

The Impact of Online Information Literacy on the Information Seeking Behaviour of Military Physicians

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Abstract: Studying the information seeking behaviour and preferences of military physicians is rather important for their daily operations. This work aims in identifying the information needs, the information resources employed and the obstacles physicians encounter when seeking medical information. Based on the above we discuss the essential role doctors' online literacy skills have in everyday practices as well as in medical knowledge updating. The sample consisted of 101 military doctors working in a Greek military hospital in Attica. Data were collected using a weighted and structured questionnaire based on Wilson's macro model for information seeking behaviour. The most important information needs of military doctors were diagnosis, treatment, research, updating of knowledge and instruction-educational issues. Scientific databases and scholarly journals were the most important information resources, and the major obstacles encountered by the doctors were paucity of time and lack of access to electronic scientific databases from the workplace. Internet and other digital information tools could provide valuable additional input into physicians' routines and clinical practices. For this a new set of online literacy skills is required by military physicians.

Key-Words: Online information literacy, information seeking behaviour, military physicians

1 Introduction

The information needs of doctors serving in the armed forces are motivated from their professional role which involves the support of military operations, distinct circumstances of aviation and diving medicine, mass disasters and epidemics as well as humanitarian aid [1]. Therefore, military medical professionals need to cope with rather exceptional situations in which treatment requires a wide range of specialties and includes psychological and traumatic therapy [2]. The above issues distinguish this rather unique group of medical professionals in terms of their operational skills, culture, practices and as a result in terms of their needs for information [3].

Although research interest on information seeking behaviors of medical professionals has grown significantly in the past two decades [4], the

behaviors of this specific group of doctors' remains understudied. Indeed, studying the behaviour of military doctors towards information seeking, the use of information technologies and the internet as well as other related information services including collaborative networks is important.

Moreover, information seeking behavior studies help in developing digital information literacy programs and the relevant information literacy skills. Indeed, the development of specific information services for medical doctors should be related to their information behavioral profiles. The theoretical approach adopted is informed by Wilson's macro-model for information seeking and includes a set of information needs generated by specific personal/professional activities, a combination of information resources utilization and

barriers that doctors' encounter when seeking information [5].

2 Theoretical considerations for military physicians

The responsibilities of doctors working in the military differ from that of other medical doctors because of the complex role of supporting at military and special humanitarian operations. Their overall role involves attending medical risks, preventive and interventional needs of soldiers and other service members.

Medical doctors often deal with the prevention and treatment of infectious diseases, especially tropical diseases, and also the ergonomics and health effects of operating military-specific machines and equipment such as submarines, tanks, helicopters and airplanes (e.g., aviation and diving medicine) [1-3]. Furthermore, medical doctors deal with the planning and practice of surgical management of mass battlefield casualties, the logistics and administrating of establishing healthcare combat support units.

3 Survey design and results

3.1 Questionnaire development and methodology

For the empirical study a specially designed questionnaire was distributed to all military medical doctors serving at the time of the survey at the General Air Force Hospital of Athens (251 G.N.A.). Prior to its distribution the questionnaire was qualitatively pilot tested from a group of experts (military hospital directors and academics) for validity and approved by the scientific committee of the hospital. The survey took place during the period from February to March of 2013 and 181 questionnaires were distributed from which 101 completed and included in the survey analysis, response rate 55.80%. The personal involvement of the researchers and the approval given by the scientific committee to the survey contributed significantly to the high response rates. Medical doctors often deal with the prevention and treatment of infectious diseases, especially tropical diseases, and also the

A 5-point Likert scale was used to rate the impact of information needs (14-items), information resources utilization (14-items) and barriers

involved in information seeking (8-items), and finally the satisfaction from information seeking (single-item measurement). The values assigned to the five item Likert scale were ranging from 1= "not at all" which was indicating the lowest score to 5= "a lot" which was assigned to the highest score.

The internal consistency of the scales was tested with Cronbach's alpha reliability coefficient. The 36-item questionnaire scales used had good internal consistency reliability with overall Cronbach alpha of 0.739 which is exceeding the minimum standard suggested for basic research [6].

