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# Analyzing pharmacist representation in public-facing health media: Insights and implications

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ABSTRACT

*Background:* Despite the importance of marketing for community pharmacies, evidence on its effectiveness in influencing consumer behavior and the added value for pharmacies remains limited. This study explores the representation of pharmacists in consumer-facing print media used for consumer marketing.
*Objective:* The aim of this study is to analyze professional representation, especially of community pharmacists alongside other health professionals, in health-related public-facing print media, and to explore and further develop the use of novel, consumer facing data sources in a healthcare research context.
*Methods:* An exploratory qualitative content analysis of a sample of issues from a leading consumer-facing healthcare print magazine was conducted. Of 565 extracted text passages, 328 were retained for analysis and coded using a coding scheme focused on described professional role, type of content, depth of voice, and demographics.
*Results:* Physicians (42 %) and researchers (19 %) were the largest professional groups to be directly cited in print media texts while pharmacists provided 14 % of all direct quotations. Nurses were identified as sources in 1 % of texts. Male professionals were quoted almost twice as frequently as their female counterparts. Images accompanying texts were more gender balanced but did not reflect workforce demographics.
*Conclusion:* The comparative lack of pharmacist representation in marketing print magazines suggests a missed opportunity both as a marketing tool and for educating the public about community pharmacist expertise. There is a need to harness the potential of print media, especially those financed by and distributed in community pharmacies, to improve public perception and visibility of pharmacists, and to inform the public about the evolving roles of pharmacists in the healthcare ecosystem. Further research should explore pharmacist representations in different types of news media to better understand the impacts on public perception of pharmacists internationally.

## 1. Introduction

Pharmacists assume a critical role in maintaining public health by providing specialized expertise in medication management and delivering direct patient care within diverse environments including community pharmacies.[1,2] Pharmacists make up a large and integral part of the healthcare professional workforce globally[3,4] and they play a valuable part in disease and pandemic management, as demonstrated during the Covid-19 pandemic.[5–7] Community pharmacists are some of the most accessible healthcare professionals to patients, providing tailored treatment options through their low-threshold, community-based and collaborative care.[4,8] The role of community pharmacists is changing and expanding,[1,2,9–11] however, the public, politicians, news media and other healthcare providers tend to overlook pharmacists' contributions and expanding responsibilities.[1,2,9] Research is lacking into whether the public is aware of the comprehensive role that pharmacists play in the healthcare ecosystem, and how this gap in representation influences the public's perception of the pharmacy profession.[1,10]

Prior studies on pharmacist representation in media are varied but tend to find pharmacists underrepresented or represented negatively. Results from a study on U.S. film and television between 1970 and 2013 showed portrayals of pharmacists were predominantly negative.[11]

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Although a recent study found that public perception of the importance of pharmacists increased during the pandemic, news outlets did not cover healthcare providers equally, with pharmacists scarcely mentioned.[1] Representation of healthcare professionals in print media has been covered by two notable studies on nurses, which found that they were virtually invisible in health-related news media coverage.[12,13] Similar research on the portrayal of pharmacists is scarce.

Community pharmacies can actively shape the public's knowledge around and perception of their evolving roles and new expert services available through marketing strategies.[14–16] Regulations governing community pharmacies and their marketing activities vary considerably between countries, however, the core function of medication and expert service provision remains consistent throughout.[14] These regulations necessitate a proactive approach to customer engagement and marketing activities.[14]

Marketing strategies in the context of community pharmacies encompass both passive (e.g., flyers or 'bag stuffers') and active (e.g., in-person invitation) promotional strategies[17] around the 4P's of marketing (product, price, place, promotion).[14] Marketing initiatives can be introduced and developed by pharmacists themselves, such as creating social media content,[18] or by external parties, such as health magazines by unaffiliated publishers.[14] The aim of marketing material in community pharmacies is to effectively reach customers, actively shape their perceptions of the professional or the location, influence consumer behavior, and raise awareness of the community pharmacy's presence as a location for professional expertise and expert services.[14,15] The effectiveness of marketing materials for community pharmacies hinges among other things, on their ability to portray community pharmacists and pharmacies effectively to the target audience.[14]

According to a study on patient and community pharmacist preferences for service promotion methods, personal recommendations and posters and leaflets in physician's offices and pharmacies were among the most preferred promotional methods.[19] Pharmacists drastically overestimated the effectiveness of TV and radio advertisements as well as advertisements in local papers or email information, which were rated least favorably by the public.[19] The public has been found to have a strong preference for social media to obtain health information and community pharmacists are aware of the potential for patient communication and enhanced service provision.[20,21] However, community pharmacists reported a reluctance to use social media to communicate with their patients due to a lack of guidelines and concerns around liability and accountability.[20]

One prominent promotional material in this context that has been largely unstudied is the use of 'bag stuffers' in the form of health magazines. These materials are characterized by high financial investment for pharmacies, and often, their content is beyond the pharmacies' direct control.[22] Print media such as magazines and newspapers are known to shape public opinion and perception, as well as effectively influence consumer purchase and post-purchase behaviors.[23-27]An understanding of how healthcare professionals, especially community pharmacists, are represented in print media can offer valuable insights into how the public perceives their professional roles and help professionals and interest groups refine their communication strategies.[24]

To date, research on the portrayal of pharmacists, other healthcare professionals, and a comparative analysis of their representation in promotional, consumer-facing print media relative to their share of the healthcare workforce is scarce and inconsistent.[14] Pharmacists, as those who invest in and provide marketing materials to their customers, should expect to be represented well therein. Therefore, this study aims to investigate the effectiveness of consumer-facing print magazines as marketing tools in shaping public perception of the pharmacy profession.

