takes responsibility for its integrity and the data analysis.

Results

Resource characteristics.

Twenty-four resources were included in the study (Supplementary Table S5 and Supplementary Figure S1). Not-for-profit organisations (such as the Heart Foundation) were the most common type of publishing organisation (n=6, 25%) followed by websites (such as Healthline), academic journals and scientific societies (Table 2). Most resources were communicated via a combination of written text, visual (e.g. images), audio and video communication methods (n=17, 71%), and remaining resources were communicated by written text only (n=7, 29%; Table 2). Most resources were published in Australia (n=10, 42%) or North America (n=9, 38%), and only three (n=3, 13%) were available in languages other than English.

Table 2. Characteristics of included resources.

<i>Characteristic</i>	n (%)
<i>Type of publishing organisation</i>	
Commercial entity	3 (12%)
Scientific journal	4 (17%)
Government body	1 (4%)
Not-for-profit organisation	5 (21%)
Scientific society	5 (21%)
Website	4 (17%)
Medical research institute	2 (8%)
<i>Date of publication or last review</i>	
Last 12 months	3 (13%)
1-2 years ago	3 (13%)
2-3 years ago	2 (8%)
3-4 years ago	1 (4%)
4-5 years ago	1 (4%)
>5 years ago	4 (16%)
Not stated	10 (42%)
<i>Location of publication</i>	
Australia	10 (42%)
North America	9 (37%)
Europe	5 (21%)
<i>Communication method</i>	
Written text only	7 (29%)
Written text and visual	9 (37%)
Written text and video	4 (17%)
Written text, visual and video	3 (12%)
Written text, audio and visual	1 (4%)
<i>Languages</i>	
English only	21 (88%)
English, Mandarin and Spanish	1 (4%)
English and Spanish	2 (8%)

Resource alignment to HBPM guideline recommendations.

As shown in Figure 1, none of the resources aligned to all 23 guideline recommendations for HBPM. Almost all (n=22, 92%) of the resources incorrectly stated at least one guideline recommendation. Two resources (8%) did not align with any of the 23 guideline recommendations for HBPM. The alignment of resources to each guideline recommendation, is shown in Figure 2 indicating if the recommendation was 'aligned with', 'incorrectly stated' and 'not mentioned' in each resource. Time or frequency bound recommendations were often incorrect within resources. For example, to rest for five minutes before measuring BP was incorrectly stated in 25% (n=6) of resources and to take two BP readings one minute apart at each sitting was incorrect in 46% (n=11) of resources (Figure 2). Resources incorrectly stated guideline recommendations because the resource content was not specific enough to capture the meaning of the guideline recommendation, provided contradictory advice, or stated an alternate rest period, number of measurements, frequency, duration or other numeric parameter to the guideline recommendation (Supplementary Table S4). For example, rather than stating the recommendation to "have five minutes [or at least five minutes] of seated rest before measuring BP", resources which incorrectly stated this recommendation said to "*rest for 15 minutes*" (Resource ID 10) or "*rest quietly and wait about one to two minutes before taking another measurement*" (Resource ID 19). In addition, rather than stating the recommendation to "take two readings one minute apart at each HBPM sitting" a resource which incorrectly stated this recommendation stated "*if you get a reading that is slightly or moderately higher than normal, take your blood pressure a few more times*" (Resource ID 6).

Resource alignment to guideline recommendations according to publishing organisation is outlined in Figure 3. Resources published by scientific journals, scientific societies and not-for-profit organisations aligned to a higher number of HBPM guideline recommendations (n=14 resources, median: 16.5 recommendations, range: 2 to 22) than resources published by websites, commercial

entities and medical research institutes (n=9 resources, median: 6.5 recommendations, range: 0 to 12; Figure 3).

Grade reading level of resource text.

All resources exceeded the recommended grade ≤ 8 reading level for adults (mean grade reading level: 11.8, range: 8.8 to 17.0; Figure 4). The grade reading level of resources was not different according to the level of alignment to HBPM guideline recommendations or communication method (Figure 4 and 5). Resources presented through written text only (n=7) had the highest average grade reading level (mean grade reading level: 12.9, range: 10.5 to 16.4; Figure 5). Resources published by scientific journals had the highest average grade reading level (n=4, mean grade reading level: 16.5, range: 11.9 to 17), compared to government bodies (n=1, mean grade reading level: 8.8) and not for profit organisations (n=5, mean grade reading level: 10.2, range: 9 to 10.9) (Figure 6). Supplementary Table S6 shows the characteristics of the resource text which contributed to the grade reading level score.

End-user involvement in resource development.

None of the resources reported involving adults (such as patients, health consumers or carers) during resource development. Medical professional involvement was reported in five (21%) resources. Resources with and without medical professional involvement in development had similar alignment to HBPM guideline recommendations and grade reading level (Figure 7 and 8).

Discussion

This study has demonstrated that online resources may not be appropriate to fully support adults to undertake high-quality HBPM because none of the resources provide sufficient guideline information or communicated at an appropriate reading level. Using methodology that emulated the search strategy of adults with lived experience of HBPM to identify resources, we identified that none of the resources correctly stated all key guideline recommendations for HBPM and most resources included information that was incorrect according to guideline recommendations due to

incorrectly stating time and frequency bound recommendations. The findings of this study highlight the need to design educational materials for key BP management behaviours such as HBPM that are appropriate for adults who self-monitor BP.

