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Use of evidence in health professions education: Attitudes, practices, barriers and supports

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ABSTRACT

Introduction: Health professions educators are increasingly called upon to apply an evidence-informed approach to teaching and assessment practices. There is scant empirical research exploring educators' attitudes, practices, and perceived barriers and supports to using research evidence in educational practice.

Methods: We conducted a survey of AMEE members to explore three domains related to evidence-informed health professions education: (1) attitudes; (2) practices; and (3) supports and barriers. Analyses involved descriptive statistics to characterize participants' responses per domain. Chi-Square statistics were carried out to examine differences among the demographic variables on a subset of items in each of the three survey sections.

Results: Three hundred ninety-six (~10%) participants representing health professions educators (HPEs) and non HPEs (e.g. PhDs) and different roles (e.g. teacher, administrator) completed the survey. Attitudes toward evidence-informed HPE were generally favorable. Several barriers preclude participants from engaging in evidence-informed approaches to health professions education (HPE).

Discussion: This study provides preliminary evidence on the attitudes toward and perceived barriers and supports of research use in HPE from different groups of HP educators, clinicians, and administrators. The findings for each of the three domains require additional exploration using qualitative methodologies.

Conclusion: Targeted interventions designed to increase the uptake of research in HPE should consider different stakeholder groups' perceptions regarding these approaches, current vs. best practices, and factors that may impede evidence-informed approaches.

Introduction

In the last two decades, there has been a resounding call for health professions (HP) educators (e.g. clinical teachers, curriculum planners) and policy-makers (deans, program directors) to apply an evidence-informed approach to teaching and assessment practices and policies. Such an approach could help ensure accountability to learners and society in providing meaningful and effective education (van der Vleuten et al. 2000; Durning et al. 2012). The drive toward evidence-informed health professions education (EIHPE) is also reflected in the growth of initiatives such as the Best Evidence in Medical Education (BEME) Collaboration, which makes available the latest findings from education research to HP educators via systematic reviews and other knowledge syntheses (Harden et al. 2000).

The drive for EIHPE has led to the creation of several international initiatives aiming to explore how BEME reviews are used by educators to make evidence-informed teaching and assessment decisions (BEME website; Maggio et al. 2018). For example, members of the BEME

Practice points

- Educators and researchers in the health professions have favorable attitudes toward evidence-informed approaches to HPE.
- Barriers to evidence-informed approaches to HPE do exist.
- There are differences in attitudes and actual use of evidence among different stakeholders involved in HPE.
- Positive attitudes and actual practices can be leveraged to promote the EIHPE enterprise.
- EIHPE needs to be studied in the context of specific educational practices and policies.

Collaboration suggest that many commissioned systematic reviews often do not reach educators. A recent meta-synthesis of the quality, accessibility, and relevance of 42 BEME guides (Maggio et al. 2018) found substantial room for enhancing accessibility and relevance of findings.

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Despite these initiatives, and the growing push for HP educators to embrace and adopt best practices, there is scant empirical research on whether current HPE practices reflect the existing evidence base in the field.

In healthcare, evidence-informed approaches have long aimed for the “conscientious, explicit, and judicious use of current best evidence” in making decisions in practice (Sackett et al. 2000). Recognition of a research-practice “gap” has led to a burgeoning interest in knowledge translation (KT), a growing field that aims to identify the nature and magnitude of research-practice gaps; examine the individual and organizational factors that inhibit practitioners from using research to inform practice; and assess the impact of theory-driven strategies to support clinicians’ use of research findings (Graham 2012; Canadian Institutes of Health Research 2016).

As KT in HPE represents a relatively new area of scholarship, we anticipate that KT will involve efforts by researchers, educators, learners, faculty developers, and other stakeholders (e.g. decision-makers, program directors) to support the creation, dissemination, and utilization of educational research (Thomas and Steinert 2014; Thomas and Bussieres 2016a, 2016b). However, if concerted efforts are to be dedicated toward designing, implementing, and assessing the impact of KT interventions to promote evidence-informed HPE, it is vital that our community investigates if, and how, HPE stakeholders utilize this approach for educational decision-making.

There is limited empirical research exploring HP educators’ attitudes toward HPE evidence, whether HP educators are aware of, and can access, educational research, and whether educators use research findings to inform their teaching and assessment practices. Onyura et al. (2015) studied features of medical educators’ environments that facilitated or impeded the use of research findings and found a number of inhibiting (e.g. poor quality of available evidence, time constraints) and facilitating (e.g. faculty development) factors. This small-scale qualitative study underscored the importance of identifying supports and barriers to research use as well as the need to test emerging hypotheses using larger samples of HP educators and alternative methodologies such as large-scale surveys.