Research Question 1: To what extent does the investment in consumer-facing print media within pharmacies have the potential to shape public perceptions of pharmacists?

Furthermore, it is important to not only assess the extent to which public perceptions are shaped, but also to understand whether representation in print media reflects a realistic demographic and professional role distribution. Images were included to enhance the analysis since they have the power to enhance, mitigate or even override the message embedded in text.[28] Viewers of an image may not question what they see and assume what they see is an accurate representation of the real world.[28] This is especially relevant given that media tends to underrepresent groups as sources[29] and it is vital to understand whether the contribution of underrepresented groups is adequately portrayed in print media. Therefore, this study aims to investigate whether representation aligns with real-world distribution.

Research Question 2: How congruent is the portrayal of demographic distribution and the distribution of health professions in consumer-facing print media, both in text and images, with real-world demographics and roles?

Building on similar work,[12,26] this paper aims to contribute to the discussion of professional representation in health-related public-facing print media by conducting an exploratory qualitative content analysis of Germany's leading public-facing health magazine, the "Apotheken Umschau" (Pharmacist's Review; AU),[30] and thereby establishing a status quo of how pharmacists are portrayed in media alongside other healthcare professionals. In addition, the authors aim to explore and further develop the use of novel, consumer facing data sources in pharmacy and health services research,[31] provide an analysis framework for future studies and explore the use of images in depicting health professionals in print media.[28,32]

### 1.1. Context

Health insurance in Germany is compulsory, with 88 % of the population covered by social health insurance (SHI) and 11 % opting for private health insurance (PHI).[33,34] The German social health insurance benefits package includes all licensed prescription pharmaceuticals without a list of explicitly approved SHI-covered pharmaceuticals, thus most prescription medications are covered by SHI with a variable copay for patients.[33–35] Pharmaceuticals are distributed through institutional and community pharmacies, as well as online and mail-order pharmacies that are subject to the same regulations as traditional, on-site pharmacies.[34,35] Approximately 83 % of pharmaceutical expenditures are incurred in community pharmacies,[36] of which 85 % is spent on prescription medication and 6 % on over-the-counter medication.[37] Pharmacies enjoy freedom of establishment, meaning they can be established anywhere at any time.[34] Third-party ownership is not allowed; the operator of the pharmacy must be a licensed pharmacist and is limited to owning and operating a maximum of three subsidiaries in addition and in close proximity to their main pharmacy.[34] Table 1 provides a comparative overview of three different health systems and their respective pharmacy models.

The AU was chosen due to its high reach as the leading consumer facing health publication in Germany and is therefore expected to be representative of how healthcare providers are depicted to the public in German print media in general. The AU is a bimonthly, independent health periodical with a monthly print circulation of approximately 7 million copies.[30] Other periodicals distributable in community pharmacies, such as "Das Apotheken Magazin" (The Pharmacy Magazine) or "My life", exist in Germany, however have far fewer print circulations (between one and two million monthly copies each), a smaller readership, and thus lower reach.[45–47]

Published by the Wort & Bild Verlag since 1956, the AU generates revenue through advertisements and issues purchased and distributed by pharmacists.[30,48] A full page advertisement in one of the monthly issues costs between €91,000 and €96,000.[30] Advertisements are predominantly placed by pharmaceutical and medical technology companies and marked as advertisements in the AU issue.[49] Self-reported Thousand Ad Impressions (TAI) per month for both issues lie at €25.76 for a full page advertisement.[30] The AU's mission is to provide

**Table 1**
Health and community pharmacy system and exemplary country comparison.

| Health care system | Multi-payer social health insurance (Bismarck)[34] | Single payer social health insurance (Beveridge)[38] | Mix of social and private insurance[39] |
|---|---|---|---|
| Country for comparison | Germany | England | United States of America |
| Population covered by SHI \| PHI \| uninsured | 88 % \| 11 % \| <1 %[34] | 100 % \| 0 % \| <1 %[38,40] | 36 % \| 55 % \| 9 %[39] |
| Dominant community pharmacy ownership model % independents \| % large chains (*1–3 pharmacies \| 4+ pharmacies; †1–5 pharmacies \| 6+ pharmacies) | Privately owned by licensed pharmacists[34,41] 98 % \| 2 % * | Corporate/ Chain ownership[38,42] 40 % \| 60 % † | Corporate/Chain ownership[39,43] 27 % \| 63 % * |
| Third party ownership possible | No[34] | Yes[38] | Yes[39] |
| Limitations to ownership | - Limited to one main plus max. three subsidiary pharmacies[34] | No | No |
| Practicing pharmacists per 100,000 inhabitants (2019)[44] | 67 | 87 | 95 |
| Community pharmacies per 100,000 inhabitants (2019)[44] | 23 | 21 | 19 |
| Cost-sharing | SHI plus variable copay with exemptions[34] | SHI plus fixed copay with exemptions[38] | Highly variable/ complex; copay, deductibles, caps and other methods used in SHI & PHI[39] |

readers with empirically grounded, easily comprehensible information on important medical topics as well as on topics around prevention, mindfulness, and extant research.[30,48] Print media in general reached 73.3 % of the German public aged 14 years or older in 2023.[50] The AU reports 16.93 million monthly readers, which corresponds to 23 % of the German population aged 14 years or older.[30,51] Its readership is predominantly female (66.1 %), over 60 years of age (60.3 %), and self-reports a preference for print media (57.2 %) and health consciousness (40.2 %).[30] As such, the AU is an especially meaningful tool to reach the proportion of the population with the highest use of prescribed medicines namely women and those over 55 years of age.[52]

