

Accessing research literature: A mixed-method study of academics in Higher Education Institutions in Nepal

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Original Article

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Abstract

Background:

Research in Higher Education (HE), particularly in health and medical sciences plays a crucial role, not only in enhancing knowledge and skills of students and academics, but also in helping to develop managers and policy makers who rely on evidence-based planning and programming. This paper reports university teacher's knowledge and practices in

accessing to electronic research-based evidences in health and medical sciences in Nepal.

Material and Methods:

This was mixed-methods study comprising a self-administered questionnaire completed by HE teachers and informant key interviews with authorities of HE institutions. A total of 15 out of the total 40 institutions offering HE above Bachelors level on health-related subjects were included for the study.

Results:

The response rate was 68%; 244 out of 360 HE teachers completed self-administered questionnaire. The respondents comprised nurses (36%), followed by doctors (23%), public health practitioners (18%), dentists (17%) and pharmacists (12%). Most of the HE teachers reported that they have computer skills and possess their own computer. Two-thirds (66%) of the HE teachers had work email and almost all (93%) have a personal email ID. All institutions had a computer lab and/or library. Almost all teachers had internet access at work but the internet was reportedly slow. Each institution had a librarian to support to the students and staff but only a third of teachers sought their help. Many do not know what kind of support librarians can provide. Less than half of the staff had accessed electronic research materials. This proportion varied between HE institutions ranging from 13 to 83%. HINARI and PubMed were the mostly used research databases. Less than half of respondents (48%) had published research papers in peer-reviewed journals, and only 19% published a paper based on a systematic review. Female HE teachers were less likely to publish (32%) than males (68%). More readers and professors had published (75%) than instructors/assistant lecturers (30%) and lecturers (45%).

Conclusions:

Accessing electronic research literature provides an opportunity to gathering up-to-date research-based information that should be core to all health curricula. We call upon curriculum developers and university authorities in Nepal to revise health curricula and help build electronic searching skills among staff and students.

Keywords: Electronic research literature; Research Article; Higher Education; Nepal

Introduction

Nepal has made strides of progress in health sciences and medical education over the past decade. Over 18 medical colleges have already been established and a few are on the pipeline. There are more than 70 nursing colleges (both in private and public sectors) and equal number of other health science colleges and courses, e.g. public health, pharmacy, physiotherapy and radiography¹.

The overall health research environment is still relatively poor in Nepal². Nepali researchers have limited publications in peer reviewed journals compared to their non-Nepali counterparts. The number of publications seems lower in the public university compared to the private universities³.

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The use of available evidence-based information is necessary before we can address health problems in Nepal, however Higher Education (HE) institutions lack knowledge as well as resources for utilising research published even in free and low priced journals⁴. Moreover, many of the curricula of HE institutions do not seem strong on research methodology training⁵. Simkhada and colleagues (2013) argued that health profession curricula should include clearer instructions to students on how to access the most-up-to-date research literature and how to appraise research articles⁵.

Access to research information is an essential element in strengthening health sciences and medical practices, and empowering local experts to find solutions to health problems and to encourage the evidence based practice. Evidence-based practice is important to deliver the quality of care. However lack of research literature tends to be a serious obstacle for health professionals and researchers in the developing world. According to a World Health Organization survey, of the 75 countries with an annual income per capita of less than US \$1000, 56% of medical institutions have had no subscriptions to journals over the last five years⁶. Despite the enormous disease burden in Nepal, research is often viewed as expenditure rather than an investment. Moreover, case studies from Nepal, Bangladesh, and Pakistan report that most government funding for research goes towards training, salaries, and infrastructure, resulting in research projects being largely funded (and influenced) by external donors⁷. Due to high subscription fees and complicated licensed agreements, many medical schools and HE institutions in Nepal are unable to subscribe the health-science related journals. Therefore, many researchers, HE teachers and students often have little access to the published research literature². The advent of electronic publishing over the Internet generally improved global distribution of research information. Scientists, researchers, academics, policy-makers and medical practitioners in developing country institutions now can have access to advanced and up-to-date peer-reviewed research literature. Thousands of international scientific journals can be accessed online. Moreover, specialist databases, indexes, and reference books also available in several languages. Full-text articles can be downloaded for saving, printing or reading on screen. Many articles are available online before they are published in print. Accessing the available research information is very essential for institutions to bridge the research information gap. Therefore, there is need to improve the access to research information for Nepalese academics and researchers. This study aimed to assess HE teachers' knowledge, skills and competence on accessing electronic research literature on health sciences in Nepal.