Calls to Action on Hypertension in the United States and Australia highlight the importance of empowering patients who perform HBPM to improve and monitor BP control [40, 41]. At a global level, the World Heart Federation Hypertension Roadmap highlighted that appropriate patient education is an important strategy to improve BP control [20]. Existing research supports this by illustrating that patient education delivered with HBPM improves BP control outcomes [10] and adherence to recommendations for HBPM [11, 42]. However, the results of this current study suggest that online resources may not be appropriate to educate adults on HBPM as the identified resources did not provide the guideline information required to support HBPM in a manner that met adult reading needs. The present study found that time and frequency based HBPM recommendations, such as the number of BP measurements to take per sitting and the associated rest periods, were incorrectly stated within the most resources, while the recommendation to measure BP when seated was accurately communicated in the most resources. Interestingly, a recent study on the BP guideline recommendations followed by adults who measure BP at home, found that time-bound recommendations were performed by the least adults, while the recommendation to measure BP in a seated position was performed by the most adults. Additionally, adults who reported previously seeking information to support HBPM did this via online sources, however these adults did not perform higher quality HBPM than adults who had not used online information to support HBPM [43]. Altogether, these findings highlight that current educational resources are not appropriate to support adults to measure BP as recommended by guidelines and illustrate a possible synergy between the inaccurate information delivered within online HBPM resources and the practice of adults when measuring BP at home. This emphasises the need for online HBPM resources to accurately and clearly deliver guideline recommendations to enable proper HBPM practice among

adults, which is an important behaviour for BP management.

This study found that resources published by scientific journals, scientific societies and not-for-profit organisations stated more guideline recommendations correctly than resources published by websites, commercial entities and medical research institutes. This suggests that some organisations and resource developers may have low awareness of or access to guideline recommendations for HBPM and may not recognise the importance of standardised BP measurement practices for achieving and maintaining BP control. International BP guidelines should consider the importance of using consistent, unambiguous and plain language for HBPM recommendations to support the accurate translation of recommendations into educational resources for HBPM. To ensure guideline information is disseminated to the general public, guideline developers should share guidelines with organisations that publish online health information and partner with peak organisations to enable resource developers from outside of the scientific and clinical community to create guideline informed, evidence-based resources.

As well as correctly delivering evidence-based guideline information, HBPM resources must deliver information in a format accessible for adults to achieve effective education. Previous evidence shows that the delivery of online health information is not appropriate to inform patient decisions surrounding cardiovascular disease because the reading level is too high and the information is not adapted to meet the learning needs of adult patients [17, 26, 27, 44]. This is consistent with the findings of our study where all resources were at a reading level that was too high (≤ 8 grade) for adult comprehension and over a quarter ($n=7$, 29%) of resources only presented information via written text.

Strategies to deliver patient education that meets the literacy levels of adult patients should be implemented to ensure educational resources can support adults to perform key cardiovascular disease risk management behaviours such as HBPM. As highlighted by the World Heart Federation Hypertension Roadmap, the delivery of education via graphical means is a more appropriate

communication method to meet the needs of those with lower health literacy levels [20]. This is supported by the findings of this study, where online resources with multi-modal communication methods achieved a lower average grade reading level than resources which communicated via written text alone. Supporting audio-visuals, such as graphs, diagrams, images, videos and the read-aloud function should be used to aid understandability, comprehensibility and actionability of online health information. Additionally, the use of readability and grammar editing tools when developing resources may help to ensure that resource information is presented at a grade reading level that is appropriate to all adults, and resources such as the AHRQ Health Literacy Universal Precautions Toolkit provide actionable methods to maximise understandability of patient education strategies [45]. Finally, artificial intelligence (AI) could be used to tailor online information to meet patient literacy needs, selectively deliver information most relevant to the unique information needs of patients and to support chat-box functions enabling adults to ask clarifying questions [46]. However, although AI generated content is accurate and retains key meaning, caution should be taken to ensure that information used by AI generators is sourced from guidelines.

Direct end-user involvement in resource development is an increasingly well-recognised strategy to ensure health products and services, including health information, meet end-user needs to deliver quality care and education [21-24]. However, end-user involvement is not commonplace in resource development [24], which is consistent with the findings of our study. Although some resources of this study involved medical professionals in their development, this did not improve resource grade reading level or the number of correctly stated guideline recommendations. While medical professionals play a central role in patient education, they may not be aware or have sufficient resources to meet the health literacy needs of all patients [47-49]. Additionally, some medical professionals have general distrust of BP guidelines [50] and do not utilize current guidelines recommendations for HBPM in clinical practice, such as to use different cut offs values for a hypertension diagnosis using in-clinic versus home BP readings [12, 51]. This further highlights the

needs for adults with lived experience of BP management to be involved in resource development to identify unfamiliar medical jargon, recommend culturally and linguistically sensitive adaptations and advise on the appropriate use of images. For existing resources, such as those identified in this study, adults could be involved in appraising these resources to identify how they could better meet the needs of adults seeking information on HBPM. Implementing the strategies suggested would ensure information provided by online resources is suitable for use by all end-users to support high-quality HBPM among adults.

Strengths and limitations

A strength of this study was the involvement of consumer advisors in the development of the search strategy to emulate the experience of adults seeking information for HBPM. In addition, a rigorous framework analysis approach was used by two independent researchers for resource identification and appraisal. This study was strengthened by the guideline informed appraisal process, however guideline recommendations included in this analysis were not exhaustive of all recommendations for HBPM due to inconsistency in recommendations across guidelines. Incognito mode was used to eliminate the impact of cookies and search history unique to the reviewer. However, as a result of using default Google search engine settings and including only the first page of search results, some online HBPM resources would have been missed. The location from which this study was conducted has likely impacted the search results as 42% of included resources were from Australia. This suggests that the resources which an adult seeking HBPM information is exposed to depends on the location from which the search is conducted. This method should be replicated in other locations to assess resources that may not have been identified in this study. The scope of this study was narrow, with highly specific appraisal criteria used to evaluate resources. Other important considerations of online resources such as ease of access and usability should be included in future studies for a more complete understanding of resource appropriateness for HBPM support. Further, given the proliferation in use of AI, mHealth and eHealth for health interventions and patient education,

HBPM resources found on these information sources should also be appraised for appropriateness.

