

# Pharmaceutical Communication in Spain around the COVID-19 Crisis: A Scoping Review

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**Abstract:** This paper addresses the scientific production of pharmaceutical communication in Spain around the COVID-19 crisis, in which information overload, amplified by the digital media, evidenced the relevance of communication in the digital society. The research observes the evolution and characteristics of such studies, identifying scientific fields and disciplines related to communication, thematic lines, agents and publics. To this end, it proposes an exploratory review study adjusted to the PRISMA protocol with a search strategy including three databases (Scopus, WOS and Dialnet) and whose filtration produced a final population of 56 publications on Spanish pharmaceutical communication between 2018 and 2022. The results point to a greater production of scientific papers around the year of the pandemic. These papers were published by university institutions in health sciences journals, although differences in authorship by gender were detected. Most of them are empirical papers, with a predominance of mixed content analyses. The field of public relations stands out, but terminological confusion was also detected. This leads to a reflection on its causes and solutions in favour of the transparency and accountability in pharmaceutical communication.

**Keywords:** pharmaceutical communication; health literacy; digital society; coronavirus; information overload; scoping review; PRISMA



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## 1. Introduction

### 1.1. Communication and Health

Communication processes acquire special relevance when applied in the field of health, with them having a direct consequence on people's well-being and quality of life. Such processes are present in the doctor–patient relationship, but they are also present in those forms of communication produced by different organisations, either public or private, which have effects on a larger scale.

Health and communication studies gained strength at the end of the 20th century [1,2]. In doctor–patient matters, this is an incipient research field, which authors confirm with an increase in the number of study studies that, coinciding with the turn of the century, allow an improvement in the effectiveness of communication between doctors and patients, paying greater attention to doctors' communication skills and to patients' needs for information, as well as to the context in which health interaction occurs [2].

Studies on doctor–patient communication [3] are beginning to “take into account the psychosocial aspects of patients, adapt to their needs, to the different stages of the treatment” (p. 28) in order to achieve greater efficacy, satisfaction and adherence to such aspects. Thus, according to the authors of [3], contrary to traditional paternalism in medical practice, at the end of the 70s, the idea of the competent patient arose, which is linked to the concept of self-efficacy. In the current context of globalisation, this consideration takes on special relevance, as health information of all kinds has a place in a hyperconnected society. The idea of the self-management of one's own health is supported by patients' easy access to information that affects them. The patient-public now has direct ways to form a

prior opinion on their health problems, which eventually changes the traditional forms of communication with health professionals authorised to look after patients' health.

At the same time, although its application is of special relevance in the current context of information overload, the idea of health literacy confined to health education and that has direct consequences for disease prevention and people's quality of life [4] is beginning to emerge. The World Health Organisation [5] consolidates the concept in the Ottawa Charter of 1986, defining it as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health". So, health literacy is a process that empowers people, enabling them to make better decisions on health issues and to prevent individual or collective diseases [6].

In close relation to the field of prevention, and as a paradigmatic example of social communication addressed to a large number of people, communication for the promotion of health is recognised as a necessary mechanism for improving health, either public or personal [7]. Here, it is noticed that assuming the possibility of carrying out campaigns for health promotion implies positioning oneself close to the paradigm of communication for social change [8]. As a consequence, defending the importance of this type of communication also implies attributing the property of impacting society to it. In addition, it is this impact that leads us to reflect on the type of communication that the pharmaceutical industry develops, with the use of other marketing and advertising techniques, for any purpose.

### *1.2. Communication and the Pharmaceutical Industry*

The pharmaceutical industry generates around EUR 1.4 trillion per year around the world, an amount that could exceed EUR 1.6 trillion in the next 6 years [9]. In Spain, it exceeded EUR 22,000 million in 2020, according to 2022 data [10], generating more than 47,000 jobs in the country and with annual exports above 12,000 million. It is therefore one of the most powerful and competitive sectors of the Spanish and global economy that, due to the needs inherent to its industrial activity, invests large sums in R&D, contributing to scientific progress, global health and social progress.

Given its social and economic implications, the pharmaceutical industry is subject to strong regulatory and organisational limitations, where all communication channels are not always possible and where most of its products are prohibited from advertising. Therefore, to guarantee a safe, rational and effective use for each patient, the Royal Decree 1416/1994 of 25 June defines what is advertising and what is not regarding pharmaceutical products. This regulation expressly prohibits the advertising of any medicinal product for human use that must be prescribed by a doctor, namely all those containing psychotropic or narcotic substances and the entire catalogue of medicaments included in the provision of the national health system [11]. Exceptions to this rule are consumer health care (CHC) products, which, without exemption from the control and requirements established by the competent health authorities at the national and European level, have greater freedom and promotion, since they are products that are not subject to state funding, they are free of psychotropic or narcotic substances or they do not require a doctor's prescription or follow-up. In this sense, the same legislative text recognises advertising for people who can prescribe and dispense medicines as communication. "They are products that require medical prescription, and this condition also affects the public to which they should be addressed, that is, the message should be addressed to doctors, not to the patient" [12] (p. 98).

Article [12] also regulates the relationships established between the doctor and the medical representative, and it states that "the medical representative's visit is the means of relationship between laboratories and the people empowered to prescribe or dispense medicines for the purposes of information and advertising such medicines" [11] (p. 5). Likewise, it also regulates some type of incentive, such as sending free samples, and other frequent relational practices in the sector, such as sponsoring scientific events, as "other

forms of advertising". Therefore, given the impossibility of freely promoting certain pharmaceutical products, manufacturers tend to strengthen their brands to generate confidence through alternative techniques such as public relations or training for commercial and advertising purposes [13].

Consequently, disciplines such as public relations, advertising or digital marketing make the sector face a great ethical dilemma. However, while pharmaceutical companies often refer to standards and ethical codes such as those of the WHO [14], the same attention is not paid to those who use the medicines, even at the risk of encouraging self-consumption [15]. These authors warn that the rest of the promotional activities are not closely monitored, even confusing concepts such as promotion, advertising and medical information in their terminology to facilitate the mass diffusion of pharmaceutical products in a disguised way.

This terminological confusion is produced to the detriment of the transparency in pharmaceutical promotion, and it is understood as veracity and responsibility in its diffusion, since the aim is that consumers are well informed of the benefits and possible risks related to their pharmacological treatments [13]. This premise, the authors continue, is based on the assumption that patients in general do not have sufficient knowledge to discern the veracity of an advertising message about medicaments. At this point, health literacy is as important as literacy in advertising and in any other form of promotion for which it is not possible to ignore the transformation in the communicative processes that new technologies have posed.

In any case, the interdisciplinary essence of communication in the field of health is necessary to guarantee its effectiveness, since the success of health promotion campaigns is also conditioned by the knowledge of theories and behavioural trends of cultural and structural circumstances as well as by the knowledge of social and cultural trends of socio-health aspects, of the available health system and, in particular, of a deep knowledge of the publics and their perceptions of health [7]. Based on the public map proposed by the World Health Organization [16] to improve the effectiveness of its communication with the main recipients of its messages and thus protect the health of individuals and societies in the different countries in which it operates, it is necessary, therefore, to apply the situational theory of publics [17] in the pharmaceutical context. In this sense, the map of publics and agents for the pharmaceutical reality is adjusted to the diversity and communicative complexity in the medicine chain, as it is a system that interrelates the many actors in the sector and affects publics of different nature and with different communication needs [18]. For these authors, this relationship with society as a whole and, more specifically, with agents and publics such as the group of health professionals—pharmaceutical manufacturers, distribution companies, political authorities and regulatory agents, patient-consumers, patient associations, pharmacies and pharmaceutical offices [18]—emanate from different links and require a different communicative approach.