Community pharmacies commonly utilize the periodical as a marketing tool, distributing it to their customers free of charge.[22,53,54] While figures may vary, estimates suggest that community pharmacies allocate average annual budgets ranging from €5,000 to €10,000, with unit costs ranging between €0.50 to €0.80 an issue (depending on individual contracts) to provide the AU to their customers.[22,53–56] It is important to note that these cost assessments may underestimate actual expenditures, considering recent economic contractions and challenges in obtaining up-to-date financial data.

A study commissioned by the AU publisher found that customers who read the AU self-reported to spend nearly twice as much for over-the-counter products in community pharmacies compared to non-readers.[57] However, these findings have not been independently verified by a neutral research organization and pharmacist's assessment of the AU's benefits remains ambivalent. While some pharmacists concur that the AU magazine likely has a positive cost-benefit balance, quantifying its added value remains a challenge.[22,53] Conversely, others argue against its cost-effectiveness as a marketing tool.[57] Either way, the AU is often the single largest marketing expense of community pharmacies.[22,54,55]

## 2. Method

An exploratory qualitative content analysis of the AU, Germany's leading consumer facing healthcare publication, was conducted. Content analysis has been used in prior studies examining media portrayal of professional groups within and outside of healthcare.[12,58–60] The qualitative content analysis approach allows researchers to examine content by dividing large numbers of texts into valid categories representing similar meanings.[61] An overview of the methodological approach used in the present study is illustrated in Fig. 1.

### 2.1. Data sample

Multiple steps were followed to create a robust sample. First, 24 issues from the months January, April, June, and October for the years 2019–2021 were obtained. The selection of years encompassed magazine issues published before and during the COVID-19 pandemic. Samples from the year 2019 were included to balance potential overreporting of pharmacists in the following COVID-19 years while samples from the years 2020 and 2021 were included to account for potential shifts in the narrative due to the expansion of pharmacist roles, such as the provision of new and specialized services (e.g., COVID testing, digital vaccination certificates, the distribution of FFP2 masks), that may have led to an increased presence of pharmacists in media coverage during this period. Additionally, the choice of specific months aimed to consider and control for potential seasonal variations in the topics covered. Second, twelve issues were randomly selected to be independently coded by two authors each to eliminate potential biases. Issues were obtained by digitalizing the selected issues from the archival collection of the Bavarian State Library.

A total of 1078 pages were digitalized during the data collection process. During the first round of exclusions, structural or special-interest content (e.g., table of contents, crosswords, or travel destinations; 14 %), full-page advertisements (18 %), and duplicates (1 %) were excluded leaving 731 (68 %) pages for further review. Within these, 565 independent healthcare-related texts were identified (see Table A1 in the Appendix). After removing advertisements (237), the final sample consisted of 328 texts (731 pages) that met the criteria for analysis. The majority of analyzed texts were full-length articles (192; 60 %), followed by informatory briefs (119; 36 %), and interviews (14; 4 %) (see Table A2 in the Appendix).

### 2.2. Coding and analysis

The coding approach was informed by Tankard,[24] Hsieh & Shannon,[62] and Mason et al.,[12] and adjusted to the data sample. Four authors independently read and reviewed the sample to familiarize themselves with the content and subsequently set the inclusion and exclusion criteria for text segments as well as the codebook together. Atlas.ti (version 8.4 26.0)[63] was used for coding, augmented by Microsoft Excel for analysis. Authors piloted the codebook using four issues that included 100 text passages. Results and discrepancies were discussed iteratively[64] until a consensus was reached and systematically integrated into the coding system. Intercoder reliability was established using a 10 % sub-sample that was independently coded by all four researchers and then iteratively discussed until the team reached an acceptable level of agreement of Krippendorff's alpha >.8 for all variables.[65] All four authors independently coded between seven and eight

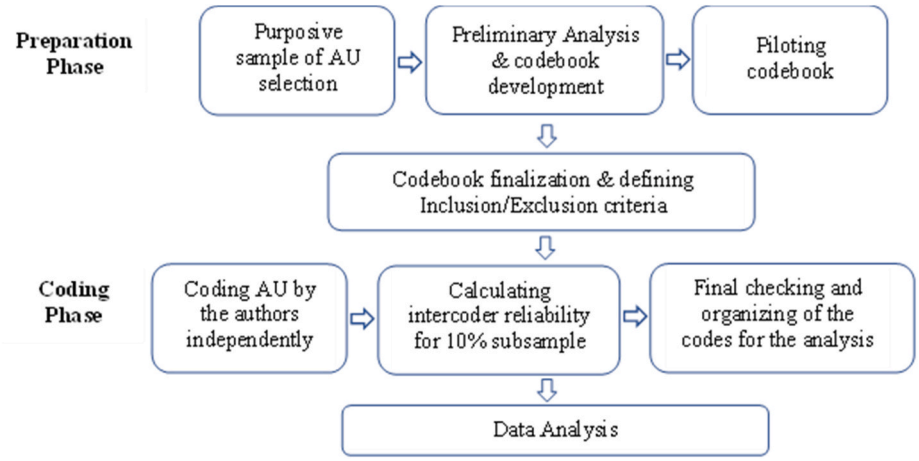


**Fig. 1.** Overview of inductive content analysis process.

issues, whereby each issue was coded by at least two researchers. Disagreements were resolved through discussion within the team.