Materials and Methods

Study design and the participants:

A descriptive research design with a mixed-methods approach was used for the study during the period first half of 2009 to first half of 2010. The research comprised a questionnaire survey of HE staff and interviews with key

informants in the HE sector. In view of higher concentration of the medical institutions around the capital Kathmandu, this study covered all the medical, nursing and public health institutions providing higher education above Bachelor's level within the Kathmandu Valley. Furthermore, it included the three major institutions located in different parts outside Kathmandu: BPKIHS (BP Koirala Institute of Health Sciences), the only institution outside Kathmandu Valley with a Masters in Public Health at the time of study; Manipal College in Pokhara; and Kathmandu University School of Medical Science (KUMS) in Dhilukhel. Out of the total 1088 HE teachers on the HE institutions' records, 360 were physically available during the study visits and were willing to participate in the self-administered questionnaire. Of the 360 HE teachers who were given the questionnaire, 244 (68%) returned a completed questionnaire.

Questionnaire design

An extensive review of the literature, combined with exploratory research⁵ and qualitative piloting⁸ contributed to the development and refinement of a structured questionnaire in English.

Sample size calculation

The sample size calculation suggested that for a 95% confidence interval and significance level $\alpha = 5\%$, $P = 0.5$, $Q = 0.5$, allowable error = 14%, whereby $P =$ Proportion of HE teachers had access to electronic research databases among the 50 respondents of the pilot study sample from Nepal, the required sample size was 205⁹.

Qualitative Research design

Interviews were conducted face-to-face with principals or campus chiefs, head of the departments and subject committee members. In total twelve key informant interviews were conducted. The qualitative interviews were analyzed thematically by reading transcriptions repeatedly to generate key themes¹⁰.

Outcome variable

The main outcome variable was the HE teachers access to electronic research databases.

Explanatory variables

Factors which are taken into account at individual level were: gender, institution, designation and discipline.

Data management and statistical analysis

The data collected were analyzed using Excel 2003, Statistical Package for the Social Sciences (SPSS) for Windows Version 16.0 (SPSS Inc; Chicago, IL, USA) and EPI Info 3.5.1 Windows Version. The chi square test was used to observe the relationship between the variables, and $p < 0.05$ was considered as statistically significant.

Ethical committee approval:

The study received ethical approval from the Nepal Health Research Council (NHRC) and individual consent was taken by all participants.

Results:

Out of the total 244 higher education (HE) teachers, fewer men completed the questionnaire ($n=108$ or 44.3%) than women ($n=136$ or 55.7%). By discipline or educational programme, the majority was from nursing (36.1%) followed by public health (17.6%) and pharmacy (11.9%).

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The majority of staff was lecturer (47.5%) and nearly three-quarters (72%) had completed Masters degree, the single largest proportion of the sample was aged 30 to 39 years (43.4%), whilst 28.8% was younger (20-29 years). Overall, 42% of HE teachers had been educated abroad. The proportion seems higher at BPKIHS (66%) followed by 55% at TU (Tribhuvan University) and 52% at PoU (Pokhara University). The proportion of females educated abroad (42%) was lower than that of males (55%).

