INFORMATION WANTS AND INFORMATION SEEKING ACTIONS FROM PORTUGUESE NEUROLOGIST: INVESTIGATIVE ASSORTED TECHNIQUE RESEARCH

Amilcar Barreto[1]

Maria Jose Sá[2]

Isabel Luzeiro[3]

Abstract: Background: Medical professionals nowadays must be well-versed in the most recent, scientifically confirmed facts on illness diagnosis, treatment, and patient care. Despite the fact that there are an increasing number and variety of information sources available to physicians, many questions remain concerning the authenticity, quality, and usefulness of medical information. With the goal of improving current medical information delivery, new methodologies are needed to assess doctors' real-life demands. Objective: The goal of this study was to explore the information requirements and seeking behaviour of Portuguese's neurologists treating patients with multiple sclerosis (MS) and migraine. Methods: An exploratory mixed methods (quantitative and qualitative) investigation of 15 consecutive days was conducted. It was necessary to recruit a total of 50 neurologists (25 MS experts and 25 migraine specialists). An instant messaging programme built for this study was used to gather data. Personal interviews were conducted by computer at each information-seeking session, which included semi structured interviews and closed-ended questions. Content analysis was used to identify emergent themes from the mobile app interactions and physician enquiries. Results: A total of 36/20, or 71 percent, of the questions posed by neurologists were linked to treatment management and pharmacological information, followed by diagnostic techniques and procedures. Online resources were preferred by doctors (48/50, 96 percent) over offline alternatives (24/50, 47 percent) in a quantitative

1 Universidade Catolica Portuguesa, PhD(c)
2 Universidade Fernando Pessoa (Porto), PhD
3 Centro Hospitalar Universitário de Coimbra, President Sociedade Portuguesa de Neurologia

study. In 33% of information-seeking activities, a multi-channel strategy was used, which included using both online and offline resources to address the same demand. Neurologists were more likely to use internet resources than offline ones (F=1.7; P=.01) to get information. Compared to migraine neurologists, MS specialists were 53% more likely to participate in a single information-seeking event (risk ratio 1.54; 95% CI 1.12 to 2.05). More than two-thirds of MS specialists (28 percent [7/25] vs. 10 percent [2/25], P=.06) were interested in patient-related material, whereas migraine physicians (85% [21/25] vs. 60% [15/25], P=.05) were more inclined to seek information on treatment management. Both online and offline information searching was more difficult for migraine experts (F=12.5, P=.01) and offline channels were utilised less often (30 percent [8/25] versus 60 percent of information-seeking events, P=.02). To get information from various sources, both migraine and MS experts reported lower satisfaction rates (single source vs multiple sources P=.003). Conclusion: Portuguese MS and migraine neurologists are described in great depth in this research, including their real-life search activity as well as educational requirements and information sources they use. Neurologist information demands and information-seeking behaviour are influenced by their professional field. Identifying the temporal and context-specific demands of physicians is essential for designing a successful medical information strategy, according to these results.

Keywords: Information-seeking behaviour, info wants; info bases; medicinal info delivery; neurologists; multiple sclerosis; migraine

Introduction

Today's medical practitioners must read an expanding volume of scholarly works to stay abreast of new developments in the field Experienced doctors have been said to manage their patients using as much as 2 million bits of information. Furthermore, the precision medicine (PM) paradigm, which was recently introduced, necessitates a greater knowledge of the features and side effects of