### *1.3. Communication and the Digital Environment*

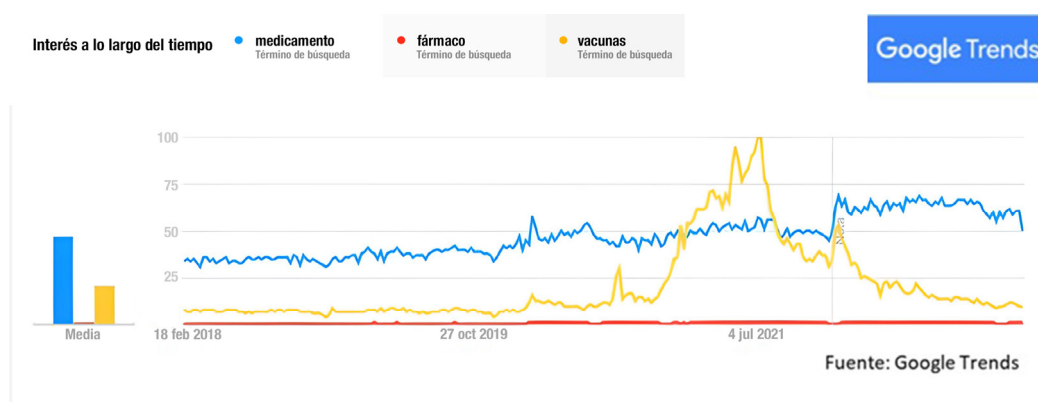
The emergence of the Internet introduced a new open and two-way communication channel with the final recipient of the pharmaceutical product. This allowed the agents involved to find new ways of disseminating and promoting their products, which citizens could access with a click. This made the volume of pharmaceutical content of a varying nature, which went far beyond the publication of the prospectus, shoot up in the digital environment. In the sea of the Internet, the sector navigates with a greater impunity than in the brick-and-mortar pharmacy. Electronic media can be very practical in spreading health issues among the population and achieve greater and more effective health promotion among citizens [19]. However, it is also a challenge for health professionals who have to acquire communicative skills to use mobile applications that provide scientific information about a treatment, to make a video and use it in health promotion and to keep up to date with digital resources to provide reliable health information to a patient or connect with other professionals online. Additionally, all this information on the Internet and social

media has added greater complexity to this situation even before a user, who usually lacks the necessary training, is able to distinguish it properly.

Patients, overwhelmed by information, can check their maladies online, contrast opinions with other Internet users or receive the impact of health influencers. All this results in the idea that individuals, by themselves, can self-manage their health care, find out information by themselves and even give opinions or discern about the most appropriate treatments to heal the pathologies affecting them and improve their quality of life, without the need to visit a doctor or consult a pharmacist. In addition, although a health professional's opinion is irreplaceable, the free access to so much different information requires greater training and judgment. In this sense, regarding self-medication, it is "positive to encourage the participation of citizens in everything related to health, but, if the appropriate therapeutic advice is not offered, it can be harmful to the patient" [20] (p. 285). Thus, the key element of responsible behaviour when using medicines also lies in correct information and proper health education.

The importance of such considerations has become more visible worldwide with and after the COVID-19 crisis, which involved a large consumption of pharmaceutical information. "Given the health risk perceived by the population, people feel an urgent need to know its scope with the greatest precision as well as to be informed of appropriate behaviours to reduce risks" [21] (p. 45).

In fact, as can be seen in Figure 1, there was a quantitative leap in the search for the term "vaccine" during the first half of 2021, coinciding with the start of COVID-19 vaccination campaigns around the world, and another peak of this search at the start of the pandemic in March 2020. This behaviour contrasts with that observed in other related words such as the term "medicament", whose progression has slightly increased but is constant, with some less-relevant peaks.



**Figure 1.** Searches from February 2018 to May 2022. Source: Google Trends.

Consequently, if a few years ago the advice of a doctor or pharmacist was sufficient for a patient to trust the prescribed treatment, the pandemic accelerated a situation of unprecedented information saturation in the sector, amplified, moreover, by digital media. This situation led to a state of disinformation, or infodemic, whose proper management began to be part of the objectives of the WHO [22]. In the digital environment, it is possible to consult the composition of medicaments, their manufacturing and approval processes and to obtain information from clinical trials on vaccines and other medicaments that are being designed to combat the disease. The pandemic is presented, in this way, as a paradigmatic case study, so it can be expected that it has aroused interest among the scientific community focused on pharmaceutical communication.

#### 1.4. The Study of Scientific Production and Bibliometric Analysis

The scientific literature in the field of health is one of the most prolific ones, according to the results indexed in different databases, especially in the branches of medicine, nursing

and pharmacy. This [23] is due to the strategic importance of health sciences and the great social and economic interest they arouse. Thus, “scientific activity in this area has been widely evaluated in different countries” [23] (p. 27). On the other hand, scientific research is not only relevant to the extent that its results generate knowledge, “but they are also a product that has market value and can be used as an input to transform reality, make decisions or solve problems” [24] (p. 428). In addition, paying attention to their production at such a specific time provides information of great interest to understand context, detect lines of research and order results.

For this purpose, bibliometrics is a type of quantitative analysis that allows the extraction of data from publications and the analysis of said data in diverse ways. It is a procedure that allows producers to study the processes and evolution of research, in which scientific inquiry is the unit of analysis [25]. This procedure is applicable to any branch of science, forming an essential and unpostponable tool to analyse scientific production in a technological society [26].

The phase of the selection of documents and the extraction of their main indicators can be guided by a systematic review, understood as a recovery method that aims to identify relevant international and national evidence given a research question and to evaluate and synthesise the results of bibliographic searches [27]. Thus, the purpose of such a review is “to integrate in an objective and systematic way the results of empirical studies on a particular research problem in order to determine the ‘state of the art’ in that field of study” [28] (p. 53), for which an objective method must be applied, comparable to any empirical process. Another advantage of this method is to allow “identifying knowledge gaps, analysing a body of literature, clarifying concepts, investigating the behaviour of the research, or reporting a systematic review” [27] (p. 6).

Consequently, a scoping review, a systematic mapping of the literature or a mapping review [29] searches the existing evidence on a research question or a particular topic [30–32]. In the Spanish literature, a scoping review is an exploratory systematic review and a research method for the synthesis of scientific knowledge [33]. Specifically, this method makes it possible to explore the characteristics of a broad object of study [34] in order to generate new hypotheses and areas of study that are still poorly developed [35].

In the field of health, the joint application of these procedures forms an effective method for the development of knowledge. In recent years, the field has experienced an increase in productivity, especially in medicine. The growth of studies applying this analysis is attributed to the increase in the use of quantitative metrics in the evaluation of research, to the need of the researcher to publish and to a greater use of evidence-based medicine [36].

On the other hand, and despite the fact that, as a result of the pandemic, scientific production on pharmaceutical activity has increased, the academic literature on pharmaceutical communication seems to remain eclipsed by the rest of the publications of the sector as a whole. However, a recent bibliometric study on the general trends in the field of pharmaceutical care research in the last 20 years [37] both proves the validity and suitability of the method to determine the development of research in the pharmaceutical sector and allows the tracking of academic interests in this field, highlighting the little interest in studying communicative aspects. Communication appears in the context of pharmaceutical care and clinical pharmacy as information to patients and as a channel to collect data to monitor their pharmacological follow-up.

Consequently, considering the framework described, this research places its focus of interest in scientific production centred on pharmaceutical communication to try to find out if the pandemic has precipitated its study and, in this case, the main approaches from which it has been approached. To conduct this, the following objectives are established:

1. To observe the evolution of these studies and find out their main characteristics, according to the indicators of bibliometric production (number of publications per year, number of authors and affiliation of authors).

2. To identify the main scientific areas of the publications and the potential impact of the studies conducted.
3. To detect the predominant research topics through the extracted data and the terminology used in the different studies, their typology and the applied methods.
4. To explore the links in the medicine chain that arouse the greatest interest among researchers and define the publics of their communication.

## 2. Materials and Methods

### 2.1. Study Design and Selection of Analysis Units

This study focused on the identification and analysis of the scientific literature produced and published in the years before and after the declaration of the state of emergency in Spain on 14 March 2020. In particular, the observation period was between 2018 and 2022.

To do this, a scoping review was applied, as it facilitated “the analysis and synthesis of the academic literature produced in an area of science” [38] and allowed us to answer both precise and broad-spectrum research questions. In addition, to ensure the quality of the review, the guidelines proposed by the 2020 PRISMA declaration were followed. This declaration established an “evidence-based minimum set of items for reporting in systematic reviews and meta-analyses” [39] and for which it contemplated 17 elements of verification to establish a solid and replicable protocol of the review [40], and the bibliometric analysis was chosen to analyse the main aspects posed in the objectives.