The analysis consisted of descriptive statistics in order to summarize the data on reported information behaviours. Further analysis, centred on the differences in reported behaviours by the physicians and their demographic characteristics, was performed. Regularity was checked by Kolmogorov-Smirnov test and Monte Carlo technique. For all checks made, the significance level (P) was set at 0.05. In this paper only statistically significant results have been reported. Statistical data analysis was performed using the SPSS for Windows (version 20) statistical software (SPSS Inc., Chicago, IL).

3.2 Limitations

As the survey was conducted on a specific socioeconomic setting, the results should be generalized with caution since they may not be directly applicable in other settings and countries. However, they offer a useful insight into information behavior of doctors working in a military hospital in Attica and can be useful for follow up research studies that aim to explore those topics in depth.

3.3 Survey results

3.3.1 Military physicians' demographic characteristics

Overall, 101 military doctors took part in the survey from a total number of 181 questionnaires distributed from February to March of 2013. Table 1 summarizes the demographic characteristics of military doctors (hospital, gender, age, rank, faculty and sector). The majority of physicians (82.2%) were men and 17.8% were women. Furthermore, 48.0% of doctors were younger than 36 years old, 34.0% were between 36 and 45 years old, while 18.0% were older than 45 years old.

Moreover, 1.0% of the physicians were senior officials, 45.5% were executives, while 53.5% were

inferior officers. Also, 60.0% of the military doctors were specialists, while 40.0% were residents.

Concluding the findings, concerning military doctors' characteristics, 43.4% of physicians had the pathological specialty, 25.3% the surgical specialty and 31.3% of them had the laboratory specialty.

Table 1: Military physicians' characteristics

Medical Specialty		Age	
Pathological	43 (43.4%)	≤35	48 (48.0%)
Laboratory	31 (31.3%)	36-45	34 (34.0%)
Surgical	25 (25.3%)	>45	18 (18.0%)
Gender		Faculty	
Male	83 (82.2%)	Specialist	60 (60.0%)
Female	18 (17.8%)	Resident	40 (40.0%)
Rank			
Senior official		1 (1.0%)	
Executive		45 (45.5%)	
Inferior officer		53 (53.5%)	

3.3.2 Descriptive statistics

3.3.2.1 Military physicians' information needs

The results for the impact of the factors that motivate doctors of military hospitals to search scientific information are depicted in Table 2. The Mann-Whitney U test identified differences between the faculty of respondents and the information needs "updating knowledge" and "teaching – educational work" ($U=785.000$, $p=0.000$) and ($U=886.000$, $p=0.017$) respectively. On the other hand, the Kruskal-Wallis test identified also differences between the information needs "preventive medicine" and "teaching – educational work" and the age of physicians ($H(2)=6.352$, $p=0.042$) and ($H(2)=10.117$, $p=0.006$) respectively.

3.3.2.2 Military physicians' information resources

Table 3 provides the survey results for the impact of the different information sources in making medical

decision. The Kruskal-Wallis test identified also differences between "electronic books" and the age of physicians ($H(2)=5.982$, $p=0.050$), and between "websites of state organizations" and the medical specialty of doctors ($H(2)=9.321$, $p=0.009$) as well. Furthermore, statistically significant differences were identified using the Mann-Whitney U test between the faculty of respondents and the resource "electronic scientific journals" ($U=851.000$, $p=0.006$).