The present study seeks to identify current practices regarding research utilization and the determinants (attitudes, barriers and supports) of research utilization within HPE. Specifically, we sought to answer:

1. What are HP educators’ attitudes toward using educational research evidence to inform their teaching and assessment practices?
2. To what extent do HP educators use educational research evidence in their practice?
3. What are the individual and organizational supports and barriers of evidence-informed education from the perspective of HP educators?

Methodology

Study design

The study consisted of a cross-sectional survey of members of the Association for Medical Education in Europe (AMEE) working across the continuum of HPE. The study was

granted ethics approval from McGill University’s Institutional Review Board.

Participants

Eligible participants included AMEE members and/or attendees of the 2015 AMEE conference in Glasgow, Scotland who were HP educators. We defined ‘HP educators’ as individuals who teach in academic and clinical settings, as well as those involved in educational planning, administration and/or research. AMEE members represent a wide range of countries, health professions (e.g. medicine, nursing, and rehabilitation), and academic disciplines (e.g. education, psychology, and psychometrics), with different credentials (clinical degrees and/or graduate degrees) and roles. All AMEE members ($\sim n = 1200$) and/or attendees of the 2015 AMEE conference in Glasgow ($\sim n = 3200$ —including AMEE members) were recruited and eligible to participate in the study for a total number of participants ranging from 1200 to 3200 as the conservative estimated population from which our sample was drawn.

Study procedure and data collection

An AMEE representative forwarded a recruitment email and a link to the online survey to all eligible participants. They sent one reminder email 2 weeks after the initial invitation.

Survey instrument

A review of the literature revealed no existing questionnaires measuring our constructs of interest. Through a three-phase process, we developed a questionnaire to measure HP educators’ *attitudes toward* evidence-informed HPE, *examine current practices* associated with an evidence-informed approach to HPE, and *identify the supports and barriers* to using evidence to inform educational practices. We defined “evidence” as results obtained from scientific educational research.

Phase 1: review of the literature

We reviewed the literature on (1) EIHP to identify constructs at the forefront of discourses surrounding best practices in HPE (Onyura et al. 2015; Thomas and Law 2014) and (2) the rich body of literature on EBP and KT in the clinical realm in order to identify the major factors known to influence clinicians’ use of evidence in clinical practice.

Phase 2: item development

Using the principles outlined in Dillman’s Tailored Design Method (Dillman et al. 2009) and our review of the literature, we developed the first version of items exploring attitudes, practices, and supports and barriers. An interprofessional, international group of HPE clinician-educators and researchers (including a psychometrician) with content, methodological and measurement expertise ($n = 8$) were invited to review the questionnaire for content validity. Feedback centered on the number of items and time required to complete the questionnaire, item clarity, cultural specificity, and the risk of social desirability. We revised the survey based on this feedback.

Phase 3: pilot testing of survey items

The revised questionnaire was pilot tested with a subset of educators ($n = 10$), representative of our target population but not included in our sampling frame. Based on the feedback, additional revisions were made to improve clarity and shorten the survey. The final survey consisted of 49 items divided across four sections (Supplementary Appendix A). Items in Sections 1–3 used a 5-point Likert scale. Section 4 captured participants' demographic details. The survey was distributed via the online platform "Fluid Surveys."

Data analysis

Data were analyzed using SAS® software 9.4. Descriptive statistics (frequencies and percentages) were carried out to describe both the demographic characteristics as well as the responses for each survey item corresponding to attitudes, practices, and reported barriers and supports for the whole sample. The five response anchors for Sections 1 and 2 were collapsed into three categories. For Section 1 (attitudes), Disagree (D) and Strongly disagree (SD) were combined to form "Disagree," and Agreed (A) was combined with Strongly Agreed (SA) to form "Agree." For Section 2 (practices), Often (O) and Very Often (VO) formed 'often' and Frequent (F) and Very frequent (VF) were combined to form "frequent."

