

# Susceptibility of falling behind current medical knowledge among health-care professionals: the extended parallel process model

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## Abstract

**Purpose** – The purpose of this paper is to appraise the possible response outcomes (no response, fear control or danger control) of a fear-based message on falling behind current medical knowledge among health-care professionals (HCPs).

**Design/methodology/approach** – This study was conducted using a quantitative research design. A cross-sectional survey was carried out in 2,873 health-care facilities across 36 districts of Punjab. The Extended Parallel Process Model (EPPM) provided a theoretical framework for this study. The important components to EPPM such as threat, efficacy and outcomes were used to collect the data. The collected data was analyzed using Statistical Package for Social Sciences (SPSS) version 22.

**Findings** – HCPs perceived high susceptibility and threat of falling behind current medical knowledge. A majority of the HCPs were at the danger control process and engaged in a behavior that is recommended for adaptive behavioral changes. Clinical experience and enrollment in post-graduation programs (e.g. FCPS, MCPS) were significant factors as to HCPs' perceived response efficacy.

**Research limitations/implications** – The responses were obtained using a structured questionnaire, which is always subject to respondents' personal biases and ability to understand the question's statement.

**Practical implications** – This study has important implications in terms of introducing promotional, educational and logistical interventions that could help in HCPs overcoming the fear of falling behind current medical knowledge and develop productive and adoptive information behavior thus improving patient care and outcome.

**Originality/value** – This is the first large-scale empirical study in Pakistan that measured the level of threat and efficacy among HCPs using the EPPM. It proposes a framework for developing long-lasting adaptive information behavioral changes that may result in informed patient care and better decision-making.

**Keywords** Health-care professionals, Threat, Efficacy, Outdated knowledge, Patient care decisions, Primary and secondary health care, Extended parallel process model, Information needs, Information outreach

**Paper type** Research paper

## 1. Introduction

Information has always been a basic commodity to improve knowledge. Health sciences librarians (HSLs) have relied on its dissemination to health-care professionals (HCPs) to promote informed patient care decisions. Traditionally, the health sciences library was a physical place, stocked with information resources on different subjects, usually attached to a tertiary care hospital in the urban area (Naeem *et al.*, 2020). To keep

abreast of the latest information resources, HCPs were required to visit the physical place (library). On the other hand, HCPs in the rural settings in Pakistan had no access to such resources owing to the non-availability of a library and poor information, communication and technological (ICT) infrastructure, resulting in the compromised patient care (Naeem and Bhatti, 2015; Rockefeller Foundation, 2008; González-González *et al.*, 2007).

Advancements in information technology have removed the restrictions of physical place, as well as helped in diminishing

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the information gap between the rural and non-rural practice settings (Sapp and Cogdill, 2010; Shumaker, 2009). Literature is replete with the descriptions of specific health information outreach projects aimed at meeting the information needs of various library constituents, particularly marginalized HCPs (Naeem *et al.*, 2020; Naeem and Bhatti, 2018; Pifalo, 2000). Many studies have suggested different ways (e.g. access to the Internet, online databases, establishing an online clinical information system or e-library) to address the information inequality between rural and non-rural settings.

Medical literature is growing at an exponential rate. To keep abreast of the latest information, HCPs need have to peruse about 6,000 articles per day (Lundberg, 1992). In just 2019, MEDLINE indexed almost 1 million new medical articles (Natioanl Library of Medicine, 2020). There is also a flood of medical information on the internet. HCPs in rural settings owing to lack of online access to this information can easily feel overwhelmed and develop low self-confidence in the search's they perform online to find the required information and often opt to abandon the information-seeking skills they may have (Naeem and Bhatti, 2020; Bhatti and Naeem, 2017). In another study, Naeem and Bhatti (2020) reported that the majority (51.65%) of the doctors in rural areas had never used any medical database (e.g. MEDLINE/PUBMED, MEDSCAPE/PAKMEDINET, UPTODATE) and some had never used the internet for seeking clinical information.

Access to information resources and library services increases HCPs' self-confidence for clinical decision-making (Naeem and Bhatti, 2015). Moreover, self-efficacy improves the quality of patient care decisions (Ravanipour *et al.*, 2015; Lee and Lin, 2009). Nevertheless, fear is also a powerful motivator for adoptive behavior (Witte, 2008). The threat of falling behind current medical knowledge or not having enough knowledge to treat the patients can motivate HCPs to seek the latest information about medical interventions (Burroughs and Wood, 2000).

### 1.1 Impact of information outreach services

HSLs strive to ensure that

- HCPs and those who use health-care services are knowledgeable about health-care information resources and services; and
- library access and services are available to them.

These endeavors often require HSL to leave the physical place and reach out to HCPs practicing in far-flung areas (Burroughs and Wood, 2000). Information outreach is the most recommended approach to improve information access, use and exchange in rural settings (Naeem *et al.*, 2020; Cogdill *et al.*, 2007).

National Library of Medicine (NLM) is the leading library that has conducted most information outreach projects. The US Greater Midwest Region (GMR) outreach program, operated under a contract by NLM, is one of the examples through which outreach services were provided to over 1,100 libraries and information centers in that region. A total of 74% of the participants indicated that as a result of the outreach project they were able to identify reliable online resources for evidence-based practice. The four positive outcomes of the outreach projects reported by the participants were as follows:

- 1 networking;
- 2 library promotion;
- 3 training; and
- 4 easy access to information.

On the other hand, four negative outcomes included:

- 1 staffing issues;
- 2 time constraint;
- 3 non-availability of required technology; and
- 4 sustainability in funding.

The results of the Kentucky study indicated that NLM outreach funding helped in improving access to reliable and accurate health-care information resources to rural physicians. It also helped in raising the awareness of Medline Plus, PubMed and other reliable online resources and databases among HCPs. A total of 71% of HCPs indicated that the availability of electronic information resources through SHELSI'S virtual library enabled them to handle clinical cases differently. A total of 38% reported that they changed the advice given to patients as a result of information obtained, 36% of HCPs reported change in choice of treatment, 22% indicated a change in choice of drugs, 16% highlighted the change in choice of tests and 13% reported change in diagnosis (Huber *et al.*, 2011). In study by Richwine and McGowan (2001), 31% reported that the information made available to them through virtual library, contributed to their ability to avoid additional tests and procedures, 20% highlighted avoidance in medication errors, 15% reported avoidance in additional outpatient visits and 14% HCPs reported avoidance in hospital admission.