Thus, in May 2022, a Boolean search process was initiated in three databases, two international and one national: Web of Science core collection (WOS-CC), Scopus (including indexed production in the MEDLINE and PUBMED specialty collections) and Dialnet.

Regarding the inclusion criteria, in international sources, both for Scopus and for WOS-CC, the search strategy selected combined the following English terms: (pharmaceutical OR drug OR medicament OR pharmaco) AND (advertising OR “public relations” OR “pharmaceutical communication” OR marketing OR “social media”) AND (Spain OR spanish). The same search strategy was tested in DIALNET, but a single result was obtained, as the review was focused on the Spanish national level, so it was necessary to translate them into Spanish and reformulate the strategy. In this second search sequence (in Spanish) the term “drug” was removed as a synonym for medicament. The result was the following string:

(farmaco OR medicamento OR farmaceutic\* OR farmacia) AND (publicidad OR publicitari\* OR “relaciones públicas” OR marketing OR “comunicacion farmaceutica” OR “redes sociales”) AND (Españ\*).

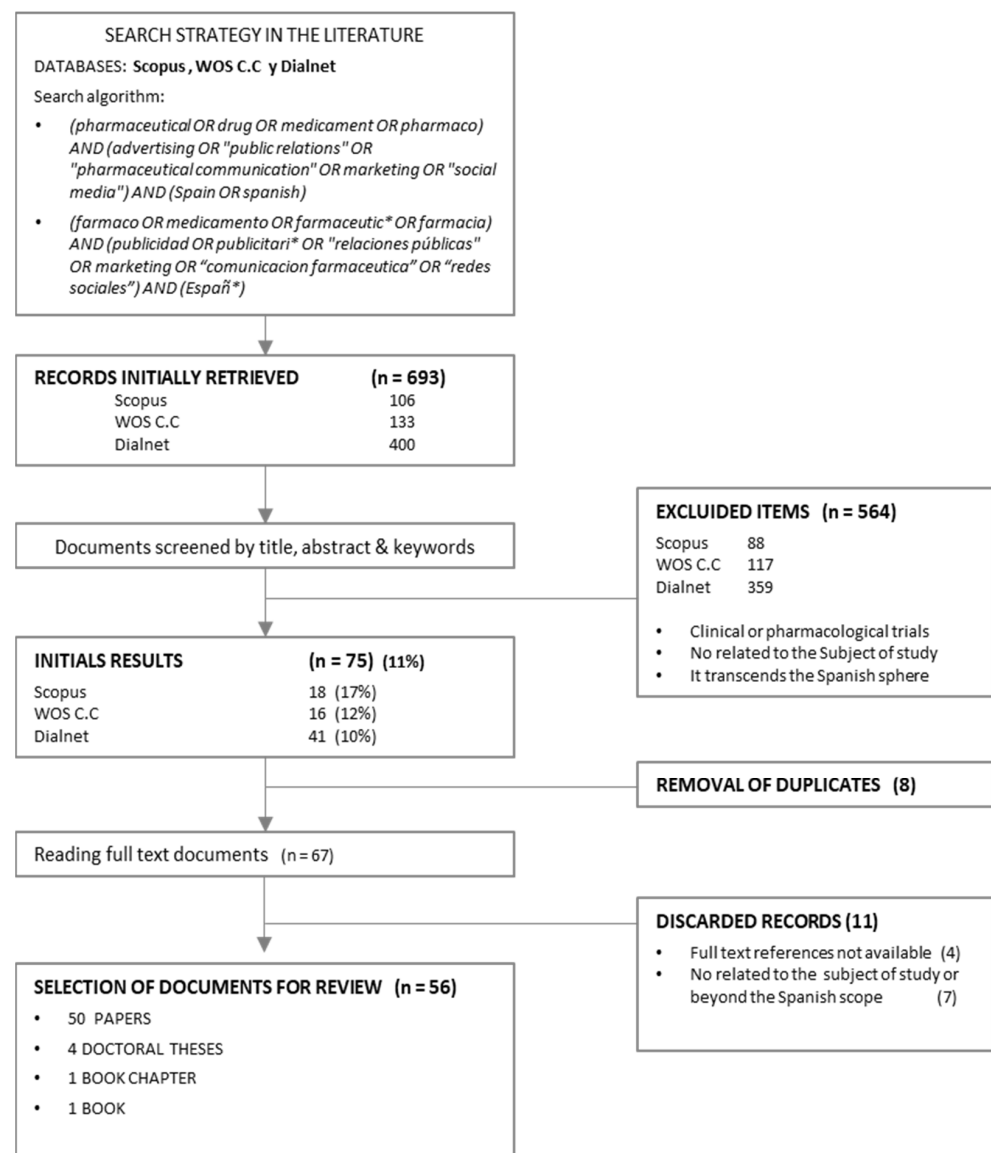
\* The asterisk is a kind of wildcard used to retrieve in databases words of the same family that share a lexical root, since it allows finding any group of characters, including their absence.

Search dates were also adjusted to the possibilities of each database. In the WOS-CC, all the publications between 15 March 2018 and 15 March 2022 were retrieved, according to the criteria considered. On the other hand, Dialnet and Scopus do not allow filtering by date, but by years. Consequently, a larger window was taken as the basis of study in both sources, from 1 January 2018 to 10 May 2022, to narrow the analysis period, manually, from the date of publication of the paper or the issue of the journal when dealing with scientific papers.

In Scopus and Dialnet, the search was performed in the fields “title”, “abstract” and “keywords”, while in WOS-CC, the search was performed only by topic, which provided the data of the three previous fields in addition to the “abstract” and “keywords plus”.

Regarding the type of document (or type of materials to be analysed), limits were established for papers, reviews, books and chapters of books and doctoral theses published. Once the previous inclusion criteria were applied, 639 records were retrieved (Figure 2). Then, with the purpose of selecting those publications that fit the geographical scope (Spain)

and the subject of study of this paper, a qualitative review was applied by reading the title and the abstract.



**Figure 2.** Review diagram. Source: own elaboration.

As exclusion criteria, this review eliminated those contributions that did not include Spain in their analysis. Also excluded were those papers that did not have a marketing, advertising or communication approach as the central axis of their content, as they did not contain related terms such as “marketing”, “advertising”, “social networks”, “public relations” and “pharmaceutical communication” at the core of their approach. Similarly, documents addressing treatises or studies related to other specialties of health sciences were excluded, especially those related to any area of clinical medicine, nutrition and nursing. Pharmaceutical studies dealing with active ingredients, medicament combinations, pharmacotherapy or clinical trials were also eliminated.

On the contrary, records referring to aspects related to promotion, information on medicaments, information transparency, patient perception of the medicament or treatment prescribed, social responsibility and impact of communication on public opinion were included. In the pharmaceutical field, papers on pharmaceutical care, community pharmacy and pharmaceutical advice were included due to the relationship with the social responsibility of the sector and its relevance in the field of public relations. Also included

were those that dealt with a particular social network or media, studies on specific social networks or any of the usual strategies of public relations (sponsorship, lobbies, etc.).

In order to compile and examine the results of the sample selected for full-text reading, the Mendeley reference manager was used to detect 8 duplicate records corresponding to 6 papers. To eliminate duplicates, we applied the preferential criterion of papers in “Journal Citation Reports (JCR) in WOSCC” and, as a second criterion, papers in SCOPUS journals. Finally, after reviewing the bibliographic corpus, 4 papers were discarded because they could not be obtained in full, and another 7 papers were discarded because they did not fit the study topic, did not refer to the Spanish case or referred to drugs in the context of addictions.

The result was a sample of analysis composed of fifty-six records, with most being scientific papers ( $n = 50$ ), four doctoral theses, a book and a book chapter, which were coded from their reading in full.

## 2.2. Variables, Coding Sheet and Applied Analyses

When coding the characteristics of the studies to moderate the results, the data collection form (Table 1) of a systematic review article [41] was adapted and complemented with variables validated by previous studies [18,42–44].