currently accessible medications. Medical professionals now face an ever-increasing deluge of scientific publications (Bornmann L et al, 2015). The selection, integration, and translation of medical knowledge into clinical practise have become even more difficult due to the widespread dissemination of online scientific resources that allow health care practitioners to participate in multichannel interaction. Contrary to popular belief, the expansion of scientific evidence and the availability of a wide range of information sources does not always match the requirements of clinicians or meet quality standards. Even while continuing medical education (CME) is a significant (and sometimes necessary) source of medical information for most doctors, it has been demonstrated that such programmes frequently fail to meet physician demands and may not convert into better clinical practise patterns. In fact, it's possible that the time elapsed between instructional activities and actual information requirements may prevent this data from being useful in answering problems that arise during patient care (Bornmann L et al, 2015). While the US market is well-established in its dependence on industrial or sponsored resources, little is known about use rates in Europe and notably in Portugal. In order to guide the content and structure of Medical Information services in our department, we looked at the information demands and seeking behaviour of Portugal neurologists treating MS and migraine patients. Recent advances in the treatment of multiple sclerosis (MS) and migraine headaches (migraine therapy) have diverged significantly. There have been significant advancements in MS therapy, with more and more disease-modifying medications available for both progressive and relapsing-remitting MS. In order to support neurologists' ongoing education, pharmaceutical firms, scientific organisations, and patient groups have given various scientific educational programmes and appropriate internet resources. This study examines how Portugal MS and migraine neurologists look for information in the actual world, as well as their educational requirements and information sources. These elements have never been examined in this context to our knowledge. In order to better understand the unique information requirements of neurologists, we used our data to take an exploratory step back and look at the motivations, responses, and information gaps that exist in the landscape of resources accessible to them (Smith R, 1996). As a consequence of these findings, fresh Medical Information techniques

might be developed to give individualised information that is accurate, consistent, and timely across all channels in order to enhance patient care.

Material and Methods

Study Sample and Data Collection

To assess doctor eligibility, a screener survey was managed to 72 clinicians employed in dissimilar well-being centres and infirmaries through the Portugal land. Founded on the screener consequences, In all, we had 50 neurologists enrolled, 25 of whom were MS experts and 25 of whom were migraine experts. Staffing was designed to have a balanced representation of doctors from all of Italy's microregions, no matter where they practised. The education was an investigative varied approaches (i.e., qualitative and quantitative) investigation that lasted for 15 consecutive days. An prompt messaging telephone app founded on WhatsApp called Physician Line was utilised for the observation, allowing doctors to communicate and explain their information requirements and the sources they used to get the information they required in their regular clinical practise.

Through the use of a kick-off video presentation, attendees were introduced to the Physician Line app's features (The AOMS, 2015). A monetary incentive was offered to those who responded to the survey. Every time a physician sent a text message to the Physician Line app, two qualitative researchers (BG and MA) were allowed to start a conversation. As a result, during the interview, doctors and moderators had a direct line of communication. A semi structured meeting and two closed-ended queries were delivered to the doctors through the Physician Line app for each information-seeking event. Dr. motives and behavioural patterns were captured in the semi-structured interview, which contained five questions

To gauge how often they were able to locate the relevant information and how happy they were with what they had learned, doctors completed a semi structured interview. Two different Likert scales, one for 5 points and one for 4 points, were used for the evaluations, which ranged from zero

to four points.

Ethics Approval and Consent to Participate in the Research

No ethics committee permission was necessary because of the nature of the Patients or members of the general public were not included in the research and no health care was provided to participants. Regulations leading promotion investigate, counting the Marketplace Investigate Civilisation cypher of behaviour (2019 revision) and the Portuguese Code on Professional Ethics, were adhered to throughout this study, including the EU General Data Protection Regulation 2016/679 and well-established controlling practises and events (curated by ASSIRM 2016 revision) (Avorn J, 2013). Physicians voluntarily agreed to take part in the research. This includes data retention rules, data privacy declarations, and authorization to participate in a survey or data collecting exercise. Also included is a consent to the processing of personal data. No sensitive themes like religion or political convictions or sexual orientation were addressed in the interview questions. Preceding the extraction and analysis of primary data, Doxa Pharma Srl maintained the confidentiality of the obtained information and the pseudonymization of the individual replies.

Qualitative Analysis

Using the Physician Line app, the content analysis of physician inquiries and interactions with moderators was conducted. Following the sense-making method, we defined an ontology of info looking for that includes the idea of an information-seeking occasion labelled by a usual of areas counting circumstances, holes, and strategies, such as incentive and gun trigger, setting, info gap gratified, info bases, and info hunt plan (Tan SS et al, 2017). Each one of a doctor's actions is characterised as an event of information seeking (ie, consulting online sources, discussing with colleagues or sales representatives, reading a scientific article). A combination deductive-inductive content

analysis of the transcripts conducted by each moderator drew out key themes from the Physician Line app transcripts. Codable words, phrases, and paragraphs were highlighted by the moderators before the transcript was entered into the system as raw data. To begin with, a differentiation was drawn to distinguish between different types of information seeking and querying behaviour.