Two-thirds of staff had a work email account, the lower raking staff less (60.6%) than readers/professors (77.2%), but there was no statistically significant difference between HEIs. There was a significant gender difference, with 75.9% of men having work email and only 58.8% of female staff ($\chi^2=7.891$; $p=0.006$). The availability of computers for academic use seemed good at all level of HE teachers, at different universities and for both sexes. Availability was little higher at BPKIHS and PoU, but this was not statistically significant ($p=0.067$). Internet was available in all HEIs. When it comes to the question of access of personal computer and internet access, it was reported only in BPKIHS where every faculty member had a personal laptop and 7/24 access to internet, including the online journals. The qualitative findings reiterated this, for example:

"Here every faculty has a personal computer and space with regular internet facility, 24 hours a day, seven days a week. They can access online journals anytime they like".

-Key informant, BPKIHS

Most students (89%) had access to internet. Almost all students from BPKIHS and 96% from KU (Kathmandu University) had access to the internet, but a lower proportion at Pokhara University. One key informant reported that students often visit other organisations to access the literature:

".. (students) are far better than us (teachers) using internet and are very curious to learn. They also visit different organisations (NHRC, Family Health Division Teku, Primary Health Care Center, Bagbazar) to get other grey literatures. We usually ask them to visit these organisations because they have systematic management of reading materials and updated literature in their library.

-Interviewee 1

However, some staff thought students did not want to make the effort to learn about accessing electronic journals:

"Students ... always seek for easy way that makes them lazy." -Interviewee 2

Staff from all colleges reported in interviews that they had had IT facilities, but they recognised the following problems: (a) not all computers were equally good; (b) not having enough computers for all students; or (c) no generator when there was load-shedding. The following quote illustrates several issues:

"You can see the computer with internet at our tables. However, it is too slow and boring to wait for downloading, no free access of websites. I have heard that the staff in lab is highly qualified in computer". -Interviewee 5

Access to Electronic Research Database

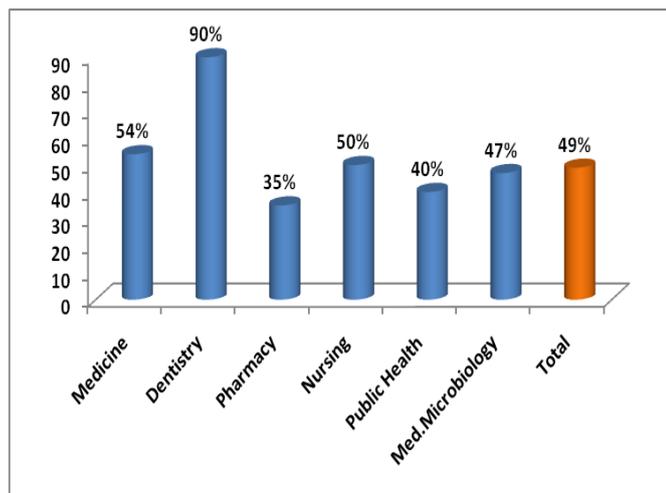
Table 1 shows that less than half of HE teachers (49%) had access to electronic research databases. A small proportion (14%) even didn't know whether it was available at their HEI. The self-reported access was highest in BPKIHS and lowest at TU and PU (Purbanchal University).

Table 1: Access to electronic research database at the HEIs

Response	TU	PU	KU	PoU	BPKIHS	Total	χ^2 value
Yes	33(58.9)	25 (33.3)	39 (58.2)	3 (13.0)	19 (82.6)	119 (48.8)	$\chi^2=45.002$, P=0.001
No	15 (26.8)	44 (58.7)	17 (25.4)	13 (56.5)	3 (13.0)	92 (37.7)	
Do not know	8 (14.3)	6 (8.0)	11(16.4)	7 (30.4)	1 (4.3)	33 (13.5)	
Total	56	75	67	23	23	244 (100.0)	

The data disaggregated by academic programme shows access to research database was highest in dentistry (Fig. 1).

Figure 1: Teacher access to electronic database by discipline



Fewer than half of HE teachers from other programmes had access to it (P=0.001).