### 1.2 Benefits of library services on clinical decision-making and patient care

Benefits of traditional library services to the patients have been reported in many studies (Naeem *et al.*, 2013a, 2013b; Wilson *et al.*, 1989; Marshall, 1992; Ali, 2000; Burton, 1995; Uriguen, 1995; Barbour and Young, 1986; Weightman and Williamson, 2005; Veenstra, 1992). These studies have shown that information provided by traditional libraries helped in reducing hospital admissions by 2% to 17%, reduction of additional or unnecessary tests by 13%–49%, mortality by 19%, reduction of hospital-acquired infection by 8%–25% and surgery by 19%–34%. Between 49% and 86% of HCPs reported that the library provided information saved their time. Between 20% and 95% of clinicians reported that the library provided information had an impact on their clinical practice, while 51%–95% indicated that this information influenced the choice of medication they prescribed. All the above studies suggested that the library provided information had a positive impact on clinicians and their practice, but O'Connor (2002) has cautioned that there is no consensus for assessing the level of impact.

### 1.3 Status of rural library services in Pakistan

Hoq (2015) conducted a review of the literature to examine the factors related to the success, failure and sustainability of a rural library and information services. The review concluded that rural communities all across the world had less access to information resources. However, in the past few decades, the importance of information had been recognized and the role of information for national development acknowledged.

Historically several attempts have been made to improve information access in rural areas of Pakistan. For example, 700 box libraries were established in 1984. After five years, the number of box libraries increased to 4,373 with a collection of 1,050,000 volumes. Box libraries comprise small, catalogued collections according to the needs of the local people. The concept of box libraries has become very popular amongst the rural population. However, it did not last long owing to a lack of funding (Khurshid, 2000). Pakistan Library Association (PLA) and PharmEvo (a pharmaceutical company) have established fifty smart libraries with a moderate collection in the hospitals (Pulse International [Internet], 2014).

### 1.3.1 Integrated rural information system in Pakistan

Anwar (1976) proposed an “integrated rural information system” under the cooperative efforts of the USA-Pakistan Librarianship. A preliminary report for the organization of libraries and information networks in Pakistan was submitted to the Ministry of Education, Government of Pakistan in 1976. The report was an attempt to outline a framework for the organization and development of libraries in Pakistan in conjunction with the National Information Networks (NINs) or National Information System (NATIS).

It was proposed to establish Peoples District Libraries, Peoples Tehsil Libraries, Peoples Provincial Libraries and Peoples Libraries at the local level (rural and non-rural areas) under NATIS. It was also proposed that the National Library would serve as the national coordinating agency to manage and run all these people’s libraries. Although the project would be a part of NATIS, the development of these centers would be the responsibility of the provincial department of education. It was also proposed that the scheme would initially be launched as a pilot project in thousand villages that had a primary school though preference was to be given to large villages with schools. The success or failure of the pilot project was to be evaluated after the completion of two years. If successful along with recommended it would be expanded to other areas. After two years, the project was to be launched to other rural areas by establishing 2,000 centers each year. However, the proposed “integrated rural information system” could not come into existence and has remained as a paper exercise.

### 1.3.2 Multipurpose community telecenters in rural areas of Pakistan

Mahmood (2005) proposed setting up multipurpose community telecenters (MCTs) in rural areas of Pakistan, to provide an opportunity to establish programs and services that could provide economic, social and IT support. The study reported that the public library system was almost non-existent in rural areas of Pakistan and people were seeking information from other sources. Therefore, the development of MCTs could be an alternative to libraries in rural areas meeting the information needs of rural communities instead of traditional books, journals, newspapers, etc. MCT could also provide new electronic information sources such as databases, internet, etc. Many challenges and opportunities were anticipated in the establishment of MCTs in rural areas of Pakistan. The main challenge being low information literacy, lack of awareness of services and benefits of ICTs, cost, poor ICT infrastructure, language barrier, power failure, funding and lack of political will. On the other hand, the opportunities were; the promotion

of ICT, provision of information services to the rural population through web resources and distance education through ICTs.

### 1.3.3 Health-care information outreach program

More recently, Naeem and Bhatti (2018) proposed a health-care information outreach program to improve information access, use and exchange in the rural health-care setting of Pakistan. They identified that rural HCPs have significantly less access to information resources, most rely on their knowledge to treat the patients though most of the time this knowledge is outdated. The study stated the information outreach program’s goals and strategies using a logic model that aimed at influencing/reinforcing behavior, influencing practice and facilitating onsite information access.

Naeem et al. (2020) recommended the information outreach program’s interventions to improve the information use and exchange in rural health-care practice settings. These interventions include educational activities such as increasing awareness, developing knowledge and skills among HCPs, ability to effectively seek health-care information online and keep abreast with the latest medical knowledge. The process activities included developing an information communication and technological infrastructure to provide HCPs access to the latest information resources.

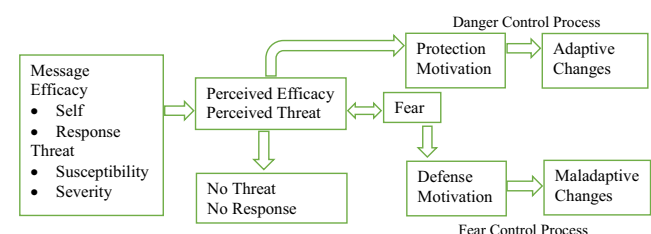
The review of the literature section of the present study concludes that the availability of information to HCPs in rural practice settings would significantly improve patient care decisions and outcomes. However, the information access to rural HCPs in Pakistan is hampered by several barriers such as non-availability of library or information services, poor ICT infrastructure and geographic isolation, resulting in compromised patient care. It is clear from the literature and local studies that information outreach programs are the most recommended approach to improve information access, use and exchange in rural settings.

### 1.4 Theoretical framework

The extended parallel process model (EPPM) is also known as the “fear appeal theory.” It focuses on the use of fear to motivate action. Largely, research on the EPPM reports that high threat/high efficacy messages encourage long-lasting behavioral change (Witte, 1998). According to this theory, most risks are inherently fear-producing; fear being induced by the feeling of not knowing. The extended parallel process comprises the following important components (Figure 1):

- Message: message is the essential component of EPPM, the component within which have to be able to identify the

Figure 1 Extended Parallel Process Model

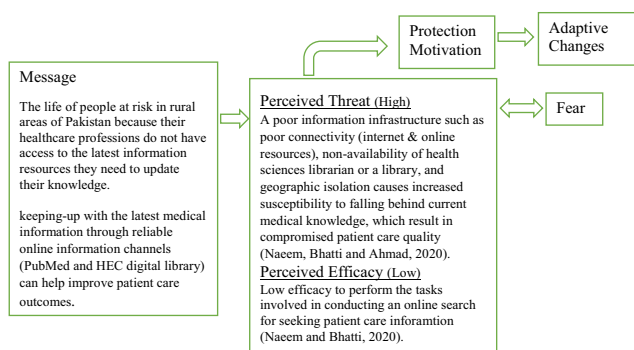


threats and what the issues of efficacy for the target audience.