Segments on medical conditions and diseases, prevention, lifestyle, expert advice and interviews, health news and research developments, as well as personal stories and testimonials were retained. Segments that were irrelevant to shape reader perceptions of pharmacists and healthcare professionals (e.g., travel destinations, recipes, crossword puzzles), made little or no mention of health, healthcare, or health professionals (e.g., editorials and commentaries), were purely structural (e.g., title page, table of contents, outlook on future issues) and advertisements were excluded.

The articles were grouped according to publication type, specifically informative briefs (less than five paragraphs), articles (more than five paragraphs), and interviews (transcript of conversation between two or more people). Coding variables for text segments included profession and gender of the speaker and depth of speaker integration (i.e., directly quoted as part of an interview, named, or mentioned). In addition, the type of content in the segment and the number of times a health profession is mentioned were coded. A speaker's profession was identified by examining the descriptions, titles, and credentials included in the analyzed segment. Coding variables for image analysis included gender and depicted profession of individuals. Images that did not depict people and those unrelated to health provision were excluded.

Coding variables included the type and content of the article, profession and personal characteristics of the speakers, and the number of times professionals were cited or mentioned as sources. The descriptions, titles, and credentials provided in articles were used to identify the speaker's profession and were coded as unknown if the profession was not explicit. The coding tree was used throughout the subsequent coding process to ensure coherent, systematic, accurate and reliable coding.

## 3. Results

To answer the first research question, an analysis of the frequency and depth with which pharmacists and other health professionals are mentioned and the topic areas covered in print media was performed.

### 3.1. Topics

Most content (88 %) featured texts on public health related issues across a range of topics such as physical fitness, mental well-being, dossiers on illnesses and public health campaigns. Texts in this category often featured direct and indirect quotes from high-ranking experts in the field to provide insights into the topic trajectory from baseline research to diagnosis and treatment or prevention options.

In some cases, individuals provided opinions on topics that are outside of their main area of expertise (4 %), for example an anesthesiologist speaking on climate or medical professionals on health policy. Topics around pharmaceuticals (4 %) included specific medication substances, adherence, self-medication, and symptom reduction using over-the-counter medications. Several stories featured the realities of healthcare professions (3 %) such as the administrative tasks associated with being a pharmacist or a medical doctor. Lastly, a small number of texts explored alternative treatments (1 %) such as acupuncture, traditional Chinese medicine, and mind-based interventions.

### 3.2. Level of integration of professions and organizations

Professionals and organizations were coded based on the degree of their integration within the text. The shallowest level of integration encompassed mentioning a professional role (e.g., 'doctor') or entity (e.g., 'pharmacy') without referring to anyone specific and was coded as a mentioned entity. The next level, coded as named entities, involved explicit mention by name (e.g., 'Dr. Maier'), but without providing a verbatim quote by the individual or statement from the organization. The deepest level of integration was characterized by direct quotes, where the professional or organization was integrated with a verbatim statement (e.g., 'Prof. Maier stated that "X cures Y"').

#### 3.2.1. Mentioned entities

Coding for mentioned entities focused exclusively on the three largest healthcare professional groups: nurses, physicians, and pharmacists. Of the mentioned entities (n = 816), physicians and their practices were most frequently mentioned (64 %), followed by pharmacists (35 %), with nurses receiving less than 1 % of mentions (see Fig. 2). Pharmacies as organizations were mentioned almost five times more often than physician's offices. Nonetheless, taking the profession and corresponding entity together, physicians and their organizations were mentioned almost twice as often as pharmacists and pharmacies.

#### 3.2.2. Named entities

Individuals or organizations specifically named without provision of a direct quote were coded as named entities (see Fig. 3). This category included primarily organizations (144; 92 %) rather than individuals (13; 8 %). Research entities such as universities, research institutes (e.g., the Robert-Koch-Institute) and scholarly journals (e.g., Journal of the American Medical Association) made up the majority of this category (56 %). Health institutions such as health insurances, the World Health Organization and government health agencies were the second most mentioned source of information (18 %), followed by professional associations (11 %), non-health adjacent organizations such as