Statistical Analysis

For categorical variables, we calculated the absolute and relative frequency, as well as the mean and standard deviation. For continuous variables, we calculated the mean and standard deviation. According to the total number of information-seeking events throughout the research period, the incidence rate (number of information-seeking events/10 person-day) was determined. The Poisson distribution was used to calculate confidence ranges for information-seeking rates. The two-way analysis of variance was utilised to examine the variations in information retrieval and satisfaction levels across medical specialisation and information channel.

Results

Physicians relied on both online and offline resources to find information:

Offline materials were thought to be more conducive to in-depth study, whilst online resources were seen as more convenient. Google and scientific literature repositories such as PubMed and Embase were the most often referenced internet search engines when searching for credible, accurate, unbiased, and comprehensive information. I was interested in learning about new MS medications (Cook DA et al, 2013). Reading the abstracts of a few systematic reviews and editorials on PubMed led me to choose a handful. Using mobile applications to access online resources, such as PubMed, was deemed more convenient) Figure 1. The absence of institutional subscriptions to professional scientific journals was a constraint in the utilisation of professional scientific literature, as most published

research demands payment of access fees. Non-professional search engines like Google were used for exploratory searches or when basic inquiries needed to be answered quickly. In situations where active triggers prompted information-seeking behaviour and little bits of information were immediately needed to supplement clinical decision-making or to make sense of a query made during medical contacts or educational activities, this was especially true. During a visit, I asked a nurse about a patient's liver disease dose schedules.

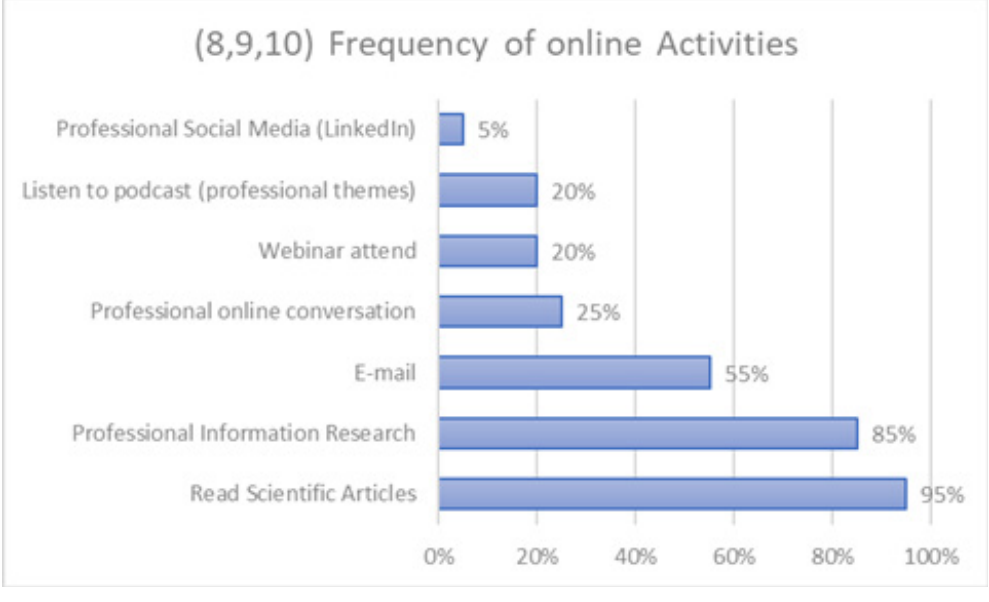

Figure 1: Read scientific articles is the most frequent professional online activity.