- Threat: the first component of the appraisal of threat is determining whether or not the target audience feels a threat to the situation? Then how severe that threat is going to be (severity)? So they can recognize that it could affect them (susceptibility), the question then becomes how much will it affect them?
- Efficacy: when the target audience experience a threat, they have to decide whether they can act or not. In the EPPM, “efficacy” is broken down into two components: self-efficacy and response efficacy. Self-efficacy is the belief in one’s own ability to perform the required task. Response efficacy is not just what one believes that he can but it has an impact.
- Three outcomes of a fear-based message: if one is exposed to a fear-based message, what might happen? There are three possible message outcomes which are: no response; fear control process; or a danger control process.
- No response: the first response is there is “no response.” It is just like that efficacy is low among a population, or the population cannot see a threat.
- Fear control process: the second response is that the population goes through “fear control response” which is going on to “defense mode/motivation” and response like “denial, or avoidance,” i.e. inability to cope with the threat or there is no need to access information, or the false confidence that knowledge is already updated. At some point, there is fear control. I just do my job and hope for the best. Those are only fear control messages. There is all kind of mal-adaptive changes that can make denial and stop acting the needed action which is required.
- Danger control process: the third response includes going through a danger control process such as protection motivation and adaptive changes. In danger control, we act and engage in a behavior that is recommended to it (Figure 1).

Figure 2 indicates that HCPs are exposed to a fear-based message that the life of people at risk in rural areas of Pakistan because their HCPs do not have access to the latest information they need to update their knowledge (Naeem and Bhatti, 2015). Keeping up with the latest medical information through reliable online information resources can help improve patient

**Figure 2** Theoretical framework using the components of the Extended Parallel Process Model



care outcomes. HCPs also had low efficacy to perform the tasks involved in conducting an online search for clinical information (Naeem and Bhatti, 2020).

In the theoretical framework in Figure 2, a “threat” is defined as the severity of the problem, the degree to which rural HCPs are at risk and recognizing the problem (e.g. not keeping up with the latest information). “Efficacy” is defined as the degree to which rural HCPs can find the latest health-care information online for clinical decision-making? “Outcome” is defined as the degree to which rural HCPs can control the fear by using adaptive or maladaptive actions to find the information online for clinical decision-making (Burroughs and Wood, 2000).

The main components from the EPPM such as threat, efficacy and outcome were used and conceptualized in the present study to collect the data from the HCPs (Table 1).

### 1.5 Objectives of the study

The present study is conducted to appraise the possible outcomes (no response, fear control or danger control response) of a fear-based message using the components of EPPM such as a level of threat and efficacy among HCPs.

### 1.6 Hypotheses of the study

The following alternative hypotheses are formulated using the components important to the EPPM (Table 1):

- There is a statistically significant difference in the perceived susceptibility to a threat among HCPs across different health-care facilities, categories of clinical experience and HCPs’ enrollment in the post-graduation program.
- There is a statistically significant difference in the perceived severity of a threat among HCPs across different health-care facilities, categories of clinical experience and HCPs’ enrollment in the post-graduation program.
- There is a statistically significant difference in the perceived self-efficacy of HCPs across different health-care facilities, categories of clinical experience and HCPs’ enrollment in the post-graduation program.
- There is a statistically significant difference in the perceived response efficacy of HCPs across different health-care facilities, categories of clinical experience and HCPs’ enrollment in the post-graduation program.

## 2. Research methodology

This study adopted a quantitative research design. A large-scale cross-sectional survey was conducted in the 2,873 health-care facilities that included 2,748 Primary Health Care (PHC) and 125 Secondary Healthcare (SHC) facilities across 36 districts of Punjab, Pakistan. Basic Health Units (BHUs) along with Tehsil Headquarters (THQs) form the Primary Health Care (PHC) delivery system. The Tehsil Headquarters (THQs) and District Headquarters (DHQs) form the Secondary Healthcare (SHC) delivery system in Pakistan. All of these are integrated health-care systems, administratively handled at a district level. The districts are the second-order administrative units of government in Punjab, below divisions. Tehsil is an administrative sub-division of a district and forms the third tier of government. Tehsil is administratively subdivided into union



**Table 1** Conceptualization of the theoretical framework based on the EPPM

Component	Dimension of Component	Definition	Questionnaire Items
Threat	Severity of threat	The severity or seriousness of the problem	- It is dangerous to fall behind current medical knowledge
	Susceptibility to threat	The degree to which one is at risk of experiencing the problem	- I am at risk of falling behind current medical knowledge
Efficacy	Self-efficacy	The degree to which one feels able to do what's recommended to avert the problem	- I am easily able to use PubMed to avoid falling behind current medical knowledge - I am easily able to use the Higher Education Commission's (HEC) digital library to avoid falling behind current medical knowledge
	Response efficacy	The degree to which one feels that what's recommended to avert the problem works	- Using PubMed prevents me from falling behind current medical knowledge - Using the HEC digital library prevents me from falling behind current medical knowledge
Outcome	No response, Danger control or Fear control	Adaptive, protective actions taken when one is motivated to act and believes s/he can act No response: message just did not work. HCPs did not feel a threat Fear control process: there is all kind of mal-adaptive changes that can make denial and stop acting the needed action which is required. Danger control process: HCPs act and engage in a behavior that is recommended to it	

councils. Presently, Punjab has 9 divisions, which are subdivided into 36 districts having 127 tehsils.

The study's population comprised of ( $N = 4,033$ ) HCPs, (medical officers/physicians, surgeons, gynecologists, anesthetists, pediatricians, etc.). Of these 4,033, 2,273 (56.36%) were from PHC and 1,760 (43.64%) SHC. Using Krejcie and Morgan's (1970) sample size table, we calculated the minimum sample size ( $n = 357$ ) with a 5% margin of error. The following sample size calculation formula was used:

$$n = \frac{X^2 * N * P * (1 - P)}{(ME^2 * (N - 1)) + (X^2 * P * (1 - P))}$$

$N$  = sample size,  $\chi^2$  = Chi-square for the specified confidence level at 1 degree of freedom.  $N$  = population size,  $P$  = population proportion,  $ME$  = desired margin of error (expressed as a proportion).

Using a quota sampling, the population was divided into four strata, which were coded as; BHUs (stratum A), RHCs (stratum B), THQs (stratum C) and DHQs (stratum D). The proportions of each stratum to the population were identified so that the number of participants from each stratum was proportional to

the population. The rationale for adopting a quota sampling methodology was to assemble the representative proportion of the total population with their health-care facilities (e.g. BHUs, RHCs, THQs and DHQs) thus reducing the sampling bias. Originally, the proportion of stratum A to the population was 41%, stratum B counts for 15%, stratum C for 21% and stratum D has a 23% proportion of the population. A total of 9% sampling proportion allowed to have an equal percent of proportion from each sampling stratum to the study sample size, as the proportion of each stratum to population (Table 2).