Table 2: Military physicians' information needs

Information needs	Impact of information needs			
	The values from 1 to 5 indicate the level of impact ranging from not at all to a lot			
	Low (1 & 2)	Medium (3)	High (4 & 5)	Median value
Diagnosis (Valid N=100)	7.0%	10.0%	83.0%	5.00
Treatment (Valid N=101)	6.9%	6.9%	86.2%	5.00
Care (Valid N=100)	18.0%	27.0%	55.0%	4.00
Research (Valid N=101)	6.9%	12.9%	80.2%	5.00
Updating knowledge (Valid N=101)	2.0%	10.9%	87.1%	5.00
Teaching – educational work (Valid N=100)	10.0%	15.0%	75.0%	5.00
Information on drugs (Valid N=101)	13.9%	20.8%	65.3%	4.00
Care of war wounds (Valid N=92)	50.0%	27.2%	22.8%	3.00
Practice of medicine in a hostile environment (e.g. remote areas, military operations) (Valid N=92)	45.6%	27.2%	27.2%	3.00
Deal of massive numbers of wounded (Valid N=93)	40.9%	22.6%	36.5%	3.00
Care of wounds of weapons of mass destruction (Valid N=93)	36.6%	32.3%	31.1%	3.00
Medical evacuation of patients (Valid N=98)	28.6%	28.6%	42.8%	3.00
Infectious diseases (Valid N=99)	17.2%	29.3%	53.5%	4.00
Preventive Medicine (Valid N=98)	25.5%	26.5%	48.0%	3.00

Table 3: Military physicians' information resources

Information resources	Impact of information resources <i>The values from 1 to 5 indicate the level of impact ranging from not at all to a lot</i>			
	Low (1 & 2)	Medium (3)	High (4 & 5)	Median value
Personal library (Valid N=100)	7.0%	18.0 %	75.0%	4.00
Hospital library (Valid N=100)	25.0%	26.0%	49.0%	3.00
Communication with colleagues (Valid N=101)	10.9%	29.7%	59.4%	4.00
Medical journals (Valid N=99)	22.2%	25.3%	52.5%	4.00
Medical conferences and workshops (Valid N=100)	10.0%	23.0%	67.0%	4.00
Pharmaceutical representatives (Valid N=99)	58.6%	28.3%	13.1%	2.00
Media (Valid N=98)	88.8%	7.1%	4.1%	1.00
Search engines (e.g. Google) (Valid N=101)	6.9%	16.8%	76.3%	5.00
Scientific databases (e.g. Pubmed) (Valid N=100)	2.0%	5.0%	93.0%	5.00
Electronic scientific journals (Valid N=99)	3.0%	15.2%	81.8%	5.00
Websites of state organizations (Valid N=99)	23.2%	24.2%	52.6%	4.00
Electronic books (Valid N=101)	8.0%	23.8%	68.2%	4.00
Websites of military medicine organizations (Valid N=96)	50.0%	27.1%	22.9%	3.00
Websites of military medical conferences (Valid N=97)	53.6%	26.8%	19.6%	2.00

3.3.2.3 Barriers to military physicians' information seeking

The results for the impact of obstacles to military doctors' information seeking are depicted in Table 4. Statistically significant differences were identified using the Mann-Whitney U test between the faculty of respondents and the obstacles "lack of time" and "lack of information services" ($U=910.000$, $p=0.035$) and ($U=915.000$, $p=0.039$) respectively.

Table 4: Military physicians' barriers to information seeking

Barriers to information seeking	Impact of barriers to information seeking <i>The values from 1 to 5 indicate the level of impact ranging from not at all to a lot.</i>			
	Low (1 & 2)	Medium (3)	High (4 & 5)	Median value
Lack of time (Valid N=100)	20.0%	22.0 %	58.0%	4.00
Cost (Valid N=100)	27.0%	30.0%	43.0%	3.00
Lack of information services (Valid N=100)	38.0%	31.0%	31.0%	3.00
Lack of access to electronic databases from the work (Valid N=97)	33.0%	15.5%	51.5%	4.00
Lack of computer skills (Valid N=99)	78.8%	10.1%	11.1%	1.00
Lack of familiarity with the ways of information seeking (Valid N=100)	78.0%	13.0%	9.0%	1.00
Difficulty in understanding information at foreign language (Valid N=100)	78.0%	12.0%	10.0%	1.00

3.3.2.4 Military physicians' satisfaction from information seeking

Table 5 summarizes the results of the satisfaction of military physicians from information seeking. The majority (63.3%) of military doctors were fairly or very satisfied with their current ability to search scientific information.