The demographic and work-related variables were regrouped using an iterative process of collapsing categories and creating new ones, as outlined in Table 1. For instance, the first question "What are your professional qualifications" initially included nine response categories (Dentist, Nurse, Occupational Therapist (OT), Pharmacist, Physician, Physiotherapist (PT), Speech Language Pathologist (SLP), I am not a clinician, Other (please specify)). Participants who were not health care professionals (e.g. not a doctor, not a physical therapist), selected "Other" or "I am not a clinician." We recoded participants' responses by collapsing several of the original response codes containing few observations (e.g. OT, PT, SLP) and created a new variable called, "Allied health." In addition, response categories with few observations, such as "Dentist" and "Pharmacist" were collapsed with the "Physician" category and "Other" with "I am not a clinician." This resulted in three response categories: "allied health," "physician/pharmacist/dentist," and "I am not a clinician/other."

Chi-square statistics with Monte Carlo estimates for the presence of expected counts less than five were carried out to examine differences among the demographic variables on a subset of items in each of the three survey sections.

Results

Table 1 presents the participants' demographic and practice characteristics. Three hundred eighteen participants submitted completed questionnaires, yielding a response rate of 10% based on an estimated sample of 3200 (3200 is the most conservative basis for our frequency calculations). Almost two-thirds of respondents were physicians/pharmacists/dentists and 22.6% reported that they were not clinicians. Thirty-one percent reported having a

Table 1. Participant demographics.

Variable	N (%)
Professional qualifications	
Allied health professional	31 (10.5)
Physician, Pharmacist or Dentist	198 (66.9)
I am not a clinician/other	67 (22.6)
Total	296
Highest degree obtained	
Bachelor's	2 (0.7)
Master's/Graduate certificate	71 (23.9)
PhD	93 (31.3)
MD	63 (21.2)
MD with graduate degree	65 (21.9)
Doctor of veterinary medicine	3 (1.0)
Total	297
Primary work role	
Clinician	24 (8.2)
Administrator or program director	63 (21.4)
Teacher	37 (12.6)
Researcher	31 (10.5)
Multiple roles including researcher	78 (26.5)
Multiple roles not including researcher	61 (20.8)
Total	294
Work setting	
University-based	164 (56.0)
Hospital-based	32 (10.9)
Community-based	14 (4.8)
Policy level	8 (2.7)
Primarily university, hospital and community based	75 (25.6)
Total	293
Years practicing as a healthcare professional	
<=10 years	47 (19.6)
11–20 years	52 (21.7)
>=21 years	141 (58.8)
Total	240
Years as a health professions educator	
<=10 years	108 (37.5)
11–20 years	88 (30.6)
>=21 years	92 (31.9)
Total	288

doctorate as their highest degree, 10.5% identified as researchers, and 56% worked within a university-affiliated setting compared to 10.9% ($n = 32$) that were primarily hospital-based. The average number of years of experience as an HPE educator was distributed fairly equally with 37.5% having less than 10 years of experience, 30.6% having 11–20 years of experience, and 31.9% having over 20 years of experience.

Tables 2–4 contain the statistically significant chi-square values for items within each of the three sections based on (1) type of setting at which participants work; (2) primary work role; (3) professional qualifications; (4) years of experience as a HP educator; and (5) highest degree obtained.

Section 1: attitudes toward evidence-informed HPE

Table 5 summarizes the results in relation to attitudes toward EIHP. Eighty-three percent of respondents indicated using research findings when making decisions about educational practices. When asked about experience as the most important source of information in guiding educational decisions, the responses were evenly spread (32% disagreed; 34.3% were neutral, 33.6% agreed). Although 96.7% were open to changing their practices based on the latest evidence in the field, almost 60% agreed that educators make less use of HPE research findings. A very small proportion (17.5%) agreed that being an evidence-informed HP educator is too time-consuming. Ninety percent agreed that educational practices could be improved through a

Table 2. Significant differences on Attitude items per demographic variable.

Question Attitudes	Facility			Primary work role			Professional qualifications			Years as HPE			Highest degree		
	DF	Chi-square	p-Value	DF	Chi-square	p-Value	DF	Chi-square	p-Value	DF	Chi-square	p-Value	DF	Chi-square	p-Value
1. I draw from HPE research findings when I make important decisions about educational practices.	8	17.116	*0.016	-	-	-	-	-	-	-	-	-	-	-	-
2. I would rather learn about educational practices from colleagues than from the scientific literature.	8	15.258	*0.046	-	-	-	-	-	-	-	-	-	10	17.601	*0.038
3. I am open to changing my teaching methods based on the latest HPE research findings.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Data from student course evaluations are more important than HPE research findings in guiding the decisions I make about educational practices.	-	-	-	10	25.325	0.0048	-	-	-	-	-	-	-	-	-
8. An evidence-informed approach to HPE improves the quality of educational practices.	8	18.054	*0.016	-	-	-	-	-	-	-	-	-	-	-	-
9. The use of evidence hardly plays a role when decisions about HPE practices are being made.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Monte Carlo p-value.