The questions' statements relating to variables were put together by conducting an in-depth review of a large body of literature (Naeem and Bhatti, 2016a; Burroughs and Wood, 2000; Witte, 1998). A three-part questionnaire was developed. The first part included questions on demographic information, such as gender, age group, work experience, type of health-care facility. The second part contained questions relating to the components of EPPM such as perceived level of threat (perceived susceptibility and perceived severity) and perceived efficacy (response efficacy, self-efficacy). The last part solicited questions on the information needs to support informed patients care

**Table 2** Determining the proportion of subgroups in the population ( $N = 4,033$ )

Stratum	A	B	C	D
Population size	1,668	605	822	938
Proportion of each stratum to population	41%	15%	21%	23%
Sampling proportion	9%	9%	9%	9%
Final sample	150	54	74	84
Proportion of each sampling stratum to total sample size	41%	15%	21%	23%

Notes: A = BHU; B = RHC; C = THQs; and D = DHQs

decisions. A five-point Likert-type scale from strongly disagree to strongly agree was used to record the responses. The questionnaire was pre-tested by five experts in rural health, information management and medicine. It was pilot tested first on 20 participants. The suggested changes were adopted into the questionnaire. The variables such as clinical experience, enrollment in post-graduation programs, types of health-care facilities and age groups were taken as independent variables and perceived threat, efficacy and information needs were the dependent variables in the study (Figure 3).

A multi-tiered approach (posted mail along with a self-addressed stamped envelope, Web-based link and personal visits) was used to distribute the questionnaire and collect the data from participants. A total of 1,204 questionnaire copies were distributed through postal mail and personal visits to participants, of which 396 (32.9%) were received back, after three follow-up phone calls with a gap of 15 days.

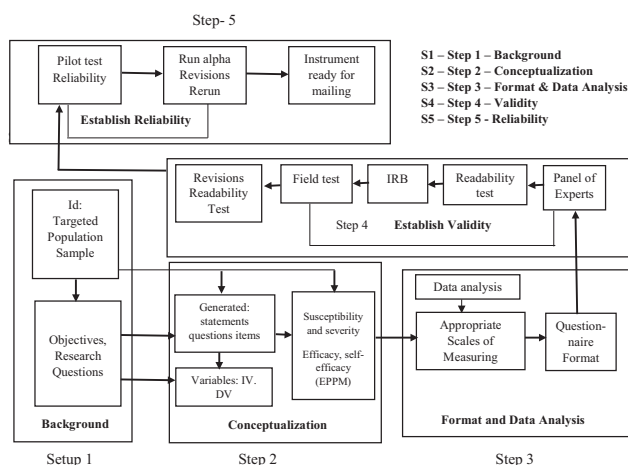
The questionnaire in electronic form ([www.questionpro.com/t/AMIRzUo4S](http://www.questionpro.com/t/AMIRzUo4S)) was sent to 600 participants on their email IDs and WhatsApp, of which 121 (20.1%) responded. A total of 1,804 questionnaires were distributed and 517 received back; a 28.65% response rate.

Because there is an inverse relationship between sample size and the margin of error, a larger sample size is likely to yield smaller margins of errors. Therefore, we decided to continue obtaining responses even after achieving the responses from the study's sample ( $n = 357$ ). A total of 517 valid responses were used for data analysis.

The data were analyzed using a "Statistical Package for Social Sciences" (SPSS) version-22. The data is reported in frequency, percentage and graph. The inferential statistics applied to find the inferences using a Kruskal–Wallis statistics (Tables 5 and 6) and Mann–Whitney  $U$  statistics (Table 7). A Cronbach's alpha value ranging from 0.86 to 0.91 indicated good reliability and consistency of the questionnaire.

The reason for applying non-parametric statistics instead of commonly used parametric statistics for data analysis includes; the collected data for this study did not come up with the basic assumptions of parametric statistics such as the normal distribution of the data across different groups and no outliers.

**Figure 3** Conceptual framework for developing and testing a questionnaire/instrument



The ethical approval to conduct the study was sought from the Departmental Research Committee (DRC) by the Department of Library & Information Science and the Board of Advanced Studies and Research (BASAR) by the Islamia University of the Bahawalpur.

### 3. Findings

#### 3.1 Demographic information

Of 517 (100%) respondents, a majority 351 (67.9%) were male. Most of the respondents 199 (38.5%) worked in BHUs, followed by 118 (22.8%) HCPs in THQs. The difference in the gender of HCPs was much higher in secondary than primary health-care facilities. Using post hoc chi-square analysis, a statistically significant difference with a small size effect was found in the gender distribution of HCPs in different health-care facilities such as BHUs, RHCs, THQs, DHQs and others ( $\chi^2 (4) = 11.141, p = 0.025$ , Cramer's  $V = 0.147$ ).

Most HCPs were in the health facilities of BHUs, and the least was in RHCs. The majority of the HCPs in primary and secondary health-care facilities were young and less experienced (age between 21 and 30 years). Only 15 (2.9%) were in the age group of 51–60 years (Table 3 and Figure 3).

A total of 272 (52.6%) respondents had less than 5-years of clinical experience, while another 47.4% had a working experience between 6 and >15 years. Statistically, there was no significant difference between the clinical experiences of HCPs working in different health-care facilities ( $\chi^2 (4) = 16.767, P = 0.180$ , Cramer's  $V = 0.401$ ) (Table 3).

#### 3.2 Level of perceived threat and efficacy among HCPs (extended parallel process model)

The important components from the EPPM were used to gather the responses on a five-point Likert-type scale. A majority of the respondents agreed with statements such as I am at risk of falling behind current medical knowledge (perceived susceptibility) ( $M = 3.85, SD = 1.054$ ), and it is dangerous to fall behind current medical knowledge (perceived severity). Mean values of all the four statements under perceived efficacy were between 2.55 to 3.22, indicating that the majority of the HCPs found "slightly agree" with the statements related to perceived efficacy (e.g. using PubMed prevents me from falling behind current medical knowledge and using HEC digital library prevents me from falling behind current medical knowledge, etc.) (Table 4).