Conclusion

This study found that online resources identified are not appropriate to fully support adults to measure their BP at home according to HBPM guideline recommendations. None of the resources identified provided sufficient guideline information to support adults to properly perform HBPM, were presented at an appropriate reading level, or involved end-users in their design. Resources that deliver health information should employ strategies such as the use of multi-modal communication methods, literacy editor tools and co-design methods with adult end-users to ensure the information delivered is appropriate to support adults for HBPM. Due to the recognised importance of effective education in achieving standardised HBPM and improving BP control, creating appropriate educational resources for key BP management behaviours such as HBPM should be considered a priority.

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Conflicts of interest: Dr. Carissa Bonner is a Director of Health Literacy Solutions, a company set up to fund the future development of the SHeLL Editor.

Abbreviations

BP: Blood pressure

HBPM: Home blood pressure measurement

SHeLL Editor: Health Literacy Lab Editor

Data availability. Data is available upon reasonable request to the corresponding author.

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Supplemental Material

Tables S1-S6

Figure S1

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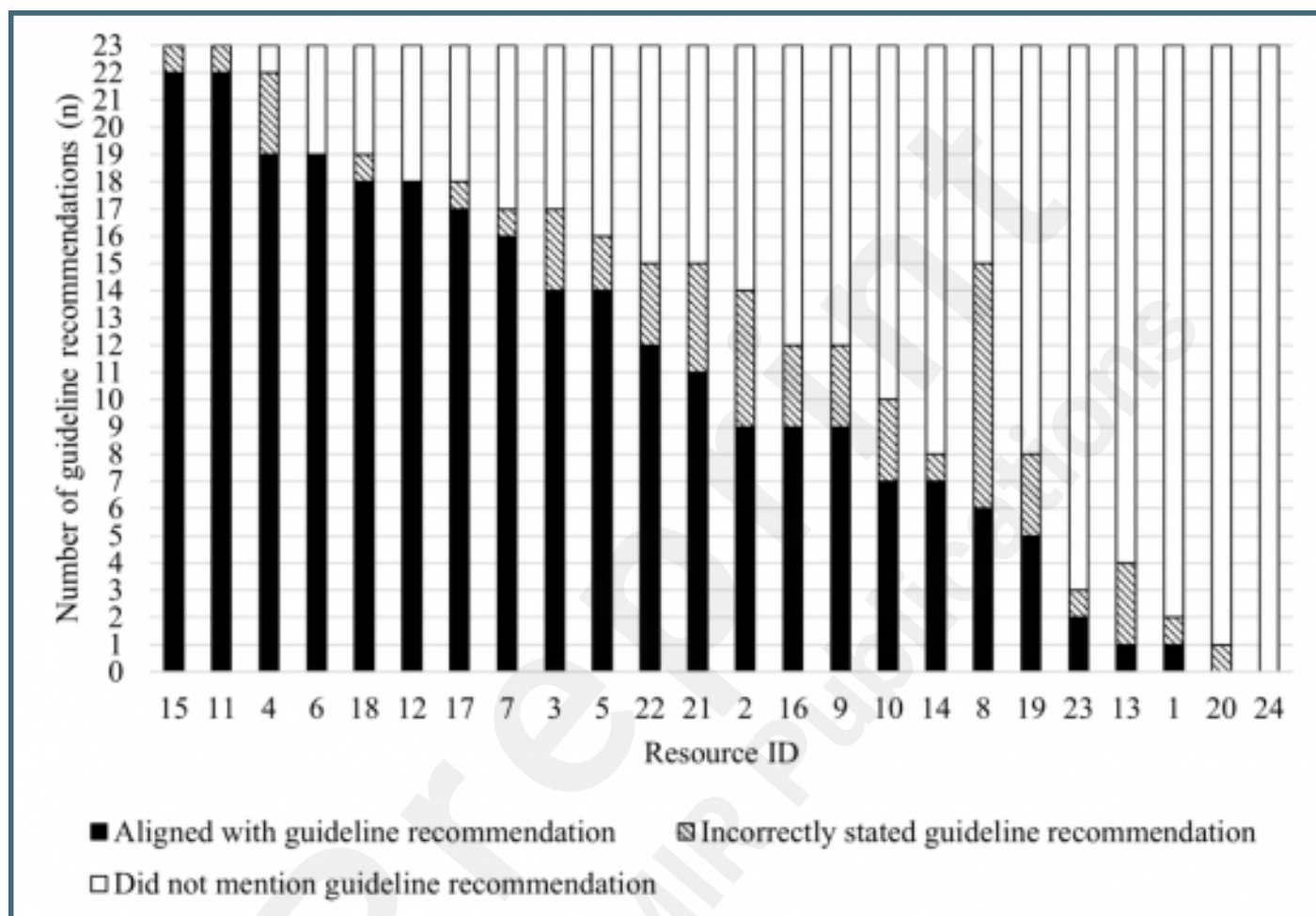
Supplementary Files