Table 3. Significant differences on Practices items per demographic variable.

Questions Practices	Facility			Primary work role			Professional qualifications			Years as HPE			Highest degree		
	DF	Chi-square	p-value	DF	Chi-square	p-value	DF	Chi-square	p-value	DF	Chi-square	p-Value	DF	Chi-square	p-Value
3. Taught learners in the classroom or clinical setting.	8	27.19	*0.002	-	-	-	4	11.972	0.017	-	-	-	-	-	-
4. Engaged in HPE curriculum design and development/ program evaluation.	8	20.183	*0.012	10	24.904	0.005	-	-	-	-	-	-	-	-	-
5. Engaged in HPE research.	8	23.614	*0.002	-	-	-	-	-	-	-	-	-	-	-	-
6. Searched for scientific articles in HPE.	-	-	-	10	18.206	*0.018	4	12.005	*0.011	4	13.200	0.01	-	-	-
11. Used HPE research findings to inform teaching in the classroom.	8	27.904	*0.0003	-	-	-	-	-	-	-	-	-	-	-	-
12. Used HPE research findings to inform teaching in the clinical setting.	8	16.457	*0.0245	10	27.502	0.0022	4	14.996	0.004	4	10.099	0.039	10	18.921	*0.0136
13. Used HPE research findings to assess learners.	8	26.489	*0.0009	-	-	-	-	-	-	-	-	-	-	-	-
15. Used HPE research findings to inform curriculum design and development.	8	32.829	*0.0002	10	35.632	<.0001	-	-	-	4	12.959	0.012	-	-	-
16. Used HPE research findings to inform administrative educational decisions.	-	-	-	-	-	-	-	-	-	4	12.025	0.017	-	-	-

*Monte Carlo p-Value.

Table 4. Significant differences on Supports and Barriers items per demographic variable.

Question	Facility			Primary work role			Professional qualifications			Years as HPE			Highest degree		
	DF	Chi-Square	p-value	DF	Chi-Square	p-value	DF	Chi-Square	p-value	DF	Chi-Square	p-value	DF	Chi-Square	p-value
Supports and Barriers															
1. I am confident in my ability to be an evidence-informed educator.	-	-	-	10	19.843	*0.031	-	-	-	-	-	-	-	-	-
3. I have other priorities (e.g. clinical practice) that limit my ability to apply HPE research findings to educational practices.	8	15.276	*0.047	10	28.551	0.002	4	10.5763	0.031	-	-	-	-	-	-
5. I have difficulty appraising the HPE literature.	-	-	-	10	21.149	0.02	-	-	-	-	-	-	10	26.727	*0.0009
6. I have colleagues who encourage me to apply HPE research findings to educational practices.	8	23.184	*0.006	-	-	-	-	-	-	4	10.16	0.037	-	-	-
7. I cannot keep up with the volume of HPE research.	-	-	-	-	-	-	4	13.177	0.010	-	-	-	-	-	-
8. My organization gives me time for faculty development/continuing professional development in HPE.	-	-	-	-	-	-	-	-	-	4	13.85	0.007	-	-	-
9. Teachers in my organization are reluctant to change educational practices.	-	-	-	-	-	-	4	10.778	0.029	-	-	-	-	-	-
12. New HPE research findings are regularly disseminated in my work environment.	-	-	-	10	28.036	0.002	-	-	-	-	-	-	-	-	-

*Monte Carlo p-value.

more evidence-informed approach to HPE. Despite this, however, an almost equal proportion of respondents agreed (37.9%) and disagreed (40.3%) that the use of evidence almost never plays a role when decisions about HPE practices are made.

Type of work setting, primary work role, years as a health professions educator and highest degree were significantly associated with attitudes toward EIHPE. Participants working in a university-based setting were more likely to make decisions based on HPE and believe that an evidence-informed approach to HPE improves the quality of educational practices compared to those in community-based and hospital-based settings. Respondents who primarily identified as a clinician or teacher reported that course evaluations are more important in guiding educational decisions than research evidence. Years of experience were also related to attitudes, as those with 11 or more years of experience are more likely to agree that an evidence-informed approach to HPE improves the quality of HPE compared to those with less experience (<10 years); for this latter group, the use of evidence almost never plays a role when decisions about HPE practices are being made.