The key informants however expressed that younger staff were more familiar with IT in general, e.g.:

"I'm sure teachers are not up to date on this matter ... the teachers who are young are somehow okay, they have at least email ID." -Key Informant, KU

Of the total 119 HE teachers who reported their HEIs had subscribed electronic research database, more than one third (43%) had access to HINARI followed by a combination of PubMed and HINARI (16%) and PubMed (3.4%). In interviews HE teachers, particularly from BPKIHS mentioned Blackwell Synergy, HINARI, PubMed and Cochrane (6 out of 7 respondents). Key informants had mixed responses regarding subscription of online databases.

in HEIs. The responses seem similar in all universities. By discipline more than half of the HE teachers teaching pharmacy (52%) and public health (51%) reported that they

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"No online journal or data base are subscribed. We actually don't know that, basically we search information in Google." -Interviewee 5

Teaching Research and Accessing Literature

Overall, only 49% HE teachers had taught research-related subjects. The proportion was consistent across all universities, except BPKIHS (100% say they teach research) whilst HE teachers from public health (74%) and medical microbiology (65%) were more likely to have taught research methods.

The majority (84%) of the HE teachers had taught research for less than five years. Of the total HE teachers who taught research, 82% had taught how to access research literature. While the proportion of teachers who taught accessing research literature of all HE teachers (N=244) only 40 % taught accessing electronic research databases.

Table 2: Methods used while teaching accessing research literature*

1. By university	Manual search	Online other than electronic database search	Online electronic database search
TU (N=19)	13 (68.4)	13 (68.4)	9 (47.4)
PU (N=24)	20 (83.3)	10 (41.7)	5 (20.8)
KU (N=27)	13 (48.1)	14 (51.9)	12 (44.4)
PoU (N=7)	2 (28.6)	5 (71.4)	3 (42.9)
BPKIHS (N=21)	12 (57.1)	20 (95.2)	12 (57.1)
Total row %	60 (61.2)	62 (63.3)	41 (41.8)
2. By discipline			
Medicine (N=26)	10 (38.5)	15 (57.7)	12 (46.2)
Pharmacy (N=6)	4 (66.7)	4 (66.7)	3 (50.0)
Nursing (N=31)	24 (77.4)	19 (61.3)	12 (38.7)
Public Health (N=23)	15 (65.2)	15 (65.2)	9 (39.1)
Med. Microbiology (N=10)	5 (50.0)	7 (70.0)	4 (40.0)
Dentistry (N=2)	2 (100.0)	2 (100.0)	1 (50.0)
Total row % (N=98)	60 (61.2)	62 (63.3)	41(41.8)

* Multiple answers are possible for each respondent, hence total >100%.

Table 2 shows the distribution of various method of accessing research currently being taught. HE teachers indicated that they used online materials other than electronic database (e.g. Google) (63%) followed by manual search (61%). In total, only 42% of the HE teachers used searching of online electronic research databases. Table 2 also shows a difference between academic disciplines.

Interestingly, only 44 % HE teachers were themselves trained on accessing electronic database during their study were taught accessing research literature while they were student but medical biology and nursing reported it the least (35% and 39% respectively).

The reasons behind why they were not taught accessing online research materials included, 'It was not incorporated into the curricula'(88 %),'Due to lack of computer'(10%) , 'internet facility'(5%) , and 'Due to lack of trained teacher' (9%). Key informant interviews from across universities revealed that their academic curricula have certain topics on general research methodology, sampling , field survey and literature review but specific topics on accessing electronic research literature and systematic reviews were lacking.