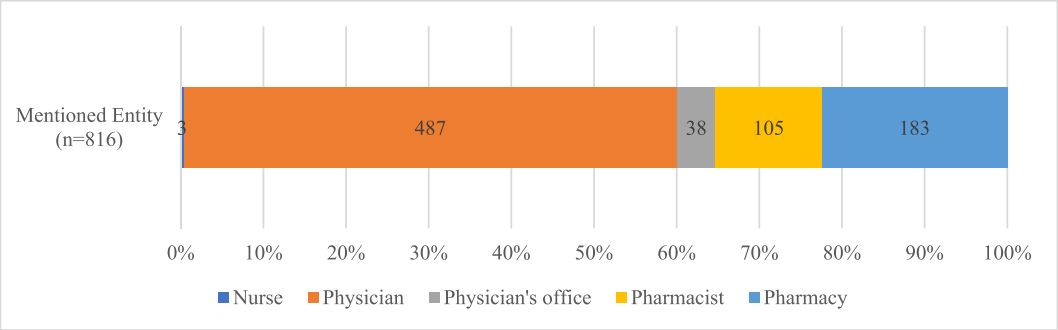


**Fig. 2.** Frequency of mentioned entities.

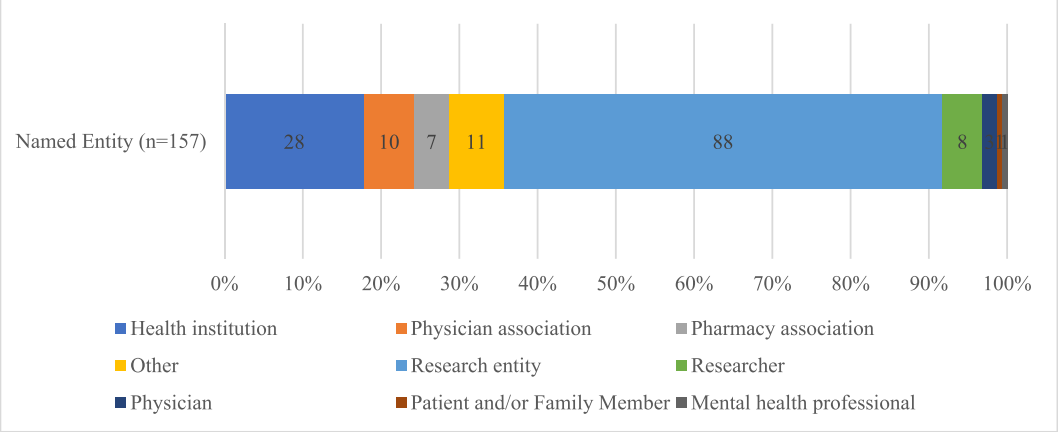


**Fig. 3.** Frequency of named entities.

accountants' or attorneys' offices (7 %), researchers (5 %) and physicians (2 %). Pharmacists, mental health professionals and patients were each named less than one percent of the time.

### 3.2.3. *Quoted professionals*

Individuals and organizations that were directly quoted or cited were coded to explore which professionals are given a direct voice to the media consumer (see Fig. 4). Physicians made up 42 % of quoted sources in the analyzed healthcare texts, with researchers working on healthcare related topics such as epidemiologists, biologists, chemists, among others coming in at 19 % of quoted sources. Pharmacists were directly quoted in 14 % of cases, the majority of which came from pharmacy proprietors. Experts not directly involved in healthcare such as sociologists, politicians, or administrators were quoted in 9 % of cases. Mental health professionals (4 %) and nurses (1 %) as well as patients and family members (2 %) accounted for significantly less quotes.

Upon further inspection, a limited number of quoted sources were representative of more than one group. Most quotes from physicians came from clinicians (47 % of physicians), while others were individuals with a research capacity such as professors at university hospitals (45 %

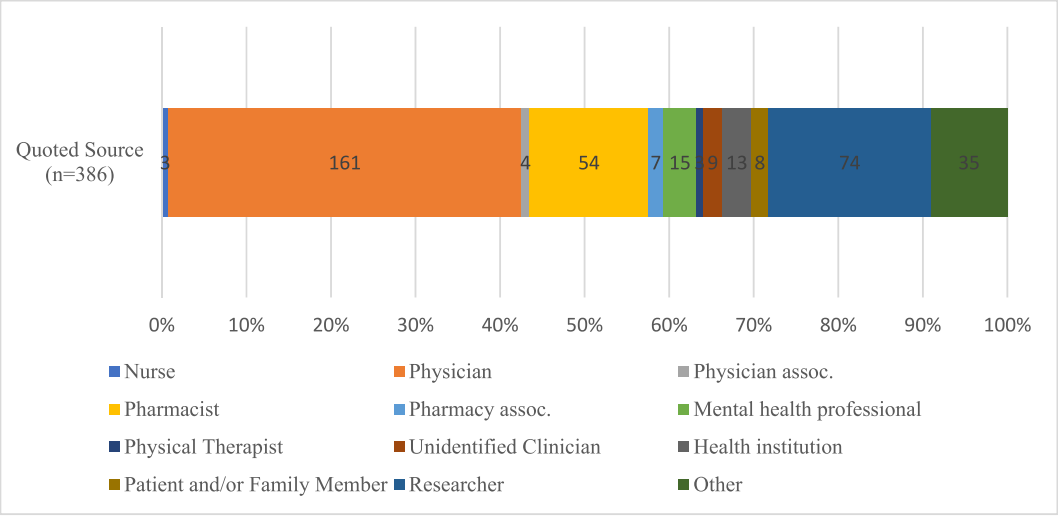


**Fig. 4.** Frequency of quoted sources per profession.

of physicians), representatives of medical associations (5 %) or health institutions (3 %). Most quoted pharmacists were practicing pharmacists or proprietors (92 %), with some associated with pharmacy associations (4 %) or working in a research capacity (4 %). Almost half of quoted mental health professionals were researchers (46 %).