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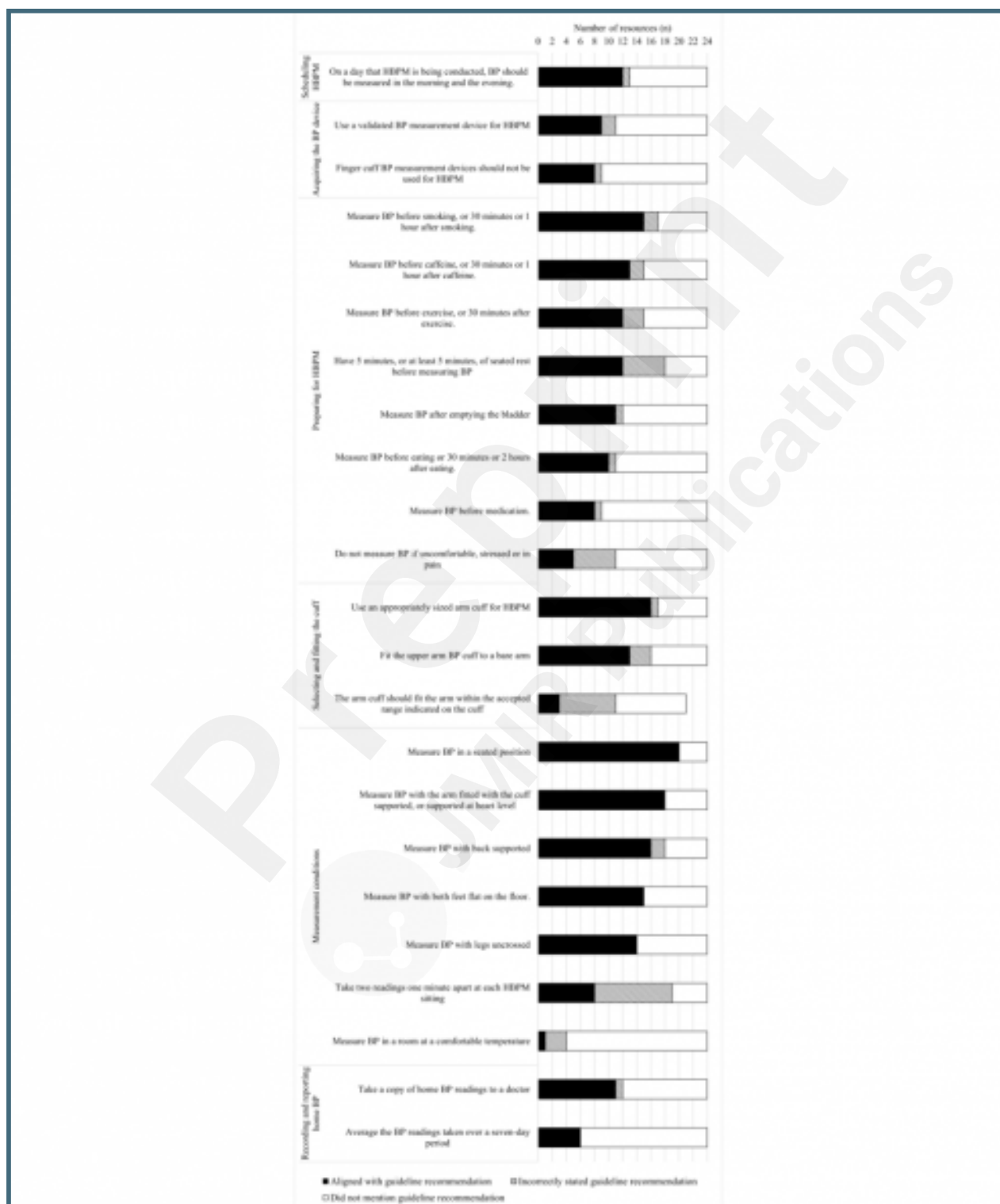
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Figures

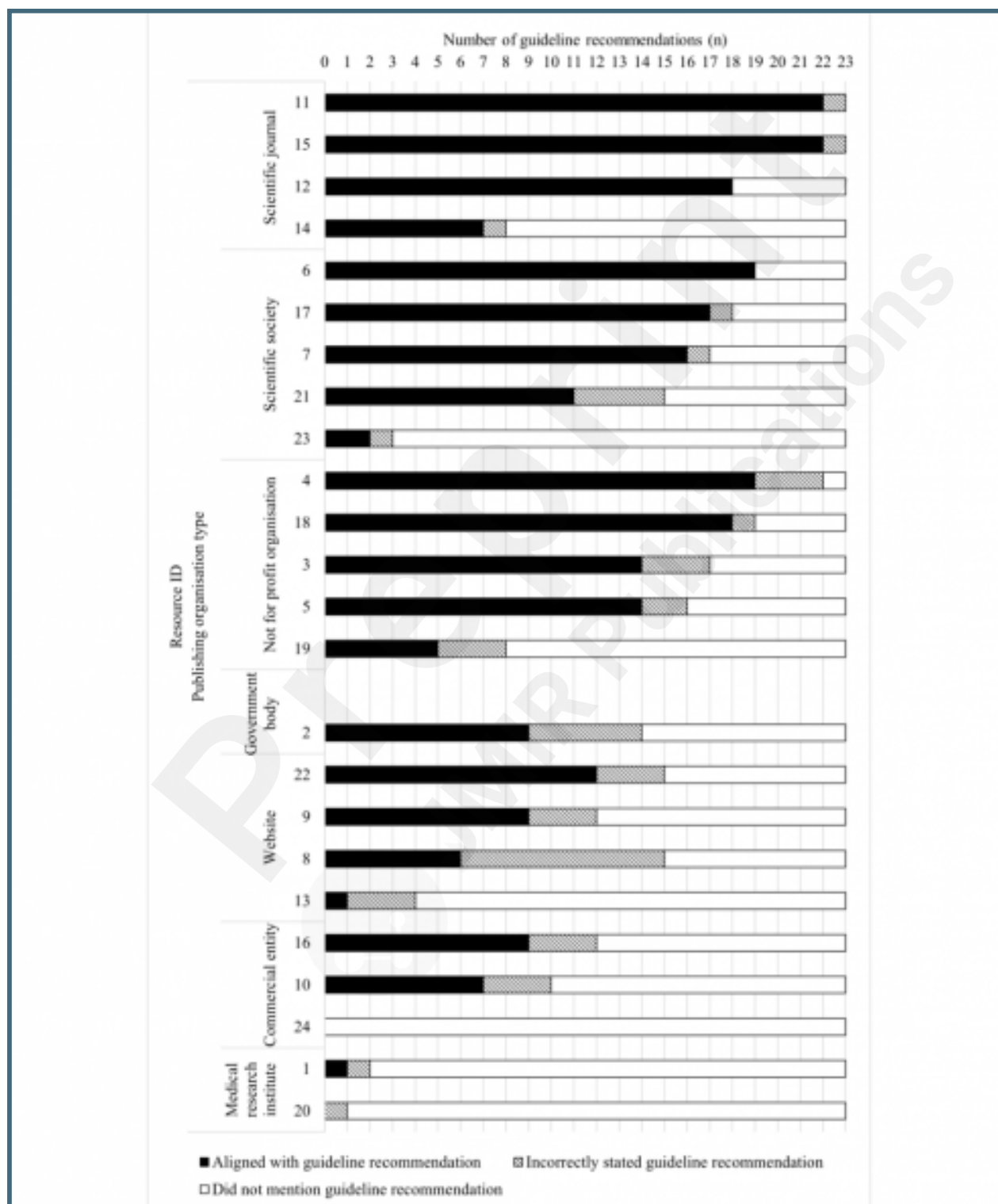
Alignment of each resource to 23 guideline recommendations for HBPM. Resource content either 'aligned with' the HBPM guideline recommendation (black bars), 'incorrectly stated' the guideline recommendation (patterned bars), or 'did not mention' the guideline recommendation (white bars). The y-axis indicates each of the 23 guideline recommendations and x-axis indicates resource number (n=24 resources). HBPM: home blood pressure measurement.