**Table 1.** Instrument for coding.

Variables	Analysis Units
Basic and identifying data of the publication and the study.	<ul style="list-style-type: none"> <li>• Name of the journal (open)</li> <li>• Issue of the journal (open)</li> <li>• Publication date (year and month) (open)</li> <li>• Study title (open)</li> <li>• Name of authors (open)</li> </ul>
Weighting of authorship by gender.	<ul style="list-style-type: none"> <li>• Number of male authors (open)</li> <li>• Number of female authors (open)</li> </ul>
Affiliation of authors (type of centre).	<ol style="list-style-type: none"> <li>1. Health centre</li> <li>2. Research centre</li> <li>3. Educational institutions</li> <li>4. Associations/foundations</li> </ol>
Quartile according to impact index.	<ol style="list-style-type: none"> <li>0. No impact factor</li> <li>1. Q1</li> <li>2. Q2</li> <li>3. Q3</li> <li>4. Q4</li> <li>5. With impact factor in Dialnet</li> </ol>
Scientific field of publication (in journals). (They grouped the areas of knowledge provided by the database for each journal).	<ol style="list-style-type: none"> <li>1. Health sciences</li> <li>2. Social sciences</li> <li>3. Human sciences</li> <li>4. Legal sciences</li> <li>5. Environmental sciences</li> <li>6. Exact and computer sciences</li> <li>7. Miscellaneous (generalities)</li> <li>8. Not available</li> </ol>



Table 1. Cont.

Variables	Analysis Units
Areas related to the communication of the paper (own codification considering the studies mentioned).	<ol style="list-style-type: none"> <li>1. Journalistic information (mass media)</li> <li>2. Marketing: product information/retail marketing/merchandising</li> <li>3. Advertising (on- and off-line)</li> <li>4. Audiovisual communication: broadcast/podcast/streaming</li> <li>5. Corporate communication, brands</li> <li>6. Public relations: lobbies, social responsibility, perception, involvement or relationship with the public.</li> <li>7. Digital marketing. Web/E-mail marketing/mobile apps/mobile apps/etc.</li> <li>8. Social networks/forums/influencers</li> <li>9. Other</li> </ol>
Scope of the sector to which the publication refers (according to medicine chain).	<ol style="list-style-type: none"> <li>1. Prescription, regulation (NHS public administration)</li> <li>2. Pharmaceutical industry</li> <li>3. Pharmaceutical distribution</li> <li>4. Dispensation (pharmacy office, hospital pharmacy)</li> <li>5. Consumer (patients/public)</li> <li>6. Sector in general</li> </ol>
Methodology.	<ol style="list-style-type: none"> <li>1. QUANTITATIVE method</li> <li>2. QUALITATIVE method</li> <li>3. MIXED method</li> <li>4. Not available</li> </ol>
Research techniques used.	<ol style="list-style-type: none"> <li>1. Content analysis MIXED</li> <li>2. Content analysis QUALITATIVE</li> <li>3. Content analysis QUANTITATIVE</li> <li>4. Survey</li> <li>5. Interview</li> <li>6. Discussion groups</li> <li>7. Content analysis mixed with software</li> <li>8. Observational studies</li> <li>9. Systematic review</li> <li>10. Documentary or secondary sources</li> <li>11. Narrative or literary review</li> <li>12. Not available</li> </ol>
Keyword recoding in the following major topics.	<ol style="list-style-type: none"> <li>1. Methodology</li> <li>2. Communication</li> <li>3. Media and press</li> <li>4. Disinformation</li> <li>5. Marketing</li> <li>6. Advertising</li> <li>7. Social media</li> <li>8. Influencers</li> <li>9. PR</li> <li>10. Ethics</li> <li>11. Pharmacy</li> <li>12. Vaccines</li> <li>13. COVID-19</li> <li>14. Public health</li> <li>15. Health professionals</li> <li>16. ICTs</li> <li>17. Other</li> <li>18. Not available</li> </ol>
Publics present in the research (including both the study universe or population and the publics affected by the research results).	<ol style="list-style-type: none"> <li>1. Healthcare system, health professionals</li> <li>2. Pharmaceutical industry, industry, pharmacies</li> <li>3. Patients</li> <li>4. Society</li> <li>5. Communicators/media/advertisers</li> <li>6. Other</li> </ol>

Source: own elaboration.

To be able to elucidate the gender of the authors and determine the number of female authors, it was necessary to resort to a search of professional profiles through Google Scholar and academic social networks to complete the initials of the name.

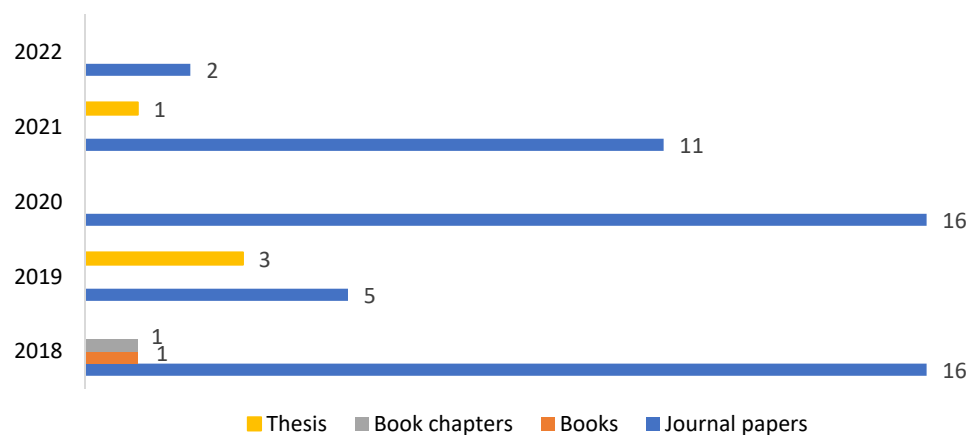
Some other variables were also coded through document analysis, such as keywords, affiliation or scope of the scientific publication.

Finally, descriptive analyses were applied, observing the number of documents in the same category to respond to the objectives, as well as statistical analyses for non-parametric tests (Kruskal–Wallis’s test and comparison of means) to observe the behaviour, before the databases, of the number of authors, the impact factor and methodology.

### 3. Results

#### 3.1. Typology of Documents and Authorship

As for the databases of the resulting analysis sample, the results indicated that the study included 59% of journal papers from DIALNET, and 23% belonged to SCOPUS. Finally, and at a considerable distance, 18% of the journal papers from the Web of Science database were grouped. The line of the evolution of publications (Figure 3) showed a predominance of publications in scientific journals that also presented two peaks of maximum publication located in 2018 and 2020, with a significant fall in 2019.



**Figure 3.** Evolution of contributions (n = 56). Absolute frequency. Note: January 2018 to May 2022 in Dialnet and Scopus, and March 2018 to March 2022 in WOS-CC. Source: own elaboration.

In 2022, data were only collected for the first five months, so this decreasing trend was expected to be less pronounced by the end of the year. In the period analysed, the defence of doctoral theses that related communication with the pharmaceutical sector was concentrated in year 2019, to resume discretely, in 2021.

With regard to authorship, a total of 168 signatures were recorded in the 56 contributions considered (76 men in 46 documents, and 92 women, also in 46 documents). By document typology, papers concentrated a large part of the signatures, as they were also the most abundant type. Thus, 74% of all the authors corresponded to papers (79% of men and 71% of women). The average number of authors per paper was three, but differences between men and women were detected in this figure, since there were more men signing alone in contrast to women, who usually signed with another person.

To determine the existence of statistically significant differences between the number of female authors participating in the co-publication of scientific articles in the three repositories, a contrast of means was performed (Table 2) using the Kruskal–Wallis test, since the variable “number of female authors” behaved in a non-parametric manner. In this sense, the analysis between the dependent variable women and the independent variable databases indicated that there were statistically relevant differences between the three databases according to the number of women who published in them, with a value of  $X^2_2 = 9.981$  and an asymptotic significance of  $p = 0.007$ , thus corroborating the alternative hypothesis that there were significant differences between the data bases. The mean comparison analysis showed that the overall mean of publications was 1.64 women, and women published more jointly in the WOSCC database with a higher mean (2.40) and with an adequate deviation (it was below the overall mean) (Table 2).