### 3.3. Demographics and role Congruence

To answer the second research question, texts and images were analyzed to determine the gender distribution of pharmacists and other portrayed health professionals. The distribution was then compared to current distribution in Germany.

#### 3.3.1. Gender

Close to two thirds of individuals directly quoted were male (64 %). The two largest categories of directly quoted individuals, physicians, and researchers, follow this trend (see Fig. 5). 68 % of physicians and 78 % of researchers integrated with direct quotations in the sample were male. Pharmacists (56 %), patients and family members (63 %), unidentified clinicians (67 %), physical therapists (67 %), and nurses (67 %) were predominantly female. None of the directly quoted individuals in the text identified as or were referred to as nonbinary, and gendered personal pronouns and titles were used in all analyzed texts, however only when describing directly quoted individuals.

#### 3.3.2. Image analysis

Of all the analyzed text segments, all but one was accompanied by at least one image, figure, or photograph. Images that did not depict humans or were unrelated to a clinical, community or other healthcare setting were excluded from the analysis. For example, images of people partaking in sports outdoors were excluded while images of physical exercise conducted in a physiotherapy setting were retained. Following exclusion, 182 images were retained for analysis. Interestingly the findings only partially mirrored those of the text-based content analysis as can be seen in Table 2.

A total of 241 individuals were identified within the 182 analyzed images. Of those, 52 % of the depicted people were female. None of the individuals were described or depicted as nonbinary. The individuals whose gender was not readily identifiable (n = 11, 4.5 %) was primarily due to poor image resolution, images taken from behind or a large distance, or the depiction of protective gear such as a hazardous material suit or face mask (e.g., in a laboratory setting). The predominant roles depicted in the images included physicians (28 %), patients or their family members (24 %), pharmacists (21 %) and researchers (12 %). Only 2 % of depictions were of nurses.

**Table 2**
Role and gender of individuals identified in images accompanying analyzed texts.

| | Female (n = 126) | | Male (n = 104) | | Gender not identified (n = 11) | |
|---|---|---|---|---|---|---|
| Identified Role | n | % | n | % | n | % |
| Physician (n = 67) | 30 | 45 | 35 | 52 | 2 | 3 |
| Patient and/or Family Member (n = 57) | 30 | 53 | 23 | 40 | 4 | 7 |
| Pharmacist (n = 50) | 32 | 64 | 18 | 36 | 0 | 0 |
| Researcher (n = 29) | 12 | 41 | 13 | 45 | 4 | 14 |
| Other (n = 18) | 10 | 56 | 8 | 44 | 0 | 0 |
| Unidentified clinician (n = 10) | 6 | 60 | 3 | 30 | 1 | 10 |
| Nurse (n = 4) | 2 | 50 | 2 | 50 | 0 | 0 |
| Physical Therapist (n = 2) | 2 | 100 | 0 | 0 | 0 | 0 |
| Policymaker (n = 2) | 0 | 0 | 2 | 100 | 0 | 0 |
| Pharmacy Assistant (n = 2) | 2 | 100 | 0 | 0 | 0 | 0 |
| Total (n = 241) | 126 | 52 | 104 | 43 | 11 | 5 |

## 4. Discussion

To the best of current knowledge, this study is one of the first to examine representation of health professionals in marketing-oriented, consumer-facing, print media distributed in community pharmacies. This study found that much of the analyzed content (87 %) centered around public health topics and instances were identified where individuals offered opinions beyond their core expertise, illustrating an interest in publishing diverse discourse. Notably, this study found physicians dominated overall mentions of health professionals compared to pharmacists, whether as a profession (64 % | 35 %) or as an expert source (42 % | 14 %). The gender distribution of directly quoted individuals and accompanying images was explored, revealing notable disparities in representation across health professions. These findings provide valuable insights into the German landscape of media coverage surrounding health topics, emphasizing the need for a more nuanced