At the times of the pandemic the online portals are tending to become essential for the daily task like that of the meetings or the remote visits. The findings of these are summarised in the Figure 2

Figure 2: Responses of the Neurologist

Qualitative Analysis

Clinical management and illness epidemiology and physiopathology; pharmaceutical firms and their operations; diagnostic methods; patient-related subjects; educational possibilities; minor categories were all included in the eight categories of physician inquiries. Using these eight categories, a total of 37 objects might be categorised and organised . Information Seeking Motives and Triggers We found that neurologist reasons to seek knowledge were categorised into two groups (Kritz M et al, 2013). In the first group were external occurrences that sparked more inquiry, i.e., triggers. As a general rule, these occurrences may be divided into passive and active. As described by the researchers, passive triggers were defined as any activating material from newsletters or websites that prompted additional information-seeking in the absence of an already-existing demand for it.Patients and colleagues' inquiries; notable topics in seminars, grand rounds, informal talks, or clinical difficulties in the course of a medical interaction were considered to be active triggers, rather than passive.The drug

Drug name> was requested by a patient. She discovered the medicine's status as an experimental new drug on Wikipedia's list of investigational new pharmaceuticals. She was concerned about the clinical deterioration of the condition as she entered a secondary progressive phase.

We also discovered that neurologists are motivated by a desire for professional progress and scientific advancement rather than urgent, contingent problem-solving difficulties. We dubbed these kinds of events "endogenous motivation," as opposed to "exogenous stimuli."

We, as doctors, must stay up to date on new medicines and scientific discoveries. As we learn more about disease pathophysiology and new therapy choices, our discipline is becoming more complicated (Heilman et al, 2011). As a result, I check out PubMed regularly. In general, online materials were seen as more convenient and accessible, whereas offline resources were viewed as more conducive to in-depth study. Most popular search engines on the internet were Google and scientific literature repositories like PubMed or Embase, which were chosen when searching for credible and correct information. I was interested in learning about new MS medications. Reading the abstracts of a few systematic reviews and editorials on PubMed led me to choose a handful.

Using mobile applications to access online resources, such as PubMed, was deemed more convenient. The absence of institutional subscriptions to professional scientific journals was a constraint in the utilisation of professional scientific literature since most published research required the payment of access fees.

Google and other non-professional search engines have long been relied upon for rapid answers to basic issues or as a starting point for more in-depth research. To a greater extent, this was the case when patients were confronted with situations in which they needed immediate answers to questions that arose during the course of their care or during educational opportunities like lectures or discussions with other healthcare providers or students.A patient with liver illness was being seen by me, and I was in need of information about dosage schedules (Masters K, 2008). I typed in the drug's name into Google and discovered the drug's informational brochure.

Medical professionals are need to do an extra screening step when using general public se-

arch engines like Google instead of PubMed or other indexed archives for scientific content. When looking for specific pieces of information, doctors have used a variety of resources, including official and unofficial websites, science and medicine portals, medical content websites, social media and blogs, and forums for professionals and patients (Bernard et al, 2012). Despite its widespread and varied use, respondents noted the difficulties in judging the quality and dependability of internet material collected using such a method. As a result, in certain situations, the portals of government agencies and scientific associations were utilised to locate particular recommendations and authoritative grey literature content. Offline materials, such as books, seminars, roundtables, workshops, educational events, and practical training, got notification of final approval. To meet demands connected to professional growth, get an in-depth grasp of an illness, and master new complicated skills, offline materials and events were deemed authoritative sources by their very nature.

Discussion

It's time to discuss the main findings. Study participants were Italian neurologists who treat patients with either MS or migraines. They were surveyed via an instant messaging phone app. Preliminary profile of neurologists is provided in this exploratory research in order to help create individualised approaches to medical education (Giffin et al, 2019). Findings from this research imply that the unique clinical situation of specialisation produces a distinct pattern of interests, information demands, concerns to be addressed, and preferred information sources for experts in MS and migraine. Due to the recent advancements in MS therapy, there are substantial disparities between contemporary MS treatment and migraine management (Río J et al, 2011). According to our findings, neurologists' information demands and search habits seem to be in line with the changes taking place in the field of medicine.