**Table 2.** Non-parametric tests and comparison of means of number of women and databases.

Databases	N	Kruskall–Wallis	Contrast of Means	
		Average Range	Mean	Standard Deviation
WOSCC	10	39.10	2.40	1.075
SCOPUS	13	34.04	2.15	1.463
DIALNET	33	23.11	1.21	1.023
Total	56		1.64	1.242

Source: own elaboration based on SPSS.

Based on the origin of the authors, the data showed a majority interest in scientific production from educational institutions or universities (62%), followed by researchers from health centres (18%), with a lower representation of research centres (11%), and, finally, of foundations and associations (9%).

### 3.2. Journals, Scientific Disciplines and Scope of the Publication

The papers analysed were published in fifty scientific publications (Table 3). Regarding the most prolific journals in pharmaceutical communication, *Gaceta Sanitaria* stood out with four publications and was followed by a group of four journals, each with three publications. Only one of them was focused on communication (*Revista española de comunicación en salud*). There were five journals with two publications, two of which were in the field of communication. The rest of the publications only appeared on one single occasion in the analysis, although there were also communication- or technology-related journals that were not necessarily specialised in health, such as *comunicación: revista Internacional de Comunicación Audiovisual*, *Publicidad y Estudios Culturales*, *Future Generation Computer Systems*, *Journal of retailing and consumer services*, *La razón histórica: revista hispanoamericana de historia de las ideas políticas y sociales*, *Methodos.revista de ciencias sociales*, *Prisma Social: revista de investigación social*, *Revista internacional de Historia de la Comunicación* and *Revista internacional de Relaciones Públicas*.

**Table 3.** Ranking of journals according to published papers (n = 50).

Ranking	Journals	Contributions per Journal (*)
1°	(n = 1) <i>Gaceta Sanitaria</i>	4
2°	(n = 4) <i>Farmacéuticos comunitarios</i> , <i>International Journal of Environmental Research and Public Health</i> , <i>Panorama actual del medicamento</i> , <i>Revista española de comunicación en salud</i>	3
3°	(n = 5) <i>Human Vaccines and Immunotherapeutics</i> , <i>Profesional de la Información</i> , <i>Revista de Enfermedades Digestivas</i> , <i>Revista de Comunicación y Salud</i> , <i>Vaccines</i>	2
4°	(n = 24) <i>AACA Digital</i> , <i>Farmacia hospitalaria: órgano oficial de expresión científica de la Sociedad de Farmacia Hospitalaria</i> , <i>Anales del sistema sanitario de Navarra</i> , <i>Ars Pharmaceutica</i> , <i>Artificial Intelligence in Medicine</i> , <i>Atención primaria</i> , <i>Comunicación: revista Internacional de Comunicación Audiovisual</i> , <i>Publicidad y Estudios Culturales</i> , <i>Future Generation Computer Systems</i> , <i>Health Policy and Technology</i> , <i>International Journal of Pharmaceutical and Healthcare Marketing</i> , <i>Journal of drugs in dermatology</i> , <i>Journal of retailing and consumer services</i> , <i>La razón histórica: revista hispanoamericana de historia de las ideas políticas y sociales</i> , <i>Metas de enfermería</i> , <i>Methodos.revista de ciencias sociales</i> , <i>Onomazein</i> , <i>Pharmaceutical care España</i> , <i>Prisma Social: revista de investigación social</i> , <i>Revista de medicina y cine</i> , <i>Revista internacional de Historia de la Comunicación</i> , <i>Revista internacional de relaciones públicas</i> , <i>Therapeutic Innovation &amp; Regulatory Science</i> , <i>Tiempos de enfermería y salud</i> , <i>Vaccine</i> .	1

(\*) Note: absolute frequency. Source: own elaboration.

Regarding the impact factor, a total of ten papers were published in journals indexed in the first quartile, while seven papers were published in Q2 and Q3, respectively, and another six were published in Q4. A high number of publications, 14 in total, had an impact index in Dialnet, although they did not correspond to the metrics of international databases. In fact, as the variable “impact factor” did not follow a parametric behaviour, the analysis of the contrast of means showed that there were statistically relevant differences between the impact factor and the databases, with a chi-square value of  $X^2_2 = 34.862$  and a significance of  $p = 0.000$  (Table 4), highlighting that Dialnet had a higher mean than the general one and had a standard deviation below the total. Finally, a total of eight publications without an impact factor were found.

**Table 4.** Non-parametric tests and comparison of means of impact factor and databases.

Databases	N	Kruskal–Wallis	Contrast of Means	
		Average Range	Mean	Standard Deviation
WOSCC	10	18.10	2.70	1.567
SCOPUS	13	10.31	1.62	0.870
DIALNET	33	38.22	5.12	0.960
Total	56		3.88	1.869

Source: own elaboration based on SPSS.

Almost half of the publications were found in journals linked to health sciences (40%) and social sciences (21%), based on the information on the scientific field of the database itself. To a lesser extent, publications in human sciences (14%) and in generalities and miscellaneous (13%) stood out. Although with little representation, papers were also published in journals in the field of empirical sciences and computer sciences (3%) and, residually—with one percentage point, respectively—in legal sciences and environmental sciences. In 7% of the cases, the scope or discipline attached to the journal was not specified (Table 5).

**Table 5.** Areas of knowledge of the publications (n = 87).

Areas of Knowledge	n	(%)
Health sciences	35	40%
Social sciences	18	21%
Human sciences	12	14%
Legal sciences	1	1%
Environmental sciences	1	1%
Empirical sciences and computer sciences	3	3%
Generalities—miscellaneous	11	13%
Not available	6	7%
Total	87	100%

Source: own elaboration. Note: multi-tag.

Regarding the most recurrent disciplines related to communication (Table 6), there was a significant presence of public relations strategies, which were present in 31% of cases, i.e., almost one out of three papers. In a more homogeneous way, areas such as advertising (18%), social media (18%) and journalistic information (14%) were represented. The interest in marketing totalled 14%, considering traditional (7%) and online (7%). Finally, corporate communication only appeared in 4% of the publications, while another 2% were dedicated to other areas related to communication in general.

**Table 6.** Areas of published papers (n = 91).

Areas Related to the Communication of the Paper (*)	1st Area (1)	2nd Area (2)	3rd Area (3)	n (1 + 2 + 3)	(% col.)
Journalistic information (mass media)	9	4	0	13	14%
Marketing: product info/retail marketing/merchandising	4	2	0	6	7%
Advertising (on- and off-line)	12	4	0	16	18%
Corporate communication. Brands	1	3	0	4	4%
Public relations: lobbies, social responsibility, public relations or involvement	15	10	3	28	31%
Digital marketing. Web/e-mail marketing/mobile apps/mobile apps/etc.	5	0	1	6	7%
Social media/forums/influencers	9	7	0	16	18%
Other	1	1	0	2	2%
<b>TOTAL</b>	<b>56</b>	<b>31</b>	<b>4</b>	<b>91</b>	<b>100%</b>