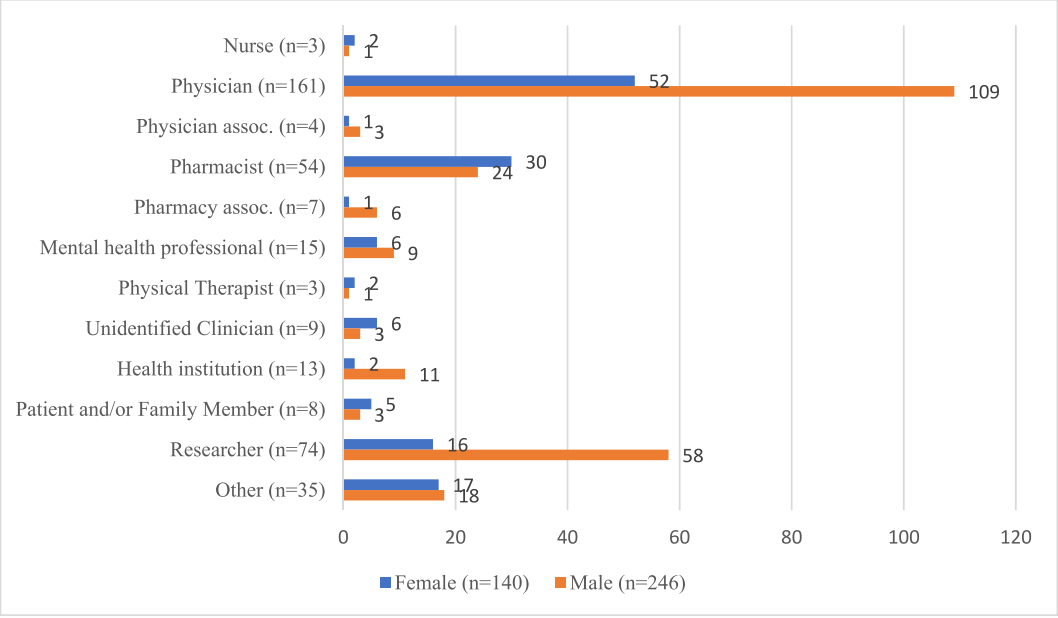


**Fig. 5.** Gender distribution of quoted individuals by profession.

and inclusive portrayal of healthcare professionals in public discourse.

### 4.1. Potential effectiveness of print magazines as marketing tools

Carlsson et al. provided first insights into the representation of the pharmacy profession in news media in Sweden.[66] While they did not conduct a comparative analysis, they found that the profession is not visible in Swedish print media and that this lack is highly disappointing to pharmacists.[66] The present study found that while pharmacists are portrayed in health-related print media used as ‚bag stuffers', the distribution of individuals directly quoted in the analyzed issues heavily favored physicians (42 %) compared to pharmacists (14 %). Considering the publication is named ‚Pharmacist Review', is primarily financed by and distributed in pharmacies, and is a key marketing tool of community pharmacies, the proportion of professional representation compared to other healthcare professionals has room for improvement. This incongruence raises questions about the value and effectiveness of investing in print magazines as marketing materials in shaping public perception. It prompts consideration whether the marketing budget could be more effectively invested in materials with a more direct potential for influencing customer perceptions of the pharmacist role and expertise, and consumer behavior.

The publisher may intentionally or unintentionally favor the inclusion of physicians as experts. Studies have found that patients tend to prefer to seek health advice from physicians over pharmacists.[21] The AU may be using this preference in information seeking to increase the perceived legitimacy of their content by linking it to physicians. Authors themselves may be subject to such a bias and therefore prefer to include physicians as primary sources rather than other health professionals. An exploration of the authors listed for the AU showed that the majority (90 %+) have a background in journalism or an adjacent field such as German studies, philosophy or similar, while 14 % reported a background in medicine and 4 % a background in pharmacy. While physicians are more strongly represented in the AU authorship than pharmacists, both professional groups are in the minority and thus cannot explain the bias in favor of physicians in the publications. Lastly, physicians may be favored to please prescribers and improve visibility of the products advertised in the magazine to both readers and prescribers. This may be unlikely in the German context since direct-to-consumer advertising of prescription medication is illegal[67] and thus advertisers would not directly benefit from pleasing prescribers. Placing OTC (over the counter) medication advertisements close to health expertise provided by physicians, however, may indirectly benefit from the physicians' reputation and look like an indirect endorsement. In addition, consumers exposed to OTC advertising in mass media are more likely to discuss the medication with their healthcare providers, friends or family, search for more information about the medication, and begin consuming the advertised OTC medication.[68]

In addition to providing insight into the representation of the pharmacist profession, this study mirrors the results of a study on nurse representation in print media conducted in the United States.[12] Nurses are wildly underrepresented considering not only the importance of the profession to providing quality care but also the fact that they often make up the largest proportion of the healthcare workforce.[12]

### 4.2. Demographics and representation

The distribution of health professionals working in the German healthcare system is not reflected in the analyzed issues, in other words some professions are more present and receive more recognition in health media than others and the weight does not correspond to the actual distribution of professions. Of the approximately six million people (75 % female) employed in healthcare in Germany in 2021, 1.7 million (28 %) were nursing staff (78 % female) and 489,000 (8 %) were medical doctors (49 % female) of which 70,000 are dentists.[69] In 2022, of the 70,000 individuals practicing as pharmacists (72 % female), 53,000 were employed in community pharmacies (74 % female).[41] In addition to pharmacists, 106,000 individuals (96 % female) worked in community pharmacies in pharmaceutical roles such as pharmaceutical-commercial staff, pharmaceutical-technical staff, and interns, among others,[41] meaning approximately 3 % of individuals employed in the German healthcare system worked in community pharmacies.