Migraine neurologists, on the other hand, were less likely to participate in information-seeking behaviour and, when they did, they were more likely to ask queries concerning treatment ma-

nagement rather than other issues while searching for medical information. In addition, migraine doctors typically relied on public search engines rather than professional scientific sources while searching for information (Ziemssen et al, 2016). As far as offline channels go, migraine neurologists were much less satisfied than MS experts when it came to meeting with pharmaceutical sales people, attending seminars, and participating in conferences.

Neurologists have established research patterns based on the kind and substance of the material they are searching for, according to a deeper investigation of resource utilisation. For starters, while looking for information, doctors choose the most efficient method and the most appropriate information source to solve the subject at hand. To do this, neuroscientists must assess the characteristics, dependability, flaws, and strength of each accessible channel. There are a number of factors to consider when deciding whether to utilise online or offline channels or a mix (e.g., during a patient contact, at home, during a conversation with colleagues) (Río J et al, 2011). According to prior research, public search engines were used in our study group to do early exploratory research or to quickly satisfy basic information demands. In the course of medical contacts or educational activities, this was especially true when tiny bits of knowledge were required to answer basic inquiries. As a result, it seems that these internet resources are employed by doctors when they need to quickly transmit medical knowledge to the clinical environment. Because of their difficulties in determining whether broad public search engines and free online encyclopaedias are reliable, doctors have increasingly turned to more authoritative scientific resources, such as PubMed and other indexed archives of scientific literature and offline channels (Bartleson et al, 2010). A multi-channel tree-like search technique was commonly utilised to handle complicated situations requiring articulated replies, in which both online and offline sources were utilised. When a single channel was unable to address a particular information demand, such as in the case of migraine experts, integrative usage of online and offline channels was common.

Recently, the complexity of information-seeking and learning methods gave birth to the concepts of individualised education (PE). As with the growing framework of PM PE believes that

educational services should be tailored to meet the individual requirements of learners now of use rather than a one-size-fits-all approach. In other words, PE is about identifying particular context-by--user information demands, optimising educational activities, and designing user-centered learning (Weatherall MW, 2015). In this setting, medical information departments have the ability to respond to particular questions from experts by providing rapid, accurate medical information. The usage of websites supported by pharmaceutical corporations was found to be minimal, in contrast to evidence from North American data. When it came to offline information sources, medical information services relied heavily on sales personnel from pharmaceutical companies, which provided a significant credibility value. Pharmaceutical businesses have both a difficulty and an opportunity when it comes to tailoring Medical Information services to the individual demands, information gaps, and information-seeking habits of patients in various therapeutic areas.

The advantages and disadvantages

An app called the Physician Line was used in this research for real-time data gathering and exchange of the information requirements of doctors. As a result of this feature, recall bias is greatly reduced. Since moderators engage with participants in their real-life setting, the Physician Line app provides a chance to acquire findings comparable to those offered by ethnographic research. In addition, this technology may identify unique information requirements based on time and location (Gilmore et al, 2011). These findings suggest that the Physician Line app might be a useful tool for assessing the training requirements and information search techniques of health care professionals in the future. This study also has several flaws that need to be pointed up. Small sample size and short observation duration are the first requirements of an exploratory design. As a result, we were unable to get more insight into the information-seeking habits of MS and migraine experts.

Conclusion

During clinical practise and/or professional growth, our study found that Portuguese neurologists in various therapeutic areas have varied information demands, diverse information seeking habits, and use different information sources. These results imply that a successful information distribution strategy involves tailoring of both the content to be supplied and the communication strategies to be used, which must be suited to the individual conditions, demands, and requirements of health care workers. For neurologists who work in a variety of subspecialty treatment areas, identifying time- and context-specific demands as well as a profile of the physician seem to be critical elements in designing individualised information delivery and medical education techniques. Instruments that can accurately measure the real-world demands of doctors are needed for this task. During this proof-of-concept research, the Physician Line app was evaluated for its potential to gather useful data without disrupting clinicians' everyday routines and at the same time allowing for interaction between doctors and moderators. According to early findings, the Physician Line app looks to be an effective tool for identifying unique context-by user information requirements, optimising educational activities, and designing user-centred learning, in line with PE principles. A bigger sample size should be used to test the feasibility of this new equipment for data collecting. In order to enhance patient care, clinicians must have access to relevant and timely information

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