In terms of highest degree obtained, participants with a Doctorate in Veterinary Medicine (DVM) preferred to learn about educational practices from colleagues rather than from the scientific literature, compared to those with a graduate certificate/masters, MDs, MDs with a graduate degree, and those with a PhD. There were no significant differences in attitudes toward EIHPE among respondents representing different professions.

Section 2: practices

Table 6 presents the frequency with which respondents engaged in EIHPE-related activities. Half of participants regularly attended conferences and almost two-thirds attended faculty development activities. Seventy percent taught in the classroom or clinical setting and two-thirds regularly engaged in curriculum design. A little over half frequently took part in research activities and more than 75% searched for scientific articles. Fifty-six percent used HPE research findings to inform teaching in the classroom, 43.6% in the clinical setting, and 54.3% to assess learners.

Regarding use of HPE research to inform teaching, those working in a mixed (i.e. primarily university and hospital/community-based) setting were more likely to use HPE research findings compared to those working in a university or community setting or at the policy level, and those working in a university-based setting were more likely to use HPE research findings than those working in a hospital-based setting. University-based individuals were more likely to use HPE research for assessment of learners compared to those working in all other areas; one exception is that those working in a hospital-based setting were more likely to use research findings compared to those working at the policy level. Those working in community-based settings reported having significantly more demands on their time compared to all other groups.

Teachers and clinicians, those with multiple roles not including research, and those working primarily in research were more likely to use HPE findings to inform teaching and curriculum design. Those with multiple roles with and

Table 5. Section 1 Attitudes (*N* = 303).

Question	Strongly disagree/disagree <i>n</i> (%)	Neutral <i>n</i> (%)	Strongly agree/agree <i>n</i> (%)
1. I draw from HPE research findings when I make important decisions about educational practices	8 (2.6)	43 (14.2)	252 (83.1)
2. I would rather learn about educational practices from colleagues than from the scientific literature ^a	146 (48.2)	104 (34.3)	53 (17.5)
3. I am open to changing my teaching methods based on the latest HPE research findings	2 (0.7)	8 (2.6)	293 (96.7)
4. Data from student course evaluations are more important than HPE research findings in guiding the decisions I make about educational practices ^a	119 (39.3)	114 (37.6)	70 (23.1)
5. My HPE experience is the most important source of information in guiding the decisions I make about educational practices ^a	97 (32.0)	104 (34.3)	102 (33.6)
6. Educators in the health professions make little use of HPE educational research findings ^a	61 (20.1)	64 (21.1)	178 (58.8)
7. An evidence-informed approach to HPE is too time-consuming ^a	174 (57.4)	76 (25.1)	53 (17.5)
8. An evidence-informed approach to HPE improves the quality of educational practices	6 (2.0)	24 (7.9)	273 (90.1)
9. The use of evidence hardly plays a role when decisions about HPE practices are being made ^a	122 (40.3)	66 (21.8)	115 (37.9)
10. If we take HPE research evidence seriously, our educational practices will look quite different to the way they do now	20 (6.6)	59 (19.5)	224 (73.9)
11. HPE research findings are applicable to educational practice	7 (2.3)	40 (13.2)	256 (84.5)
12. HPE is heavily guided by intuition ^a	107 (35.3)	90 (29.7)	106 (35.0)

a = reverse coded item.

Table 6. Section 2 Practices (*N* = 287).