The healthcare system in Germany is predominantly female; however, the individuals directly quoted in the analyzed issues were predominantly male. Overall, men were quoted almost twice as often as women in this sample. Male and female pharmacists were quoted almost equally, which, while providing balanced voice to both genders, does not reflect the gender distribution in the workforce. Conversely, gender of physicians in Germany is almost equally balanced, however men were quoted almost twice as often as women in the analyzed issues. These incongruences may be due to continued gender imbalance in leadership positions in the German healthcare system. For example, although 74 % of community pharmacists are women, the proportion of female pharmacy proprietors is only 50 %.[41] Similarly, only 14 % and 17 % of top management and medical director positions respectively in hospitals are filled by women.[70] The analyzed images were more gender balanced than the quoted sources, however do not reflect reality and nurses were extremely underrepresented yet again, mirroring previous findings.[12]

### 4.3. Strengths and limitations

To the best of our knowledge this is one of the first studies that includes pharmacists in the exploration of representation of health professionals in consumer-facing health print media used predominantly as a marketing tool. In addition, the study was carried out on a sample of consumer-facing health media that may influence public perception more strongly on healthcare perceptions due to the nature of its content and context. The findings from this study mirror previous findings from the U.S. and Sweden, suggesting that equitable representation of professions may be less related to the type of healthcare system and rather to ongoing imbalances in leadership positions. Future studies should conduct an international comparison with a country with a fundamentally different health system and more fluid health professional roles (such as the United Kingdom).[71]

This study has several limitations. First, this study focused on one consumer-facing health medium over a limited time. Future studies should build on this by incorporating different news media including newspapers without a specific health focus. Second, roles may have been marginally over- or undercounted. The identification of roles was conducted as meticulously as possible, taking all descriptions of the role into account when coding. Nonetheless, titles such as 'Dr.' were sometimes left unspecified in the text and while traditionally reserved for medical doctors can also refer to persons who obtained a title in a non-medical field.

## 5. Conclusion

Considering that the analyzed medium is distributed by and in pharmacies, the comparative lack of professional pharmacist representation is unexpected. The potential of the medium to educate and shape the public's perception of the expanding role of pharmacists is not being realized and its usefulness as a marketing tool has room for improvement. Evaluating the extent to which the public is cognizant of the expanded roles of pharmacists and their perception of pharmacists' competence is pivotal for determining the healthcare landscape's readiness to adopt pharmacists' continued role expansion and transformation. The findings emphasize the need for greater inclusion of all healthcare stakeholders, particularly nurses, in shaping healthcare narratives. The insights generated in this study open an avenue for further exploration across news outlets, countries, and marketing tools.

## CRediT authorship contribution statement

**Alessandra S. Gessl:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Nils Brodtka:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft. **Jianan Zhao:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft. **Nicolai Gessl:** Formal analysis, Investigation, Methodology, Writing – original draft.

## Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used ChatGPT in order to improve readability and language. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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## Appendix

**Table A1**
Full pages included / excluded.

| Issue Nr | Pages | | | | | |
|---|---|---|---|---|---|---|
| | Issue length | Digitalized | Excluded | | | Total Included |
| | | | Duplicates | Structural/Special interest | Full-page advertisement | |
| 2019–1 | 99 | 106 | 7 | 22 | 12 | 65 |
| 2019–2 | 107 | 93 | 0 | 13 | 9 | 71 |
| 2019–3 | 99 | 85 | 0 | 11 | 16 | 58 |
| 2020–1 | 99 | 106 | 7 | 21 | 16 | 65 |
| 2020–2 | 107 | 95 | 0 | 15 | 15 | 65 |
| 2020–3 | 100 | 78 | 0 | 4 | 17 | 57 |
| 2020–4 | 75 | 67 | 0 | 7 | 15 | 45 |
| 2020–5 | 97 | 84 | 0 | 5 | 11 | 67 |
| 2021–1 | 92 | 72 | 0 | 6 | 13 | 53 |
| 2021–2 | 91 | 77 | 0 | 8 | 18 | 51 |
| 2021–3 | 85 | 79 | 0 | 9 | 17 | 54 |
| 2021–4 | 136 | 136 | 0 | 26 | 30 | 80 |
| **Total** | **1187** | **1078** | **14** | **147** | **189** | **731** |
| **Mean** | 98,92 | 89,83 | 1,17 | 12,25 | 15,75 | 60,92 |

*Notes: 'issue nr' refers to the magazine issue; 'issue length' refers to total number of pages within the issue; 'digitalized' refers to the number of pages that were scanned during the digitalization process. Unit measure = full pages.

**Table A2**
Text passages included / excluded.

| Issue Nr | Excluded | Included | | |
|---|---|---|---|---|
| | Advertisement Segments | Full-length articles | Informatory Briefs | Interviews |
| 2019–1 | 15 | 17 | 21 | 3 |
| 2019–2 | 24 | 15 | 19 | 0 |
| 2019–3 | 18 | 16 | 7 | 1 |
| 2020–1 | 17 | 15 | 12 | 1 |
| 2020–2 | 29 | 19 | 8 | 1 |
| 2020–3 | 27 | 16 | 10 | 2 |
| 2020–4 | 12 | 13 | 2 | 1 |
| 2020–5 | 27 | 19 | 8 | 1 |
| 2021–1 | 7 | 13 | 8 | 0 |
| 2021–2 | 22 | 15 | 11 | 1 |
| 2021–3 | 10 | 14 | 6 | 2 |
| 2021–4 | 29 | 19 | 7 | 1 |
| **Total** | **237** | **191** | **119** | **14** |
| **Mean** | 19,75 | 15,92 | 9,92 | 1,17 |

*Notes: 'issue nr' refers to the magazine issue; 'advertisement segments' refers to advertisements that did not take up a full page; 'full-length articles' refers to text passages longer than four paragraphs; 'informatory briefs' refer to text segments shorter than four paragraphs; 'interviews' refers to text segments where transcripts of conversations, regardless of length, constitute the main body of the text. Unit of analysis = text segments.

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