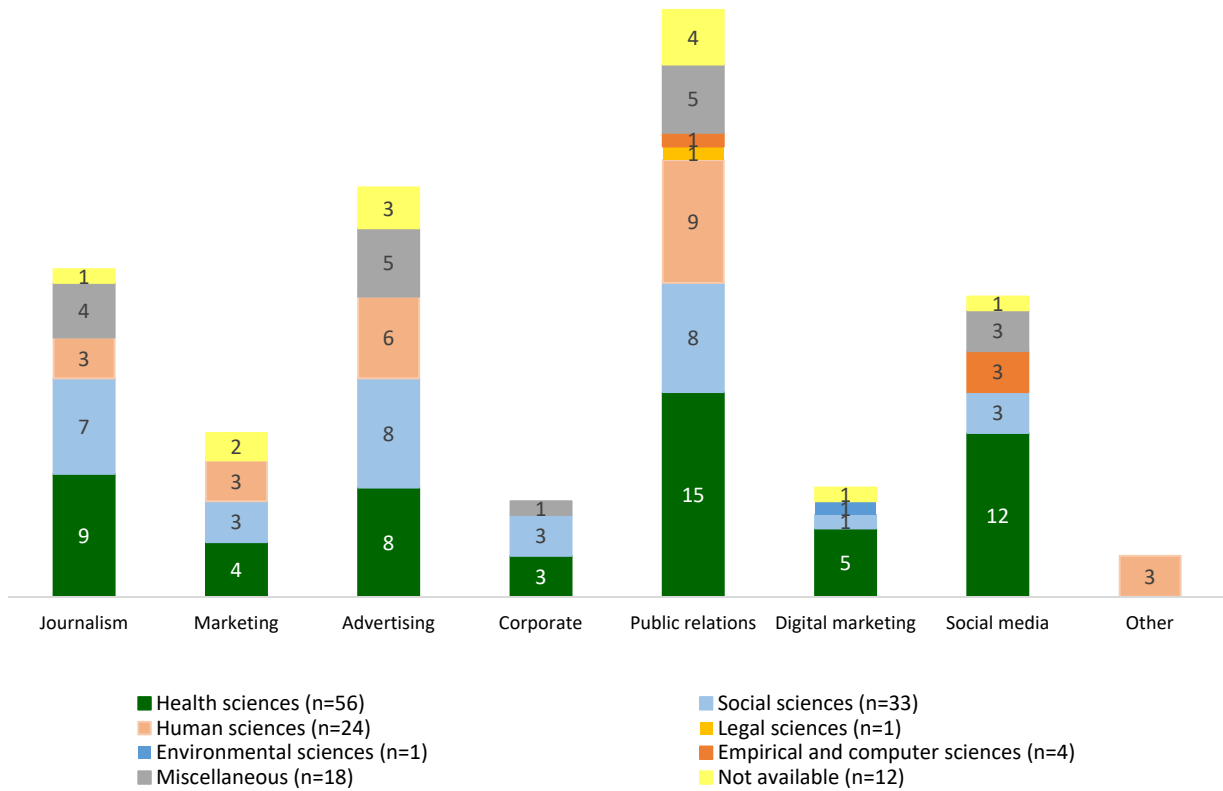
(\*) Area: the papers could be linked to several areas, up to three. Source: own elaboration. Note: multi-tag (n = 91); published papers (n = 56).

From the data, it is observed in Figure 4 that references to public relations had a notable presence in almost all areas of knowledge, with a greater presence in health sciences publications (n = 15), followed by human sciences (n = 9) and social sciences (n = 8). Advertising also had a notable presence in five of the eight areas in which the sample under study was framed, with an average value of twenty appearances. Studies on social networks had a discreet presence in different areas of science, except when they were related to exact sciences and computer sciences, where three out of four studies analysed dealt with this issue.

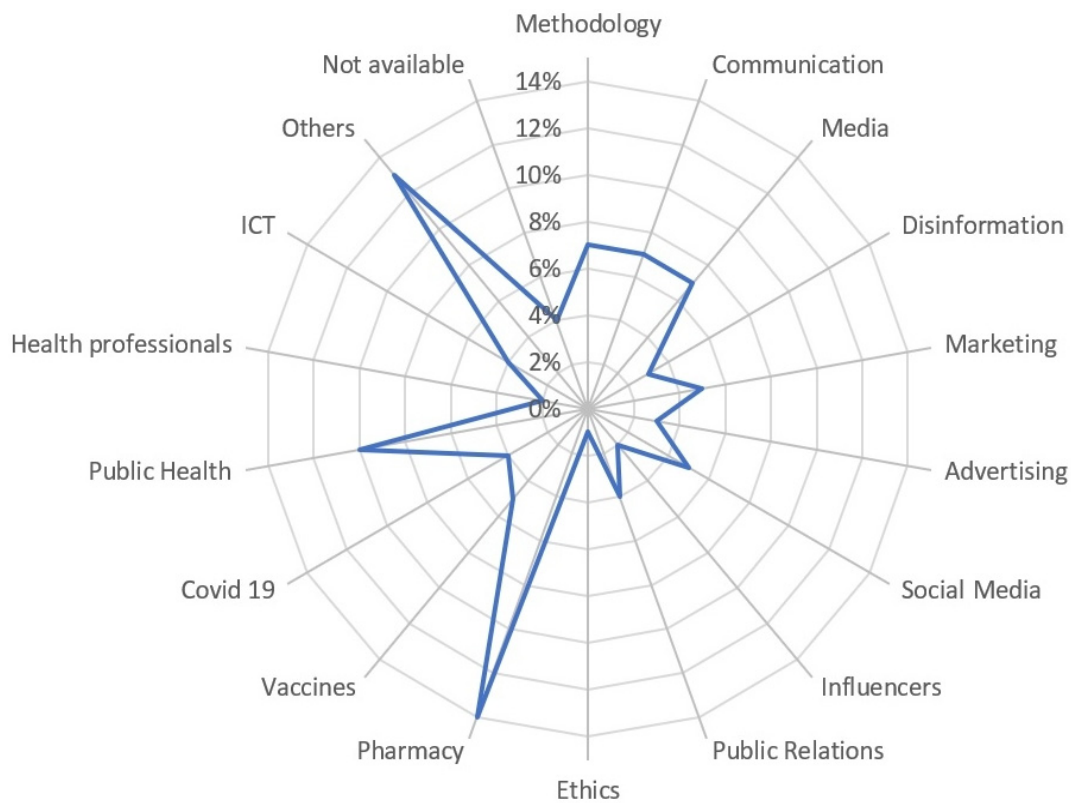
### 3.3. Topics and Methodologies of the Studies

The keywords of a document have the function of placing research both into its most general scientific field and in the most specific or related line. Their work is fundamental in the phase of searching for a theoretical framework by the scientific community carrying out research in the same line and subject. By selecting the most appropriate concepts, the study is placed into a specific topic.

The keywords were extracted from fifty-six documents, the vast majority with fewer than five terms, although up to twelve were recorded. A total of 242 words were coded and classified into thematic groups (Figure 5). Among the most frequent were those that referred to the pharmaceutical sector and activity with 14% of cases, which were followed by a miscellany of words (13%) related to the specific topics of each research article. Topics related to public health also showed a high interest in research (10%), while methodological, communicational or social media aspects had an identical presence in the research articles, with 7%, respectively. Terms related to marketing, social networks and vaccines were present in 5% of the publications, while topics such as COVID-19, public relations and ICT were seen with a percentage point less. That 4% coincided with the studies that did not refer to any keyword. With a 3% representation, there was an interest in disinformation and advertising. In the minority, influencers and health professionals appeared with 2%, and terminology that mentioned ethical issues in the pharmaceutical sector appeared with only 1%.



**Figure 4.** Disciplines related to the communication of publications by areas of knowledge of the journals. Note: multi-tag (n = 149). Source: own elaboration.