"Our curricula cover importance of research in medical/public health, research design, methodology, literature review, data analysis and use of research findings. The faculty members/students (of MPH) have to devote about 25 % of their time in delivering/engaging in research activities. MPH students are fully engaged a six month long research for their thesis However, we have very brief teaching on accessing online research and systematic reviews." -Key Informant, BPKIHS

Research Publications by the HE Teachers

Table 3: HE teachers who have published research papers in peer reviewed journals

1. By University	No.	Percentage	χ^2 value
TU	32	57.1	P=0.023
PU	25	33.3	
KU	36	53.7	
PoU	6	26.1	
BPKIHS	17	73.9	
Total	116	47.5	
2. By Discipline			
Medicine	35	61.4	P=0.001
Pharmacy	9	31.0	
Nursing	25	28.4	
Public Health	26	60.5	
Medical Microbiology	13	76.5	
Dentistry	8	80.0	
Total	116	47.5	
3. By gender			
Male	73	67.6	P=<0.001
Female	43	31.6	
Total	116	47.5	
4. By designation			
Instructor/Asst. Lecturer	21	29.6	P=0.001
Lecturer	52	44.8	
Reader/Professor	43	75.4	
Total	116	47.5	

Less than half of the HE teachers (48%) have published research papers in peer-reviewed journals (Table 3). The

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proportion of HE teachers from BPKIHS seems higher (74%) and least in PoU (26%). The trend is similar in TU (57%) and KU (54%). Table 3 also shows that by discipline the difference in publishing research papers between dentistry teachers and medical microbiology teachers, on the one hand, and pharmacy and nursing teachers, on the other, is statistically significant (p=0.001). At the same time the gender difference is also significant as less than a third of the females (32%) have published research papers against 68% of their male counterparts, while by designation, readers and professors are most likely to have produced research publications (75%).

Table 4: HE teachers who have published journal articles based on systematic review

1. By University	No.	Percent	χ^2 value
TU	10	17.9	P=0.001
PU	4	5.3	
KU	15	30.0	
PoU	1	4.3	
BPKIHS	11	61.3	
Total row %	41	18.5	
2. By gender			
Male	31	31.0	P=<0.001
Female	10	8.2	
Total	41	18.5	
3. By designation			
Instructor/Asst. Lecturer	9	14.5	P=<0.001
Lecturer	12	11.5	
Reader/Professor	20	38.5	
Total	41	18.5	

Table 4 shows that only 18.5% of HE teachers (18.5%) have published a paper based on a systematic review. The proportion was highest amongst HE teachers from BPKIHS. As expected, more men than women had published a systematic review paper (P<0.001). By designation, a little more than one-third of the Readers/Professors reported that they have published a systematic review paper.

One-third of the total HE teachers (35%) have participated in international workshop and seminars. The proportion is highest from BPKIHS (74%) followed by KU (43%) and TU (39%). The proportion seems lower in PU (14%) and PoU (26%) (P=<0.001). By sex, female participation in international research seminars tends to be very low (21%) compared to the males (52%) (P=<0.001). Key informants, particularly the principals from nursing colleges from all HEIs alike, reiterated that female teachers from nursing backgrounds were not getting fair opportunity for any research training conducted by either the university or by the outside organisations.

"We have 50 to 60 nursing teachers working in our college. Hardly one or two teachers may get opportunity to participate in a research-related training in one year. Others have to wait until they retire" -Key Informant, Institute of Medicine, TU

Another key informant from BPKIHS also suggested:

"The faculty of nursing should be included in any training/workshops related to research, curriculum review and other activities organized by the institute and/or other external organizations as this has been overlooked since long time" -Key Informant, BPKIHS

More than two-third of the Readers/Professors (68%) reported they had participated in international training and conferences, far more than the percentage reported by assistant lecturers/instructors and lecturers (28%) ($P < 0.001$).

Training Needs

Most of the interviewees said teachers were not competent in teaching research literature access and needed more exposure and appropriate training. Few said there was a need to subscribe to electronic databases.