#### 3.3 Level of perceived threat and efficacy among HCPs of different health-care facilities

Using Kruskal–Wallis statistics, we found a significant difference in the opinion of HCPs working in five different types of health-care facilities regarding perceived response efficacy that using PubMed prevents me from falling behind current medical knowledge. The mean ranks (262.35 DHQs, 254.86 THQs, 218.42 BHUs and 198.41 RHCs, 194 others) indicating that perceived response efficacy was higher among HCPs of DHQs and THQs than BHUs, RHCs and others. On the other hand, the  $p$ -value of all the other five statements was greater than the significance level of 0.05, indicating no significant difference in the perceived susceptibility and severity to a threat and perceived self-efficacy among HCPs of different

Table 3 Respondents' demographic information

	Primary health care BHUs (N = 199)	RHCs (N = 63)	Secondary health care THQs (N = 118)	DHQs (N = 101)	<sup>a</sup> Others (N = 36)	Total (N = 517)	$\chi^2$ value	p-value	Cramer's V
<b>Gender</b>									
Male	144 (41%)	33 (9.4%)	76 (21.7%)	70 (19.9%)	28 (8%)	351 (67.9%)	11.141	0.025 <sup>*</sup>	0.147
Female	55 (33.1%)	30 (18.1%)	42 (25.3%)	31 (18.7%)	8 (4.8%)	166 (32.1%)			
Total	199 (38.5%)	63 (12.2%)	118 (22.8%)	101 (19.5%)	36 (7%)	517 (100%)			
<b>Age group</b>									
21–30	103 (38.0%)	32 (11.8%)	69 (25.5%)	53 (19.6%)	14 (5.2%)	271 (52.4%)	24.210	0.216	0.019
31–40	65 (34.6%)	23 (12.2%)	41 (21.8%)	43 (22.9%)	16 (8.5%)	188 (36.4%)			
41–50	23 (53.5%)	6 (14.0%)	8 (18.6%)	4 (9.3%)	2 (4.7%)	43 (8.3%)			
51–60	8 (53.3%)	2 (13.3%)	0 (0.0%)	1 (6.7%)	4 (26.7%)	15 (2.9%)			
Total	199 (38.5%)	63 (12.2%)	118 (22.8%)	101 (19.5%)	36 (7%)	517 (100%)			
<b>Clinical experience</b>									
extended	107 (39.3%)	31 (11.4%)	68 (25.0%)	53 (19.5%)	13 (4.8%)	272 (52.6%)	16.767	0.180	0.401
extended	52 (33.1%)	19 (12.1%)	33 (21%)	39 (24.8%)	14 (8.9%)	157 (30.4%)			
extended	14 (38.9%)	6 (16.7%)	8 (22.2%)	4 (11.1%)	4 (11.1%)	36 (7%)			
extended	26 (49.1%)	7 (13.7%)	9 (17.6%)	5 (9.8%)	5 (9.8%)	52 (10%)			
extended	199 (38.5%)	63 (12.2%)	118 (22.8%)	101 (19.5%)	36 (7%)	517 (100%)			

Notes: \* $P = < 0.05$ , Cramer's V effect size:  $< 0.3$  small,  $0.3$  to  $0.5$  medium,  $0.5 >$  large (Cohen, 1988) <sup>a</sup>"Others" health-care facilities include dispensaries

Table 4 Level of the perceived threat and perceived efficacy among HCPs

Sr. no.	Statements	Mean	SD
	Perceived threat		
1	I am at risk of falling behind current medical knowledge (perceived susceptibility)	3.85	1.054
2	It is dangerous to fall behind current medical knowledge (perceived severity)	3.99	0.970
	Perceived efficacy		
3	Using PubMed prevents me from falling behind current medical knowledge (perceived response efficacy)	3.22	0.759
4	Using the HEC digital library prevents me from falling behind current medical knowledge (perceived response efficacy)	2.90	0.530
5	I am easily able to use PubMed to avoid falling behind current medical knowledge (Perceived self-efficacy)	2.55	0.987
6	I am easily able to use HEC digital library to avoid falling behind current medical knowledge (Perceived self-efficacy)	2.29	0.813

Notes: Scale: 1 = Strongly disagree; 2 = Disagree; 3 = Slightly agree; 4 = Agree; and 5 = Strongly agree

health-care facilities (Table 5). Therefore, the hypotheses that there is a significant difference in the perceived susceptibility, perceived severity to a threat and perceived self-efficacy among HCPs across different health-care facilities are statistically rejected. However, a hypothesis that there is a significant difference in the perceived response efficacy of HCPs across different health-care facilities is statistically accepted (Table 5).

### 3.4 HCPs' clinical experience and their perceived level of threat and efficacy

Kruskal–Wallis statistics were used to assess any difference of perceived threat and efficacy depending upon the clinical experience of HCPs (which had four independent groups:  $< 5$  years,  $6–10$  years,  $11–15$  years and  $> 15$  years of experience). The  $p$ -value of  $0.05$ , indicating statistically no significant difference between years of HCPs' clinical experience and their perceived level of threat of falling behind current medical knowledge (perceived susceptibility), and it is dangerous to fall behind current medical knowledge (perceived severity). Whereas, the  $p$ -value of the three statements relating to perceived efficacy is lower than the significance level of  $0.05$ ,

indicating a statistically significant difference between the clinical experience of HCPs and their level of perceived efficacy ( $\chi^2 (3) = 10.028$ ,  $p = 0.018 < 0.05$ ) and response efficacy (e.g. using PubMed ( $\chi^2 (3) = 20.124$ ,  $p = 0.000 < 0.05$ ) and HEC digital library ( $\chi^2 (3) = 16.336$ ,  $p = 0.001 < 0.05$ ) prevents me from falling behind current medical knowledge (Table 6).

The mean ranks indicating that HCPs in the groups of clinical experience  $< 5$  years and between  $6$  and  $10$  years perceived the greater response efficacy (MR =  $242.59$  " $< 5$  years," MR =  $239.49$  " $6–10$  years," MR =  $216.20$  " $11–15$  years," MR =  $159.96$  " $> 15$  years). However, HCPs in group  $11–15$  years of clinical experiences perceived the highest self-efficacy. Clinical experience was a statistically significant factor as to HCPs' perceived response efficacy and self-efficacy whilst clinical experience was not a significant factor as to HCPs' perceived threat of falling behind current medical knowledge (Table 6). Therefore, the alternative hypotheses that there is a significant difference in the perceived susceptibility and perceived severity to a threat among HCPs across different categories of clinical experience are statistically rejected. However, hypotheses that there is a significant

**Table 5** Level of perceived threat and efficacy among HCPs of different health-care facilities

Statements	Mean rank					$\chi^2$ value	p-value
	BHUs	RHCs	THQs	DHQs	Others		
Perceived threat							
I am at-risk of falling behind current medical knowledge (perceived susceptibility)	238.04	221.49	241.31	240.48	177.72	7.785	0.100
It is dangerous to fall behind current medical knowledge (perceived severity)	238.33	219.87	248.54	233.14	176.88	9.409	0.052
Perceived efficacy							
Using PubMed prevents me from falling behind current medical knowledge (perceived response efficacy)	218.42	198.41	254.86	262.35	194.93	19.444	0.001*
Using the HEC digital library prevents me from falling behind current medical knowledge (perceived response efficacy)	228.64	227.85	240.31	239.88	204.68	4.244	0.374
I am easily able to use PubMed to avoid falling behind current medical knowledge (Perceived self-efficacy)	222.83	223.28	254.99	230.01	234.20	4.596	0.331
I am easily able to use HEC digital library to avoid falling behind current medical knowledge (Perceived self-efficacy)	224.29	228.97	257.76	219.58	230.38	6.189	0.185