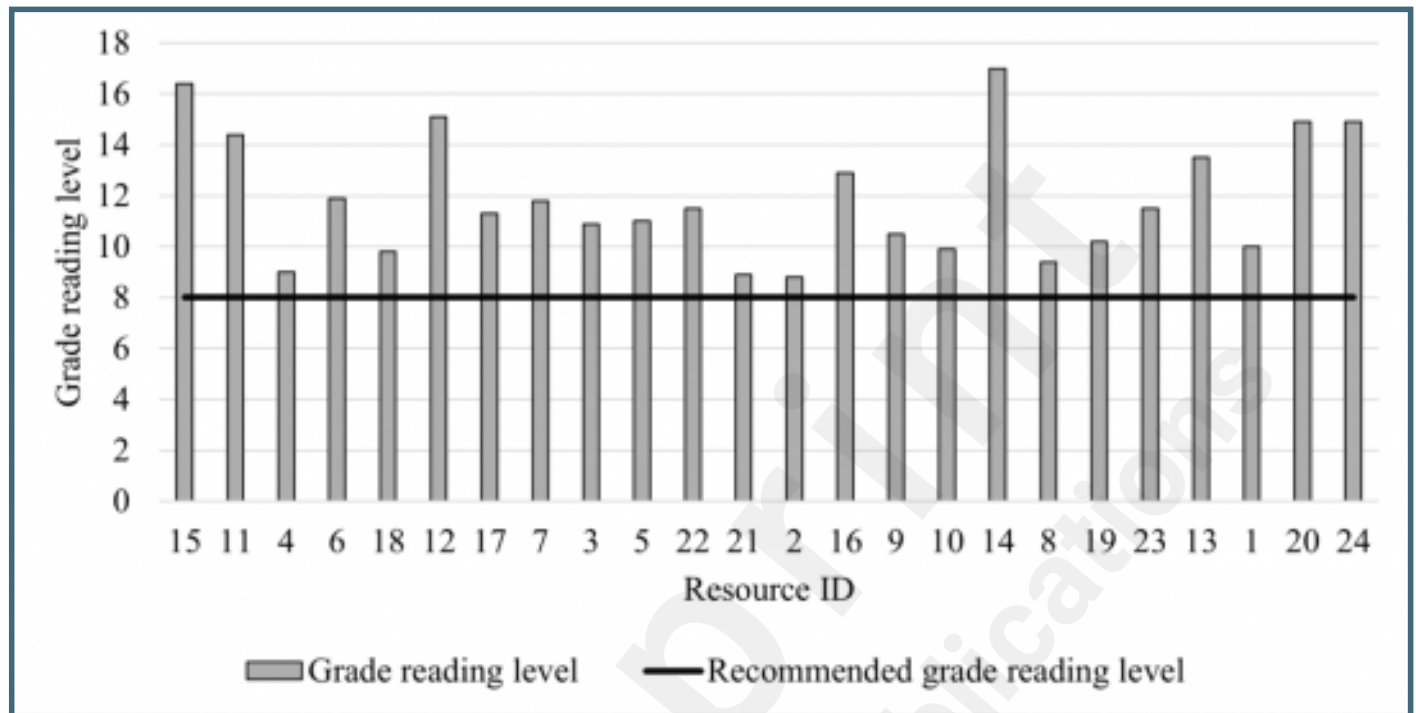
Alignment of all resources to each of the 23 guideline recommendations for key HBPM activities. Resource content either ‘aligned with’ the HBPM guideline recommendation (black bars), ‘incorrectly stated’ the guideline recommendation (patterned bars), or ‘did not mention’ the guideline recommendation (white bars). The x-axis indicates the number of HBPM resources. HBPM: home blood pressure measurement BP: blood pressure.