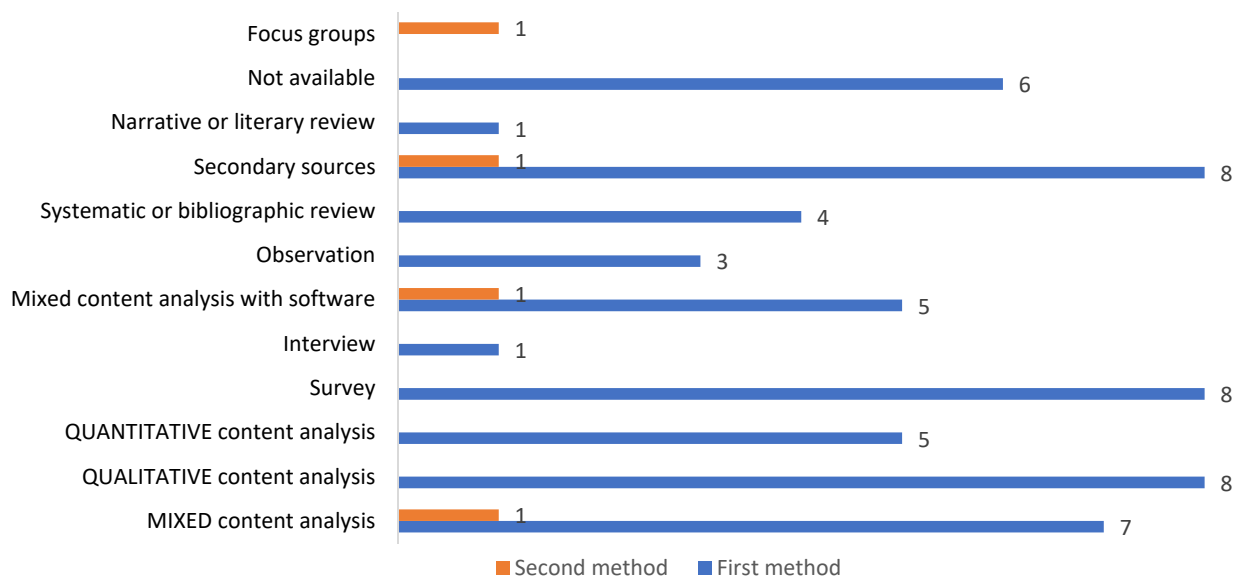


**Figure 5.** Presence of keywords in the published papers. Note: 18 thematic groups from n = 242. Source: own elaboration.

As for the methods, fifty contributions used some of the coded techniques, and four applied three of them as a second method. For the latter, the combinations were as follows: secondary sources + survey, secondary sources + mixed content analysis with software, systematic or bibliographic review + mixed content analysis and systematic or bibliographic review + discussion groups. Consequently, if empirical studies were considered those that were based on the observation of the proposed phenomenon, eliminating the review of the scientific production around it, all contributions with a second method could fall into this category ( $n = 4$ ). In addition, 43 studies were detected that applied a single method and that could also be considered empirical, so this typology would be the majority with a total of 47 documents. Other contributions were added to these studies, such as two systematic reviews and a narrative review. On the other hand, six contributions had no declared method.

Among those considered empirical ( $n = 47$ ), the methods most present in the contributions retrieved were those proposed from a mixed approach. Quantitative and qualitative methods were distributed equitably ( $n = 13$  in each case).

Among the techniques used (Figure 6), the most utilised was content analysis, whether qualitative, quantitative or mixed and with or without application support (25 contributions).



**Figure 6.** Number of contributions by type of research technique ( $n = 56$ ). Absolute frequency. Source: own elaboration.

In order to determine the weight of the methodology used in the articles according to the impact factor of the journals, cross-tabulation (Figure 7) showed that the papers in the Q1 journals employed a more quantitative and mixed methodology. Half of the studies with a qualitative methodology were found in journals with no factor and in journals with the Dialnet factor. The papers in the Q4 journals employed a mixed and qualitative methodology. Although the mixed methodology achieved a greater presence, the papers in the Q2 journals showed a heterogeneous distribution in the type of methodology used.

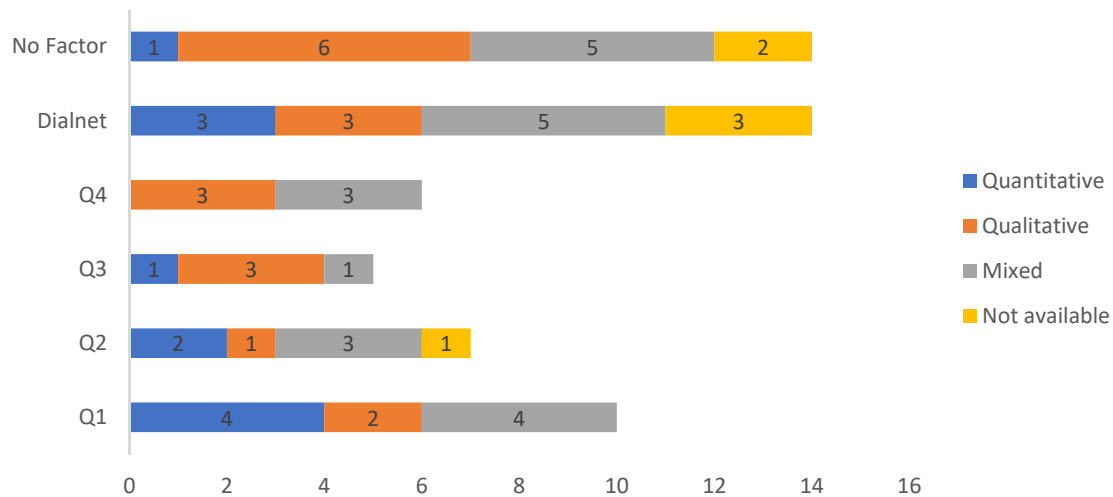


Figure 7. Cross-tabulation methodology used and impact factor. Source: SPSS.

### 3.4. Medicine Chain and Public Links Included in the Studies

In relation to the links that made up the medicine chain registered in the publications (n = 102), most of the papers analysed contemplated in their research various aspects that affected the patient as the final consumer thereof (37%). The pharmaceutical industry itself (23%) and medical prescribers and regulatory institutions of the national health system (20%) also concentrated their attention on the academy considering them, therefore, agents involved in communication within the system. Only 6% of the contributions referred to the sector in general without specifying a link.

As for the publics with the greatest presence in the studies analysed (Figure 8), the interest of society as a whole was present in 38 cases (68%). In second place, the public directly related to the medicine chain appeared in 29 cases (52%); in other words, they were all viewed from regulatory bodies, industry, distribution, dispensation and the sector as a whole. On the other hand, the health system along with the rest of the health professionals outside the pharmaceutical sector accounted for 26 cases (46%), while research aimed at professionals or organisations in the communication field, journalists, advertising and the media only appeared 17 times (30%).

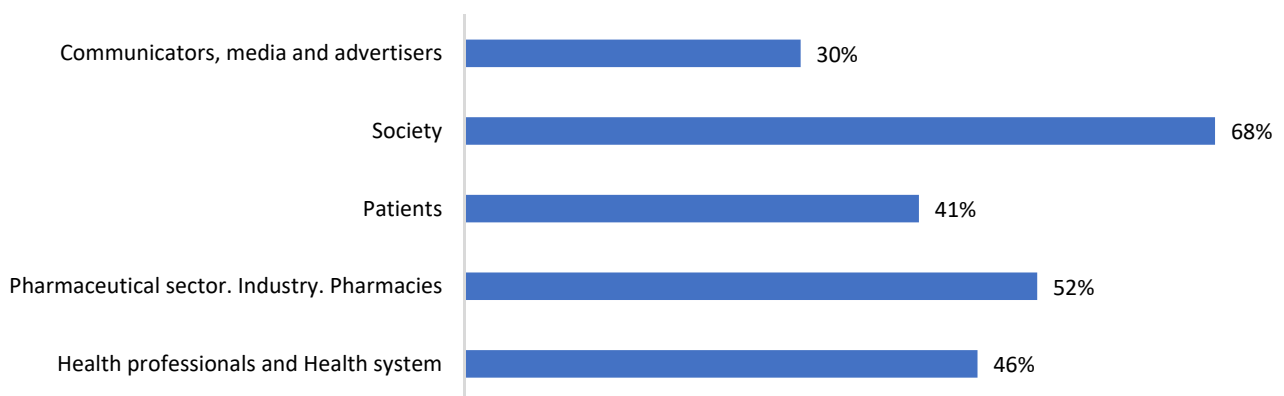


Figure 8. Publics included in the studies (%). Note: multi-answer (n = 56). Source: own elaboration.

## 4. Discussion and Conclusions

This study aimed to analyse the scientific literature to delve into the contributions made by the academic community to the field of pharmaceutical communication. Based on the results obtained, the response of the research around a health emergency situation of great exceptionality was verified, and the main characteristics and approaches of the published studies were identified. The applied method finally provided sufficient evidence



to identify the different thematic and methodological approaches, offering relevant results, as it is an eminently interdisciplinary field.