"To be frank, there is not really a competent teacher on teaching electronic research except the teachers who are young, energetic and active in research. For student, our software supporter help them, things have been running like this. The main reasons are that necessity of database has not realized yet." -Key Informant, TU

All the participants recognized the need for training e.g.:

"No any trainings and classes for teachers regarding computer is given, if you want to learn it you should go to institutions paying yourself or you can learn from your friends as well." -Key Informant PoU

More worryingly, some did not use electronic databases at all:

"We generally use library and books. Not really use online data base." -Key informant ,PU

"No special training has yet been conducted ... (we) provided HINARI user name and password to students. That's all. The teachers share ideas with each other."

-Key informant, Institute of Medicine, TU

Some highlighted that often only those staff trained abroad had the appropriate internet-based skills to teach:

"We are not able to conduct any training. ... Only very few teachers... Ph.D. from abroad are used to this matter. But those who have studied in Nepal feel lagging behind in surfing online literature." -Key informant PoU

Most of the HEIs suggested training young faculty so that they could deliver best teaching on accessing research literature. One example is given below.

"There is a need to upgrade the knowledge and ability of young faculty members in teaching/delivering research methodology as a whole, and in particular on accessing research literature. It will be helpful to further enhance the research capacity of the institute". -Key Informant BPKIHS

Others had specific solutions in mind for both staff and students, for example:

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"I think we need to develop a modular training for teachers and students on how to access research literature." - Key Informant, BPKIHS

Perceived Need for Revision of Curricula

The general agreement was that a revision of the curriculum was due. The system of curriculum revision, however, differed between universities. Few were in favour of revising at least every four year.

"We are flexible concerning this matter and the focus should be given to BPH." -Key Informant PoU

It also became clear that the process of changing the curriculum often was very bureaucratic, e.g.:

"It depends on department but basically the department discuss first, then the case goes to Subject Committee, after that, Faculty handles and makes a decision. In my opinion, the curriculum should be flexible in order to incorporate new topics since these are lacking and needs to be updated."

- Key Informant, KU

One key informant expressed lack of timely revision of the HE curricula thus:

"Seventh batch of BHP students have passed out but no curriculum has been revised yet. We are positive to incorporate these issues in our course; it must be addressed in the course. We have been teaching the same course for seven years". -Key Informant, Institute of Medicine, TU

A room to revising HE curricula clearly appeared in one statement:

"Definitely, we can incorporate such new issues in our curricula. Recently we have submitted a proposal to revise master's course in Nursing. Though we have been running 10 classes about online literature review by librarian but still if the student feels lack we can address this issue in our course." -Key informant, IOM, TU

Key informants from BPKIHS opined to review the curricula as well as teaching methods in order to incorporate and deliver research components effectively.

"There is a growing need of periodic review of curricula/teaching methodology with external support from WHO, senior faculty members from TU and others. "

-Key informant, BPKIHS.

Discussion

DELPHI Project

In collaboration the Universities of Sheffield and Bournemouth and Tribhuvan University and a number of medical colleges in Nepal, with financial support from the British Council/DFID, we successfully completed a DelPHE (Development Partnerships in Higher Education) project. The project aimed to build the capacity of higher education institutions to access and utilise research-based information in the medical, nursing and public health fields. The use of available evidence-based information in higher education is a must for addressing health-related problems in the country. Currently, there is a lack of knowledge, as well as resources for utilising research findings that are in open access and/or low cost journals. The project was a milestone in achieving the health-related MDGs (Millennium Development Goals) in Nepal through the

development of health and medical research capacity and creation of enabling environment¹¹.