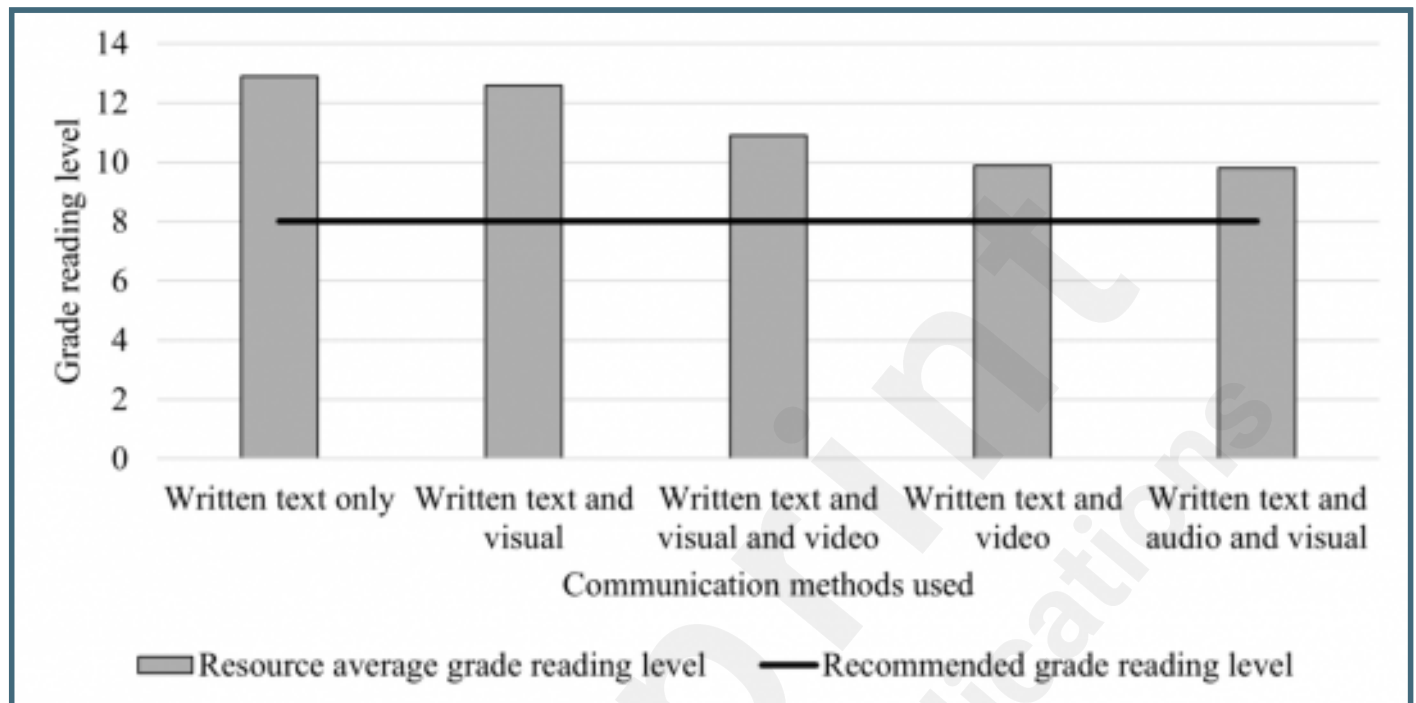
Resource alignment to HBPM guideline recommendations according to type of publishing organisation. Resource alignment was determined by appraising resource content against 23 guideline recommendations of core HBPM activities. Resource content either 'aligned with' the HBPM guideline recommendation (black bars), 'incorrectly stated' the guideline recommendation (patterned bars), or 'did not mention' the guideline recommendation (white bars). HBPM: home blood pressure measurement.



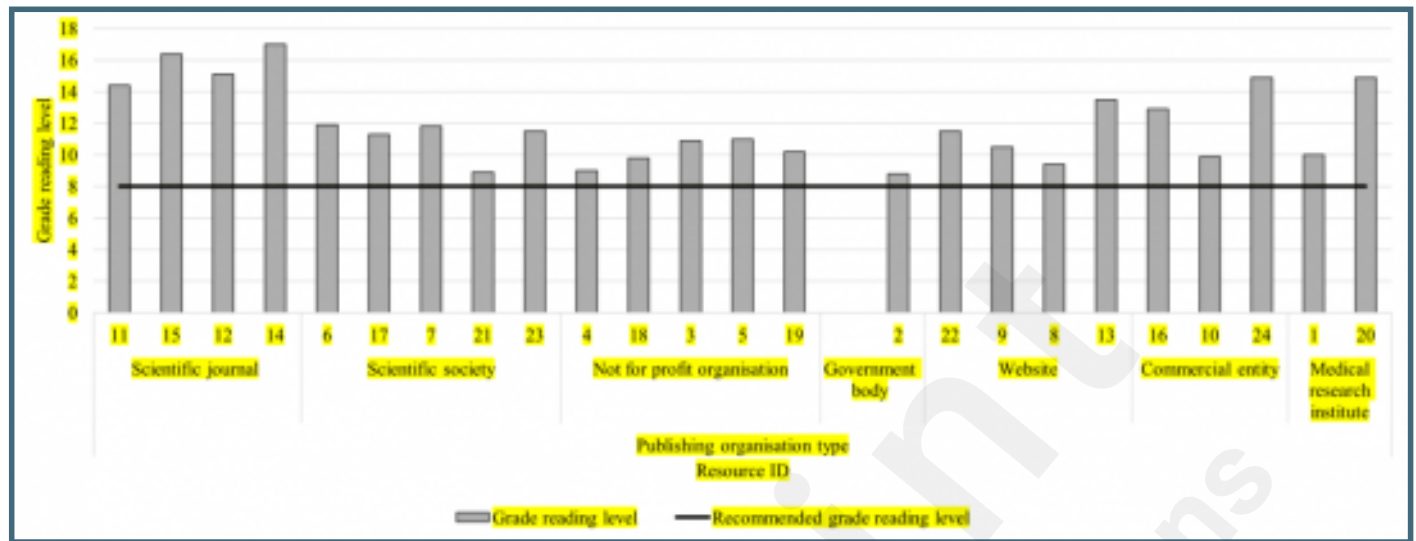
Grade reading level of online HBPM resources. Resource grade reading level (y-axis) is presented in order of resources from highest (left) to lowest alignment (right) to HBPM guideline recommendations. The grade reading level (y-axis) of resource content was calculated by inputting all resource content into the Sydney Health Literacy Lab Editor. HBPM: home blood pressure measurement.