Notes: \*The difference is significant at the 0.05 level. df = 4; Kruskal–Wallis test. Grouping variable: Health-care Facility (Basic Health-care Units (BHUs), Rural Health Centers (RHCs), Tehsil Headquarters (THQs), District Head Quarters (DHQs), Others)

**Table 6** Respondents' clinical experience and their perceived level of threat and efficacy

Statements	Mean ranks				$\chi^2$ value	p-value
	< 5 years	6–10 years	11–15 years	15 > years		
Perceived threat						
I am at the risk of falling behind current medical knowledge (perceived susceptibility)	243.69	231.78	200.40	202.30	7.011	0.072
It is dangerous to fall behind current medical knowledge (perceived severity)	240.55	235.51	219.32	194.96	6.202	0.102
Perceived efficacy						
Using PubMed prevents me from falling behind current medical knowledge (perceived response efficacy)	242.59	239.49	216.20	159.96	20.124	0.000*
Using the HEC digital library prevents me from falling behind current medical knowledge (perceived response efficacy)	242.10	234.81	190.72	193.02	16.336	0.001*
I am easily able to use PubMed to avoid falling behind current medical knowledge (Perceived self-efficacy)	237.72	224.51	283.05	193.16	10.028	0.018*
I am easily able to use HEC digital library to avoid falling behind current medical knowledge (Perceived self-efficacy)	233.26	223.43	277.35	218.16	5.244	0.155

Notes: \*The difference is significant at the 0.05 level. df = 3; Kruskal–Wallis test. Grouping variable: working experience (< 5 years, 6–10 years, 11–15 years, 15 > years)

difference in the perceived response efficacy and self-efficacy of HCPs across different categories of clinical experience are statistically accepted (Table 6).

### 3.5 Enrollment in post-graduation and perceived level of threat and efficacy

Mann–Whitney *U* statistics were used to determine any difference between HCPs' enrollment in post-graduation and their perceived level of threat and efficacy. The enrollment in post-graduation was a statistically significant factor as to HCPs perceived response efficacy ( $U = 20,346$   $p = 0.000 < 0.05$ ;  $U = 23,512$   $p = .045 < 0.05$ ) and self-efficacy ( $U = 22,050$   $p = .008 < 0.05$ ).

Therefore, the alternative hypotheses that there is a significant difference in the perceived susceptibility and

perceived severity to a threat among HCPs and their enrollment in post-graduation programs are statistically rejected. However, hypotheses that there is a significant difference in the perceived response efficacy and self-efficacy of HCPs and their enrollment in post-graduation programs are statistically accepted (Table 7)

### 3.6 Information needed to support clinical practice

Respondents were asked a question to indicate the types of information they need to support their clinical practice. The "latest medical research" indicated by 353 (19.43%) HCPs, followed by "patient management" by 340 (18.4%) and "differential diagnosis" by 326 (17.64%) (Table 8, Figure 4). Information related to "audit or standard of care," "health



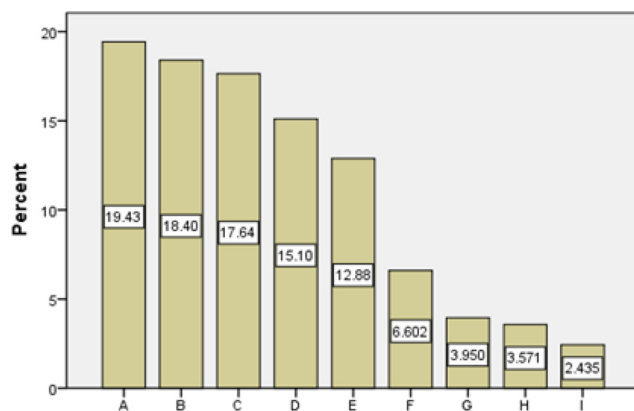
**Table 7** Respondents' enrollment in post-graduation and their perceived level of threat and efficacy

Sr. no.	Statements	Enrollment in post-graduation (Mean ranks)		Mann–Whitney <i>U</i>	<i>p</i> -value
		Yes	No		
1	Perceived threat I am at the risk of falling behind current medical knowledge (perceived susceptibility)	246.68	225.05	23,445.500	0.062
2	It is dangerous to fall behind current medical knowledge (perceived severity)	246.14	225.40	23,543.000	0.068
3	Perceived efficacy Using PubMed prevents me from falling behind current medical knowledge (perceived response efficacy)	260.59	213.65	20,346.000	0.000 <sup>*</sup>
4	Using HEC digital library prevents me from falling behind current medical knowledge (perceived response efficacy)	243.10	224.88	23,512.500	0.045 <sup>*</sup>
5	I am easily able to use PubMed to avoid falling behind current medical knowledge (Perceived self-efficacy)	252.17	219.92	22,050.500	0.008 <sup>*</sup>
6	I am easily able to use HEC digital library to avoid falling behind current medical knowledge (Perceived self-efficacy)	240.18	226.80	23,997.500	0.262

**Notes:** <sup>\*</sup>The difference is significant at the 0.05 level; Mann–Whitney *U* test. Grouping variable: Enrollment in Post-graduation (e.g., FCPS, MCPS, M.S, M. Phil)

**Table 8** Information needed by respondents to support their clinical practice

	Frequency and percentage of respondents								
	A	B	C	D	E	F	G	H	I
BHUs (N = 199)	138 (38.4%)	125 (36.8%)	128 (39.3%)	99 (35.5%)	93 (39.1%)	39 (32%)	21 (28.8%)	26 (39.4%)	11 (24.4%)
RHCs (N = 63)	42 (11.7%)	40 (11.8%)	36 (11%)	33 (11.8%)	27 (11.3%)	17 (13.9%)	13 (17.8%)	12 (18.2%)	7 (15.6%)
THQs (N = 118)	80 (22.3%)	85 (25%)	82 (25.2%)	73 (26.2%)	56 (23.5%)	36 (29.5%)	24 (32.9%)	12 (18.2%)	14 (31.1%)
DHQs (N = 101)	76 (21.2%)	70 (20.6%)	63 (19.3%)	57 (20.4%)	46 (19.3%)	25 (20.5%)	11 (15.1%)	11 (16.7%)	9 (20%)
Others (N = 36)	23 (6.4%)	20 (5.9%)	17 (5.2%)	17 (6.1%)	16 (6.7%)	5 (4.1%)	4 (5.5%)	5 (7.6%)	4 (8.9%)
Total (N = 517)	359 (100%)	340 (100%)	326 (100%)	279 (100%)	238 (100%)	122 (100%)	73 (100%)	66 (100%)	45 (100%)

**Figure 4** Information needed to support clinical practice

status indicators” and “legal/ethical issues” were the least needed information by the respondents (Figure 4).