Utilisation of research-based information among the HE Teachers

The global information and communication revolution is not only challenging teaching and learning, but also the way that academe conventionally reaches its audience and gains academic reputation. Both public and private funders of research pressure higher education institutions to make research findings more readily and quickly available, for example, through free-access on the Internet¹². There is substantial increase in on-line academic journals and a movement in some countries to place the onus and cost of an individual's publication with her/his academic home institution. Also, the number of academics who publish their own work on the Internet is growing¹³⁻¹⁴. Since universities are traditionally engaged in both education and research (and, more recently, the validation of research), they are in a good position to help make research-based knowledge benefit society at large. Collaboration between active researchers and students is one of the best channels for new scholarly knowledge to be spread, contested and advanced in the professional community. Furthermore, learning from the most up-to-date scholarly knowledge and experience is a key ingredient in good teaching. Paradoxically, researchers are expected to introduce the most complex research findings to students who have much less disciplinary knowledge, but in many settings teachers are not offered adequate support to develop such pedagogic competence¹⁴⁻¹⁵.

Although there are programmes intended to enhance faculty development in health-care professions, few of these have been adequately evaluated concerning their impact on science and clinical science faculty members including clinician-teachers¹⁶. The lack of published information regarding faculty development strongly suggests a lack of evidence-based programmes. Substantial steps are now required toward the development of faculty development programmes. Furthermore, evaluations must encompass all faculty subgroups, including tenure and non-tenured track, women, and underrepresented minorities¹⁷⁻¹⁹.

In our study just over one in four HE teaching staff (41.7%) had published in an academic peer reviewed journal, and men were considerably more likely to have published (60.9%) than women (30.6%), and higher ranking staff such as Readers and Professors were considerably more likely to publish (71.4%) than Instructors and Assistant Lecturers (28.1%). Just 13.8% had published in international peer reviewed journals and only marginally more had published in national peer-reviewed journals, although more had participated in international research conferences or workshops (28.0%). There was a clear gender difference in the latter, with 42.2% of men taking part in international conferences or workshops but only 19.8% of women. It supports the studies done in other part of the world¹⁹⁻²².

Across the five universities, some 85% claimed to have basic computer skills. Almost all HE teachers at BPKIHS (96%) claimed this. However, key informant interviews reported

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that significant minority of teachers from across all universities lack computer skills. Only 14% HE teachers self-reported they had 'advance' computer skills. KU teachers were most likely to have advanced computer skills (21%) followed by PU (16%). In the other three universities, this proportion was less than one in ten. More than nine in ten (93%) had a computer at home. Female staff were considerably less likely to have work email than men (59% versus 76%) were, and all men and 87.5% women had a personal email account. Key informant interviews revealed that young faculties are more likely to have access to computer and personal email address.

The key informants considered that majority of teachers were not confident enough on accessing online research literature, as they were not taught this at the postgraduate level. Nor they had opportunity to take part in any short-term training on accessing research literature during their professional career. The study participants suggested focusing on full time, female, young, and motivated HE teachers for any future training on accessing research literature. Almost all HE teachers (94%) were keen to participate in a learning workshop on accessing research literature. The majority was willing to come for four or more days training.

A number of factors that could enable or hinder accessing of research literature by the HE teachers and students were explored. Availability of physical facilities was considered one main prerequisite for this. The study revealed that computers and internet were available at nearly all HE institutions (98.8%), and all had a library. Nine out of ten (89.3%) teachers had computer access for academic purpose. The proportion of male staff (92.6%) was a little higher than for females (86.8%) and instructors and assistant lecturers had lower access (83%) to computers for academic use, a finding which was slightly low compared to the study by Bediang *et al.* in Cameroon²².

Nearly one fifth of the HE teachers (19.3%) were even unaware whether they could get support from a librarian at their HEI. Others (11.9%) reported that a librarian was not physically present to providing support needed by them. Two out of 12 principals were even not aware about the kind of support that their librarians could provide to the students and teachers. Cooper and Crum explored the new activities and changing roles of health sciences librarians in their systematic review²³.