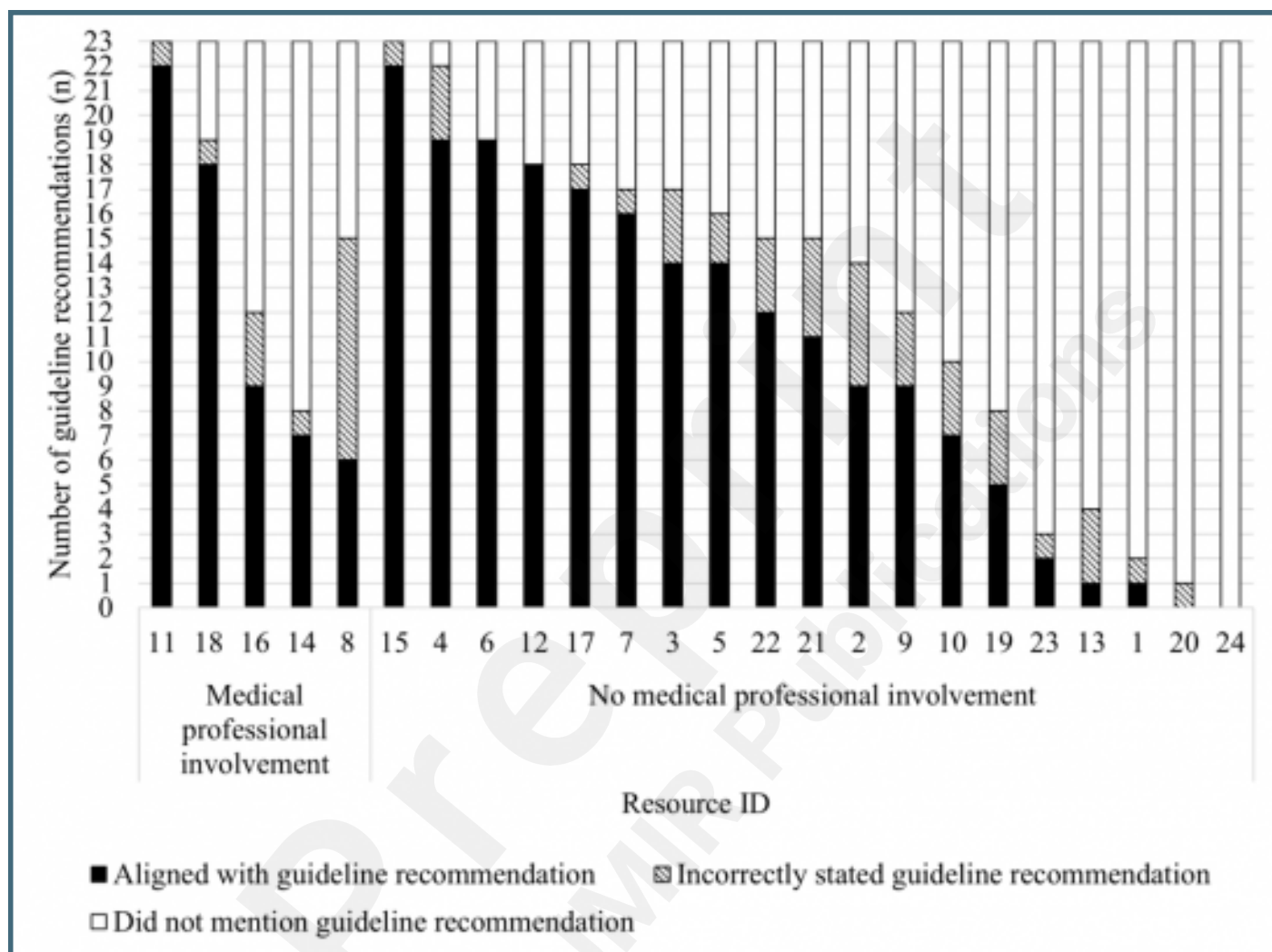
Resource grade reading level according to communication method. The average grade reading level (y-axis) of resources according to communication methods used in the resource (x-axis). The grade reading level (y-axis) of resource content was calculated by inputting all resource content into the Sydney Health Literacy Lab Editor.