The other types of information required by the respondents were related to “drug information”; 279 (15.10%), “revision of

treatment plan,” 238 (12.88%) and “evidence for procedure” 122 (6.6%) of HCPs. The respondents were asked to choose one or more options; therefore, results do not add to 100%.

### 3.7 Difference between information needs of HCPs across different health-care facilities

Chi-square statistics were used to determine any differences among HCPs of different health-care facilities (BHUs, RHCs, THQs, DHQs, any other) and their information needs. Statistically no significant difference was found between the HCPs of different health-care facilities and their information needs for patient management  $\chi^2 (4) = 7.914, p = 0.095$ , differential diagnosis  $\chi^2 (4) = 6.025, p = 0.197$ , drug information  $\chi^2 (4) = 7.624, p = 0.106$ , revision of treatment plan  $\chi^2 (4) = 4.156, p = 0.385$ , audit or standard of care  $\chi^2 (4) = 3.609, p = 0.461$ , health status indicators  $\chi^2 (4) = 3.861, p = 0.425$  and legal/ethical issues  $\chi^2 (4) = 4.066, p = 0.397$ .

Using a post hoc chi-square statistics, a difference was found with a small effect size between the HCPs of different health-care facilities and their information needs for latest medical research  $\chi^2 (4) = 12.627, p = 0.013$ , Cramer's  $V = 0.172$  and

evidence for procedure  $\chi^2(4) = 9.796, p = 0.044$ , Cramer's  $V = 0.208$ ). HCPs working at DHQs indicated a greater need for information on the latest medical research as compared to HCPs of other health-care facilities (BHUs, RHCs & THQs). HCPs at DHQs, THQs and RHCs indicated a greater need for information on evidence for procedures as compared to HCPs at BHUs.

### 3.8 Difference between information needs of HCPs across different age groups

Post hoc chi-square statistics were applied to determine whether age (21–30 years, 31–40 years, 41–50 years, 51–60 years) was in any way a determining factor of perceived information need. Age was a statistically significant factor with a small effect size as to HCPs' perceived information need for patient management only ( $\chi^2(3) = 11.037, p = 0.012$ , Cramer's  $V = 0.164$ ). HCPs in the age group between 21 and 30 years perceived the greatest need for patient management. There was no significant difference between the HCPs' age and their perceived information need for differential diagnosis, revision of treatment plan, audit or standard of care, evidence for procedures, legal/ethical issues, latest medical research, health status indicators and drug information.

### 3.9 Difference between information needs of HCPs across different categories of work experience

Using a chi-square statistics, we found no significant difference between the work experiences of HCPs (< 5 years, 6–10 years, 11–15 years, 15 > years) and their perceived information needs

(e.g. patient management, differential diagnosis, latest medical research, etc.) (Table 9).

## 4. Discussion

It is evident from the literature that the future needs of the HCPs will be served in different ways than the previously used approaches. Rather than a facility with four walls, the library of the future will have no physical boundaries (Evans and Baker, 2011).

The majority of the HCPs perceived high susceptibility (e.g. they were at the risk of falling behind current medical knowledge) and severity (e.g. it is dangerous to fall behind current medical knowledge). However, they reported low self-efficacy (e.g. they were not able to use PubMed/HEC digital library to avoid falling behind current medical knowledge). The high threat but low self-efficacy among HCPs shows that majority of the HCPs were in the danger control process and engaged in a behavior that is recommended for adaptive changes. This is a good sign because of two reasons: HCPs realized that the threat is there; and they managed to channelize the fear that is induced by the threat into the adoptive behavioral changes, which is probably the best possible response to a threat.

There may be several reasons for perceiving high threat such as follows:

- HCPs believe that lack of information is a serious problem;
- outreach messages may have outlined the hazards of not being up-to-date on medical information; and

Table 9 Hypotheses validation

Sr. no.	Hypotheses	Testing
1	$H_1$ There is a significant difference in the perceived susceptibility to a threat among HCPs across different health-care facilities	> 0.05 Rejected
2	$H_1$ There is a significant difference in the perceived severity of a threat among HCPs across different health-care facilities	> 0.05 Rejected
3	$H_1$ There is a significant difference in the perceived response efficacy of HCPs across different health-care facilities	< 0.05 Accepted
4	$H_1$ There is a significant difference in the perceived self-efficacy of HCPs across different health-care facilities	> 0.05 Rejected
5	$H_1$ There is a significant difference in the perceived susceptibility to a threat among HCPs across different categories of clinical experience	> 0.05 Rejected
6	$H_1$ There is a significant difference in the perceived severity of a threat among HCPs across different categories of clinical experience	> 0.05 Rejected
7	$H_1$ There is a significant difference in the perceived response efficacy of HCPs across different categories of clinical experience	< 0.05 Accepted
8	$H_1$ There is a significant difference in the perceived self-efficacy of HCPs across different categories of clinical experience	< 0.05 Accepted
9	$H_1$ There is a significant difference in the perceived susceptibility to a threat among HCPs and their enrollment in post-graduation programs	> 0.05 Rejected
10	$H_1$ There is a significant difference in the perceived severity of a threat among HCPs and their enrollment in post-graduation programs	> 0.05 Rejected
11	$H_1$ There is a significant difference in the perceived response efficacy and HCPs enrollment in post-graduation programs	< 0.05 Accepted
12	$H_1$ There is a significant difference in the perceived efficacy and HCPs enrollment in post-graduation programs	< 0.05 Accepted

Note: The significance level is < 0.05

- the majority of the HCPs in our cohort were from rural practice settings, where they had no access to a librarian or information services, which may have influenced their response to a threat.

According to EPPM, fear is induced by the feelings of not knowing, e.g. what information resources are available online, how to access and use them to keep abreast with new information and development in the field. On the other hand, it highlights the need to channelize this fear into adoptive action before it may lead HCPs to involve in maladaptive actions such as no need to have information for patient care decisions. Our study indicates that the overwhelming majority of the HCPs needed information on “latest medical research,” “patient management” “different diagnosis” and “drug information” to support their clinical practice. It shows that the majority of the HCPs in our population carry adaptive action. However, there is a need to provide them with the needed information that will not only channelize their fear into adoptive action but also improve patient care outcomes.