Whether or not electronic research databases were available and used by the HE teachers was the another key question of the study. On the whole, 119 out of 244 (48.8%) HE teachers reported that they had access to electronic research databases at their HEIs. The study suggests that having access to electronic databases varied widely between institutions and disciplines. HINARI, an online research database made freely accessible by WHO, was the most used electronic databases mentioned (43%), it was followed by PubMed (16%). There was confusion amongst the HE teachers that statistical packages such as SPSS and Epi-Info belong to the research databases. Key informant interviews informed that students and faculties mostly use HINARI and PubMed. Many of them used Google

for relevant materials but suspected on their authenticity. Our study finding was contradictory to the study by Maggio *et al.* which proved PubMed as the most commonly used database²⁴. Almost all key informants and HE teachers, except from BPKIHS, reported their institutions had not subscribed to online journal that involved a subscription fee, i.e. had a cost.

As external funding support is very important to strengthen research capacity of HEIs, particularly in a resource poor setting, we had asked the HE teachers whether their institutions had received any funding support from the external development partners. In total only 22.9 % respondents reported that their institutions had received funding to strengthen research capacity of teachers and students. Moreover, the key informants reiterated that there was a lack of institutional linkage among the key stakeholders involved in health research in Nepal such as NHRC, universities and medical colleges, external development partners and WHO, among others.

Our findings suggest that research in general and accessing of research literature in particular was included with different approaches and the scope of contents was also variable. Less than half of the teachers (48.8%) were involved in teaching a course on health or medical research. Out of those 199 teachers, 98(82.4%) self-reported they teach accessing research literature. When this number was matched with the total number of teachers (N=244), only 40% teachers appeared to be involved in teaching accessing research literature to the students.

Most HE teachers (84%) have taught research courses for less than five years. Those who teach research methods were more likely to include manual search (61.2%) and online search other than electronic database (63.3%). But only 41.8% HE teachers teach access to the online research literature, ranging from 20.8 % to 57.1% across institutions. By discipline, it varies from 38.7% in nursing to 50% each in pharmacy and dentistry. Those who taught research methods were more likely to give their students assignments based on accessing the research literature (63%) against the total teachers (30.7%). Less than half of the HE teachers were taught about accessing electronic research databases (43.9%), 'it was not in the curriculum' was the main reason for not teaching it (88.3%). Key informants informed that many students copy thesis from their seniors and no software is being used to measure plagiarism. Furthermore, the issue of plagiarism is not included in the HE courses and teachers not been sensitised. This is one area the DeLPHE project should focus while at designing a teacher training manual in the future. The study recommends to Improve facilities such as computers, broadband internet access, back-up power supply, furniture and space for computer labs for teaching faculty, librarians and students; subscribe to online journals; Secure more funding for research in HEIs, Establish institutional links with national research institutions such as NHRC, and universities, and international research organizations/universities; and provide research methods training to staff (librarians and HE teachers). Moreover, females, young and motivated faculties, specifically working

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on full time should be selected for any training on accessing research literature.

Future Scope of the Study

It is promising for DeLPHE partners to discuss and decide on the modality of the training; whether to provide a Master Training of Trainers (MTOT) to selected teachers or basic training to as many teachers as possible. Possibility of developing and implementing modular training to faculty/students on accessing research literature could also be considered.

Perhaps start by organising training on systematic reviews. To create research-friendly environment and develop a research culture, there should be provision of research fellowships and small grants to encourage and motivate young faculty members who are early career research professionals in the faculty.

Conclusion

The study indicates that there is a growing need for the periodic review of health and medical sciences curricula and teaching methodologies. The findings of this study should be used to advocate and sensitise curriculum development centres and university authorities for the review and revision of the curricula and include accessing of research literature with considerable importance. Finally, the authors would like to note that intra-university variations in findings in terms of curricula, research infrastructure, teaching methods and publications should not be taken as an evaluation findings, hence they are presented here as a snap-shot during the point of time study was undertaken.

Author contributions

EvT, PS, BD designed the study, BD and RSP collected data, PS and EvT drafted the manuscript. BS critically revised the manuscript and helped in data analysis and interpretation. All authors commented on various drafts of the manuscript. All the authors approved the final document.

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Conflict of interest:

There is no conflict of interest among authors arising from the study.



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