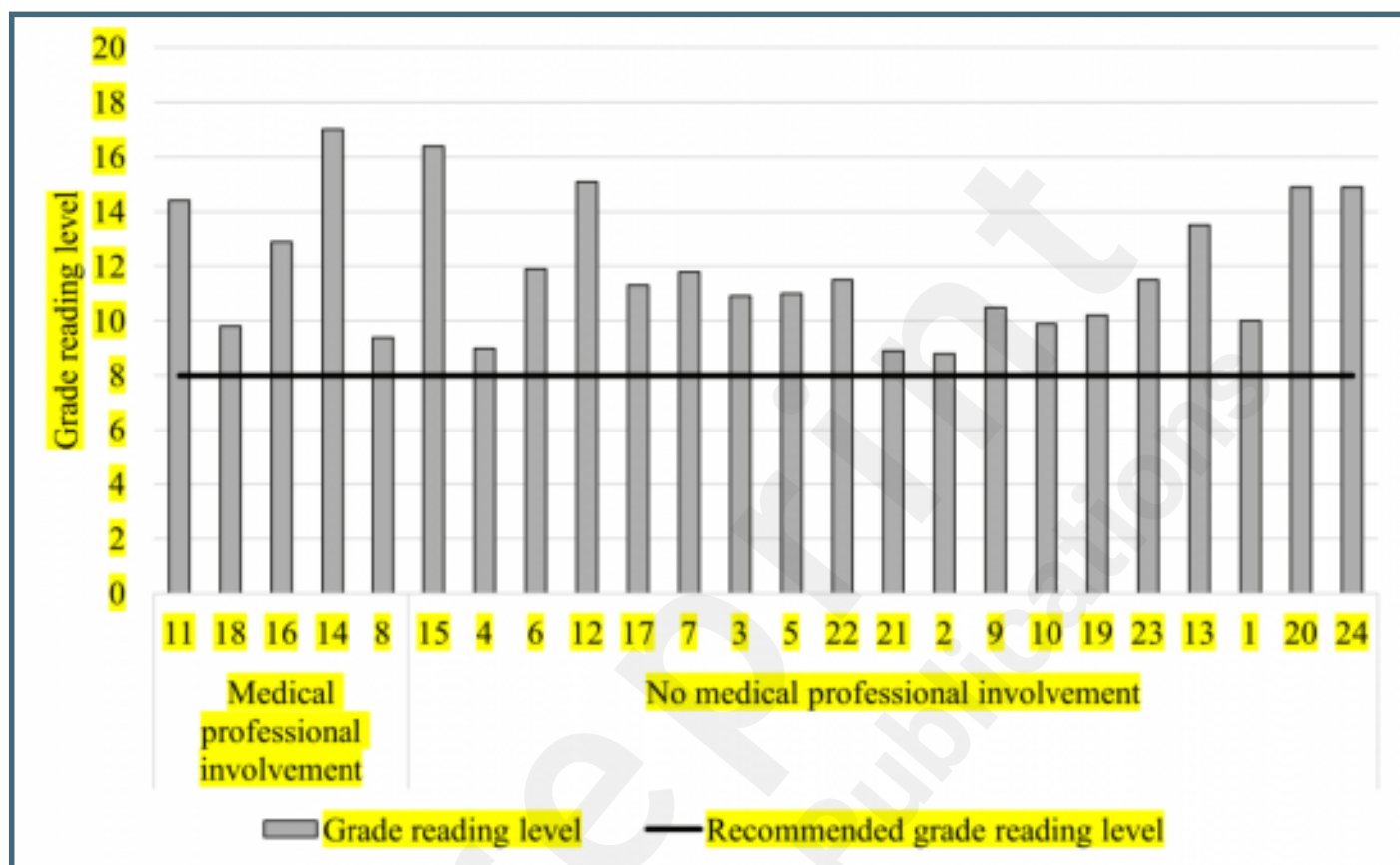
Resource grade reading level according to type of publishing organisation type. Grade reading level was calculated by inputting all resource content into the Sydney Health Literacy Lab Editor.



Resource alignment to guideline HBPM recommendations according to medical professional involvement during resource development. Resource alignment was determined by appraising resource content against 23 guideline recommendations of core HBPM activities. Resource content either 'aligned with' the HBPM guideline recommendation (black bars), 'incorrectly stated' the guideline recommendation (patterned bars), or 'did not mention' the guideline recommendation (white bars). HBPM: home blood pressure measurement.



Resource grade reading level according to medical professional involvement during resource development. Grade reading level was calculated by inputting all resource content into the Sydney Health Literacy Lab Editor. Resources are presented in order of highest (left) to lowest alignment (right) to HBPM guideline recommendations. HBPM: home blood pressure measurement.



Multimedia Appendixes

Search strategy and results.

URL: <http://asset.jmir.pub/assets/a8447fee2abc87087c6223ca30efc804.docx>

The guideline recommendations used for resource appraisal.

URL: <http://asset.jmir.pub/assets/378af03bd24bdd54db3b071263c66d6d.docx>

Development of search strategy. Consumer advisors (n=6) and Google Trends data were used to develop the search strategy to identify online HBPM resources. Search terms suggested by consumer advisors that also had a high probability of use on Google 1/1/2012 to 7/10/2022 were used.

URL: <http://asset.jmir.pub/assets/e31df69f99754ba7e2761f10077b3ec1.docx>

HBPM resource eligibility and appraisal form. HBPM resources were appraised for eligibility and appraised for alignment to HBPM guidelines, grade reading level and end-user involvement in development according to the questions in the form house on REDCap.

URL: <http://asset.jmir.pub/assets/d70ee49508d8080dba4d16904c09e706.docx>

Incorrectly stated guideline recommendations. Resource information that was marked as 'incorrectly stated' during resource appraisal 'step 1 alignment to guideline recommendations' was recorded in the REDCap appraisal framework.

URL: <http://asset.jmir.pub/assets/7947ad90b9847f150f17024a4880d735.docx>

Resources included in study.

URL: <http://asset.jmir.pub/assets/8fe92b3ab37e87bc08a734128d39a7ec.docx>

Sydney Health Literacy Lab Editor results of HBPM resources. All text within resources, including written text and transcripts of audio and video material, was input to the Sydney Health Literacy Lab Editor. Grade reading level was calculated using the Simple Measure of Gobbledygook method.

URL: <http://asset.jmir.pub/assets/94d36dda246df5c0b64ac8f9c2719d64.docx>