The findings of our study also indicate that the perceived response efficacy and perceived self-efficacy among HCPs was quite low, which may be another reason for the perceived threat of falling behind current medical knowledge. Although the perceived response efficacy among HCPs was marginally higher than to perceived self-efficacy indicating that the majority of the HCPs were slightly aware of the fact that using PubMed (*which is not only one of the largest online medical databases, but also the most accessible and useable database in medicine*) and Higher Education Commission’s (HEC) digital library (*a National Digital Library of Pakistan, which provides free access to thousands of electronic journals and books*) prevents them from falling behind current medical knowledge. However, the low self-efficacy among HCPs is a challenge that prevents HCPs access and use of online databases such as PubMed and HEC digital library. Our findings support the findings of a recent study by Naeem and Bhatti (2020) that reported that the majority of the doctors have very little or no confidence in their ability to conduct an online search using advanced searching techniques, as well as the majority (52%) of doctors in rural settings have never accessed or used any medical database such as PubMed, Pakmedinet, Uptodate, etc.

Our findings show variations among HCPs’ response efficacy to a threat. HCPs from secondary health care (THQs and DHQs) showed a higher response efficacy as compared to HCPs in primary health care (BHUs and RHCs). The clinical experience and the enrollment in post-graduation were statistically significant factors as to HCPs’ perceived response efficacy. HCPs in the groups < 5 years and between 6 and 10 years of clinical experience perceived higher response efficacy as compared to groups with greater clinical experiences. HCPs who were enrolled in the post-graduate programs also showed higher response efficacy and self-efficacy than HCPs who were not enrolled in any postgraduate program. These findings are compatible with the findings of other studies that reported that years of clinical experience were a significant factor in HCPs’ perceived ability in conducting online searches. HCPs with < 5 years of experience demonstrated a greater ability to perform the tasks involved in conducting online searches than to HCPs with longer clinical

experiences (Naeem and Bhatti, 2020; Naeem and Bhatti, 2016b). Similarly, enrollment in post-graduate programs was a significant factor in the perceived barriers relating to inadequate training facilities on the use of online information resources (Naeem *et al.*, 2020).

The findings are also comparable with other studies that indicated that the non-availability of a library or a librarian is the primary reason for low self-efficacy and less use of medical databases among rural HCPs in Pakistan (Naeem and Bhatti, 2015, 2016a). Thus, the literature shows that provision of information literacy instructions is a proven method to improve self-efficacy among HCPs (Dixon *et al.*, 2017; Naeem and Bhatti, 2020; Naeem *et al.*, 2020). Therefore, to increase self-efficacy among HCPs, our study proposes to introduce promotional and educational intervention (e.g. seminars, demonstration workshops, exhibits and brochures, etc.) with the help of HSLs. The induction of promotional interventions will persuade and motivate interest and awareness. The promotional interventions should focus on the message that how easy, convenient and effective it is to use the online health-care information resources. The awareness sessions may be offered to HCPs in terms of seminars, exhibits or brochures, highlighting the effectiveness of internet usage, such as high-quality information resources available on the internet. How to access and use them for keeping abreast with the latest information and incorporating the information into patient care decisions. The educational interventions should include training the HCPs by conducting workshops and hands-on training sessions on information literacy skills and practicing evidence-based medicine.

Our study also proposes that the Health Department, the Government of Punjab along with the University of Health Science (UHS) should facilitate the logistical support to facilitate adequate onsite access to the information resources, digital reference services and onsite help. Naeem and Bhatti (2020) recommended that HSL should be stationed at each District Headquarter Hospital (DHQs) and he/she should be responsible for conducting the promotional and educational activities in their respective districts. The infrastructure of e-libraries in each district of Punjab already exists, which may be used for the educational activities of the HCPs. Personal contact between librarians and the targeted audience has also proved a successful method to influence information behavior (Burnham and Perry, 1996).

#### 4.1 Implications of the study

The study has some important theoretical and practical implications. Theoretical implications of the study include the provision of a theoretical framework using the EPPM that helps in channelizing the fear of falling behind current medical knowledge into adaptive actions, for example; increase in the level of self-efficacy and develop long-lasting information behavioral change among HCPs. Second, this is a large study, the first of its type, that assesses the level of threat of falling behind and of efficacy that prevent HCPs from falling behind current medical knowledge in primary and secondary health-care facilities. Our findings add to our understanding of the reasons behind high level of threat that exists among HCPs.

Practical implications of our study include launching of information promotional, educational and logistical

interventions to increase the efficacy among HCPs, practical implication of the existence of fear and lack of response efficacy at some level among HCPs. This study shows that readiness among HCPs exist and they understand the fact that adopting new information-seeking behaviors may prevent them from falling behind current medical knowledge. It calls on HSLs, and other stakeholders such as the Health Department, to play an effective role in taking advantage of this response from HCPs to involve them in productive activities. It is suggested that HSLs increase information literacy skills among HCPs. Information literacy sessions should be organized at tehsil hospitals, so HCPs in rural areas can be benefit from these sessions by gaining confidence on how to access information effectively and efficiently and incorporate the information into patient care decisions.

#### 4.2 Limitations of the study

The study has some limitations. Because of population dispersion, data collected for this study through a survey method has its limitations. A self-administered questionnaire was used in this study, appraising HCPs' level of threat, efficacy and outcomes using components from the EPPM. The results could be subject to personal biases, as well as respondents' ability to understand the question's statements. Although every effort was made to minimize the bias by maintaining the internal consistency of the questions. The questionnaire was reviewed for content validity by five experts. The results of this study are self-reported and participants were mainly limited to structured questions that were asked in the questionnaire.

The study adopted a quota sampling approach, a type of non-probability sampling technique, which has some limitations. Although it was attempted to make a sample more representative of the targeted population to reduce the sampling bias. It was also tried to obtain the responses from each participating district of Punjab. Although it was quite time-consuming to get the responses from HCPs working in primary and secondary health-care facilities of 36 districts of Punjab province. Punjab is geographically Pakistan's second-largest province with an area of 79,284 square miles (205,345 square km) and the most populous province with an estimated population of 101,391,000 as of 2015 (Pakistan Bureau of Statistics, Government of Pakistan, 2016).

The data collected from HCPs of primary and secondary health-care facilities of the Punjab province; therefore, it cannot be generalized to other provinces of the country (e.g. Sindh, Baluchistan or KPK provinces) owing to different standards, dynamics, availability of resources and infrastructure. The results of this study also cannot be generalized to HCPs of tertiary care hospitals of the Punjab province. To yield comprehensive results at a national level, it is recommended that a nation-wide study may be conducted on the same variables used in this study.

#### 5. Conclusion

HCPs reported high susceptibility and threat of falling behind current medical knowledge, but a low self-confidence in their ability to prevent themselves from falling behind current medical knowledge. Clinical experience and enrollment in post-graduation programs (e.g. FCPS, MCPS) were significant

factors in HCPs' response to prevent themselves from this perceived threat. Like any other clinician HCPs need information on the latest medical research, patient management, differential diagnosis and information relating to drugs to support their clinical practice. This study recommends introducing promotional, educational and logistical interventions that will help in channelizing the threat of falling behind into productive and adoptive information behavior, which will improve patient care outcomes.

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