According to the first objective, the trend in the publication of the scientific papers was related to processes both internal and external to the research line (pharmaceutical communication). As has been explained, the temporal trend of the publications formed an uneven curve with two peaks, one in 2018, coinciding with the publication of a book and a book chapter. The other great peak was 2020, which points to a direct relationship with the current health emergency situation, judging by the significant drop in this figure in 2019. This effect of the pandemic on the increase in scientific production has been detected in other cases, such as in the paper cited [30], which focused on pharmaceutical care. However, the boost in publications during 2020 may also have been due to the publication of studies derived from the doctoral theses defended in 2019. In addition, from 2021 there was again a drop in the number of publications, but it was less sharp than two years before, at which time, again, a new doctoral thesis was defended.

To find out the sources of knowledge in the area of communication and the pharmaceutical sector, the results indicated that there were more women authors of the research articles, but more men were also detected as single authors. This evidence opens the way to the investigation of its causes, its implications and the actions that can be applied to correct it. However, these data point to the work dynamics of universities themselves as a type of institution of a predominant origin in the reviewed studies and that is equally affected by the gender system. This system interferes with scientific production among women and men, as demonstrated by the study of the Fundación Española para la Ciencia y la Tecnología [45]. Along these lines, other investigations have delved into the measures that can be implemented [46], although they may require a global action plan. These findings are a necessary starting point to continue with gender analysis and the search for solutions.

In response to the second objective, the analysed data allowed for identifying health sciences as the main scientific field of publications on pharmaceutical communication with almost twice as many cases as in journals linked to social sciences, a branch of knowledge to which studies related to communication were limited. This evidence could be related to the work processes of the field of health sciences compared to those of social sciences, which results in a better positioning and impact of this type of publications; although it could also be interpreted [36] around the publication requirements that researchers must meet to progress in the academic world. However, in the context of the COVID-19 pandemic, social science researchers have been able to generate considerable academic output, responding with surprising speed to emerging social needs and including broader research angles that involve aspects related to the ethics of pharmaceutical distribution, uptake, communication and financial and economic impacts, especially linked to vaccine production [47].

In any case, the journal with the greatest presence was a national one, *Gaceta Sanitaria*, which gives importance to social phenomena linked to health, responding to the search criteria of this review. These outcomes point to the suitability of carrying out an analysis using health sciences databases. On the other hand, given the increase in current technological innovations, it is also expected that areas with a residual presence in the analysed period, such as computer sciences, will increasingly take prominence in all the topics discussed given its great potential in terms of data management.

Likewise, this study aimed to find out the thematic approaches (fields, disciplines and keywords) as well as the most recurrent methods that predominate in scientific production, to close the second objective and respond to the third.

As for the disciplines associated with the journals and the preferred topics of the published studies, a correspondence was observed, which was due to the predominance of studies focused on the sector and the pharmaceutical activity in the area of health. Likewise, the results of the analysis of the literature in this period showed an interest in methodological, communicational and social media aspects. However, when the fields of the journals and the disciplines related to the communication of publications were related, one issue that attracted attention was the remarkable presence of strategies associated with

public relations, in almost all scientific fields but especially in human sciences. This could be due to two reasons:

On the one hand, it could be explained by the transversal nature of public relations, which can be present in different disciplines, contributing from its own competences. In fact, the field of public relations was present in an outstanding way in all cases. This fact, however, would contrast with the minimal impact of the terminology associated with public relations in the publications if compared with the sum of the rest of terms related to communication. These apparent contradictions focused on the conclusions that affirmed that the pharmaceutical sector tries to prefer brand-oriented strategies in order to promote and sell medicines [13].

On the other hand, it could also be due to the large number of terms present in the research articles around communication, such as “public relations”, “advertising”, “social networks”, “influencers” and even “marketing” or “media”, whose presence conferred difficulty when compiling the study of communication as a discipline in the pharmaceutical sector if the paper did not express a theoretical position. This difficulty corroborates the wide dispersion of terminology used by the publications analysed and confirms the multidisciplinary nature of the works, which is a challenge when it comes to connecting the different areas and clearly identifying the frameworks in which communication operates.

Consequently, given these outcomes, the broad meaning of many of the keywords and the apparent confusion in the sector of the different communication disciplines prevented offering more conclusive results in this regard. The conclusions of this study support the thesis of the terminology confusion installed in the sector in terms of communication [13,15], with the consequent damage that this can cause in terms of transparency and responsibility in pharmaceutical communication and in the process of the health education of society. Nevertheless, perhaps more detailed studies focused on different disciplines and settings will shed more light on this issue.

Likewise, the relevance of the use of public relations, advertising and marketing strategies and the use of digital environments and social networks as tools for information diffusion, health education and public awareness was also confirmed. The study suggests that communicative action is a key aspect of this, a consideration that focuses on the need to rely on effective communication, in line with what has been described by different international organisations and other studies [5,6,16,20,22].

The results focused on the scientific methods used in the analysed literature showed an empirical corpus that used different techniques of social research, among which were those based on content analysis and with a greater presence of mixed methods. These types of formulas, together with those that incorporated quantitative techniques, were the ones that had the greatest international impact, judging by the quartiles of journals.

Finally, with regard to the purpose of exploring the links in the medicine chain that arouse the greatest interest among researchers and the publics of their communication, it can be concluded that the academy and researchers are paying greater attention to those aspects that directly affect the patient—as the consumer of the medicine—and the communication agents involved in the medicine chain, especially the industry, prescribers and regulatory agents. On the other hand, there is still a wide margin for research in other links and in other publics involved in the chain. This study highlights a lack of a prominence that, as agents and publics of communication, represents pharmacy offices as a point of dispensing, a place where the interaction between the sector and the patient—ultimately, the final recipient of all the processes initiated in the medicine chain—occurs. This issue becomes particularly important if the aim is to promote the patients’ autonomous and responsible behaviour in the care of their health, having at their disposal the guidance and advice of health professionals empowered to prescribe and dispense medicines [20].

Among the limitations of the study, one of the main problems raised when establishing the selection of the bibliographic corpus to be analysed had to do with the decisions that had to be taken in terms of the accuracy of the search and those that are typical of the applied method. In this case, the semantic amplitude of the word “communication” was a

challenge for the entire design, both in the phase of the search strategy and when cleaning up and filtering the results. For this same reason, the use in the initial search strategy of the term “medicina” was avoided, despite it being very common in Spanish as a synonym of “medicamento” due to the fact that, when utilised to name the discipline of medical science, it could considerably increase the number of undesirable results that were not part of the objectives of this study. Another challenge for this review was the difficulty in separating the medical practice from prescribing medicines for the treatment of patients’ diseases and maladies. Finally, when extracting and cleaning up the results of the bibliometric work, it was observed that the double meaning of the English term “drug” generated a lot of noise, and, therefore, those results related to drug dependence or drug consumption that did not add value to this research were eliminated. All these considerations were taken into account to transform these limitations into strengths.

Among its many implications, this study demonstrates the need to continue investigating the communicative processes in all the links of the medicine chain, with special attention being paid to those most neglected by the academy: distribution and dispensation. The focus should also be placed on the communicative relationships that occur within the pharmaceutical system itself from the theoretical and practical frameworks of communication, that is, trying to give light to the terminological confusion detected and delving into the different communicational situations that occur between them.

There is no doubt that the use of common terminology could make it easier for researchers to locate, spread and access the results of studies linking communication with the pharmaceutical sector. To achieve this, it would be advisable to establish homogeneous criteria that offer a uniform terminology, which may allow future researchers to distinguish those studies that aim to focus on pharmaceutical communication from methodological or critical frameworks in order to not only improve their effectiveness but also guaranteeing transparency and security in patient information, in compliance with the social function of the sector and its relevance for global health, especially starting from the new communication possibilities provided by the Internet [48].

To conclude, although this systematic review provided conclusive results that demonstrated the interest aroused by the subject from different disciplines, primarily in health sciences and the empirical approach, it also highlighted the need for greater scientific production that analyses the consequences of information overload on medicines and their use and that delves into the communication actions of the pharmaceutical sector and the uses and effects of digital media. In the light of the results, it is considered essential to act from the regulatory field of the sector, recommending a communication guide or protocol after the review and the approval of a specific regulation that could be common on the international level for the diffusion, promotion and sale of medicines on the Internet.

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