Table 5: Military physicians' satisfaction from information seeking

Satisfaction from information seeking	Impact of satisfaction from information seeking <i>The values from 1 to 5 indicate the level of impact ranging from not at all to a lot</i>			
	Low (1 & 2)	Medium (3)	High (4 & 5)	Median value
Satisfaction from information seeking (Valid N=101)	7.0%	29,7 %	63,3%	4,00

4 Discussion

The main reason that pushes the military doctors in search of scientific information is the practice of medicine in a hostile environment, which is justified by the special and complex role of health support of military operations [1-3].

Equally important reasons that lead to the seeking of scientific information are updated knowledge for diagnosis, information on the treatment of the patient, as well as issues of preventive medicine. This is confirmed by literature [7-10]. Moreover, it is necessary for physicians to seek medical information by evidence-based and authoritative sources that will lead them in making appropriate decisions on issues of treatment [11].

The necessity of updating their knowledge to provide evidence-based care is an overwhelming information need for physicians [12]. Also, the majority of doctors use Internet to update their medical knowledge [13]. Furthermore, the main types of information needs are treatment, care, diagnosis, research, and drugs' information [14-18].

In addition, the treatment of patients is the greatest need for information seeking of unskilled medical doctors in the practice of primary health care in the military units of the Army in the Greek territory [19].

The websites of institutions of military medicine and military medical conferences, scientific databases, electronic journals, and websites of state institutions, are the most important digital resources for practitioners of the military hospital in search of scientific information. Also, search engines are equally important source for the doctors of the sample in finding information. Moreover, they often seek scientific information from the official digital information sources, such as scientific databases, search engines and websites of state institutions, while they quite often look information from websites of military medicine institutions and military medical conferences.

These results coincide with the findings of the literature. Internet, journals, digital databases, personal library, communication with colleagues, and pharmaceutical companies are the main sources of information for doctors [20-23].

Other studies emerge Internet, especially search engines, digital databases and electronic journals as the most important sources of information for health professionals, and the majority of physicians use Internet to search for scientific information [24-26]. In addition, digital information sources are more popular compared to printed sources [27].

Lack of information services and familiarity with the ways of seeking information and

computers, difficulties in understanding information at a foreign language, cost and lack of time and access to electronic scientific databases from the workplace are the major problems of doctors in search of scientific information.

The results above are confirmed by the literature. Not only the lack of adequate information technology education due to lack of access to reliable sources of information, but also lack of knowledge and use of inappropriate terms are important obstacles to the recovery of scientific information [10]. Moreover, the available time of physicians and lack of internet connection in the office and of knowledge of the English language to navigate at formal digital resources could prevent medical information seeking [15].

Equally important obstacles in information seeking are lack of time and familiarity of health professionals with search strategies [4, 28]. Also, cost, lack of time and access to library services and Internet, are obstacles to physicians' information seeking, particularly in rural areas [29]. Other studies highlight cost [12, 22] and lack of access to digital databases and familiarity with the ways of searching as major barriers in information seeking by health professionals [19].

5 Conclusion

This is the first study in Greek literature that explores the information behavior of doctors working at a military hospital in Attica, and specifically, at 251 General Air Force Hospital (251 G.N.A.). Future studies in a larger sample of military doctors in different military hospitals and health services in the Greek territory are necessary to draw conclusions capable of being generalized to all military doctors. The questionnaire that was developed for this study can be used in respective investigations.

Furthermore, the priority of administrations of military hospitals should be the promotion of knowledge and handling of scientific information among medical doctors of the above hospitals. Also, hospital managers should ensure favorable conditions for the filling of health professionals' information gaps and the confrontation of physicians' problems, concerning cost and lack of time. Towards this direction, the creation of an online medical library, a common digital platform and website for military hospitals could be useful. Finally, the presence of wireless internet access at the premises of hospitals, the creation of social network applications for doctors in military hospitals and the granting of portable digital tablets

to physicians by the administration of military hospitals are necessary for this purpose.

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