Question	Never/rarely <i>n</i> (%)	Sometimes <i>n</i> (%)	Often/very often <i>n</i> (%)
1. Attended conferences or scientific meetings on HPE	27 (9.4)	115 (40.1)	145 (50.5)
2. Attended faculty development/continuing professional development activities (e.g. workshops, webinars, grand rounds)	18 (6.2)	86 (30.0)	183 (63.8)
3. Taught learners in the classroom or clinical setting	27 (9.4)	57 (19.9)	203 (70.7)
4. Engaged in HPE curriculum design and development/ program evaluation	30 (10.5)	70 (24.4)	187 (65.2)
5. Engaged in HPE research	55 (19.2)	78 (27.2)	154 (53.6)
6. Searched for scientific articles in HPE	21 (7.3)	46 (16.0)	220 (76.6)
7. Written scholarly papers in HPE	111 (38.7)	75 (26.1)	101 (35.2)
8. Presented at a HPE conference	97 (33.8)	90 (31.4)	100 (34.9)
9. Consulted a librarian to help search for literature on HPE	169 (58.9)	61 (21.3)	57 (19.9)
10. Consulted colleagues to help you use HPE research findings	98 (34.1)	100 (34.8)	89 (31.0)
11. Used HPE research findings to inform teaching in the classroom	45 (15.7)	82 (28.6)	160 (55.7)
12. Used HPE research findings to inform teaching in the clinical setting	85 (29.6)	77 (26.8)	125 (43.6)
13. Used HPE research findings to assess learners	56 (19.5)	75 (26.1)	156 (54.3)
14. Used HPE research findings from available knowledge syntheses (e.g. systematic reviews) to inform decisions in HPE	59 (20.5)	85 (29.6)	143 (49.8)
15. Used HPE research findings to inform curriculum design and development	45 (15.7)	87 (30.3)	155 (54.0)
16. Used HPE research findings to inform administrative educational decisions	88 (30.7)	90 (31.4)	109 (38.0)

without research were more likely to use HPE research compared to clinicians and researchers. Though non-clinicians (e.g. full-time researchers, those in policy positions) and allied health professionals search for scientific evidence more often than MDs, the reverse was found for actual reported use of HPE research findings to inform teaching. Finally, those with the greatest number of years of experience more frequently engaged in HPE curriculum design and used HPE research to inform their teaching practices.

Section 3: supports and barriers

Table 7 summarizes the factors that facilitate or hinder participants' ability to use HPE research. Three-quarters of participants were confident in their ability to be an evidence informed HP educator. Eighty-seven percent reported having access to the literature, less than one third had sufficient time to read the literature and 42% had other priorities limiting their ability to apply HPE research in their practices. Critical appraisal of the literature was difficult for

less than 15%. Almost 50% indicated that their colleagues encourage them to apply HPE research findings to educational practices and just over half reported that teachers and leaders within their institutions are reluctant to change educational practices.

There were significant differences regarding factors such as confidence, competing priorities, critical appraisal skills, and availability of HPE research within the work setting based on work role and professional qualifications only. Clinicians were the least confident in their ability to be an evidence-informed educator, and those in multiple roles were more confident compared to participants whose primary responsibility is research. Clinicians reported having more time constraints than those with multiple roles (with and without research). Individuals whose responsibilities include research, administration, and teaching (i.e. multiple roles) also reported having more time constraints compared to teachers and researchers. MDs and non-clinicians reported having other priorities that significantly limit their ability to apply HPE research findings to educational practices compared to allied health professionals. MDs were

Table 7. Section 3 Supports and Barriers (*N* = 283).

Question	Strongly disagree/disagree <i>n</i> (%)	Neutral <i>n</i> (%)	Strongly agree/agree <i>n</i> (%)
1. I am confident in my ability to be an evidence-informed educator	28 (9.9)	44 (15.5)	211 (74.6)
2. I have sufficient time to read the literature on HPE	121 (42.7)	86 (30.4)	76 (26.9)
3. I have other priorities (e.g. clinical practice) that limit my ability to apply HPE research findings to educational practices ^a	90 (31.8)	74 (26.1)	119 (42.0)
4. I have access to current HPE research (electronic or paper)	16 (5.6)	21 (7.4)	246 (87.0)
5. I have difficulty appraising the HPE literature ^a	179 (63.2)	67 (23.7)	37 (13.1)
6. I have colleagues who encourage me to apply HPE research findings to educational practices	85 (30.0)	61 (21.6)	137 (48.4)
7. I cannot keep up with the volume of HPE research ^a	36 (12.7)	74 (26.1)	173 (61.2)
8. My organization gives me time for faculty development/continuing professional development in HPE	72 (25.4)	66 (23.3)	145 (51.2)
9. Teachers in my organization are reluctant to change educational practices ^a	57 (20.2)	68 (24.0)	158 (55.9)
10. Leadership in my organization is reluctant to change educational practices ^a	114 (40.3)	69 (24.4)	100 (35.3)
11. Faculty development/continuing professional development activities help me apply HPE research findings to educational practices	30 (10.6)	76 (26.9)	177 (62.6)
12. New HPE research findings are regularly disseminated in my work environment	119 (42.1)	76 (26.9)	88 (31.1)
13. Having access to HPE literature (e.g. by having access to databases) helps me apply HPE research findings to educational practices	17 (6.0)	36 (12.7)	230 (81.3)
14. Having a librarian at my institution helps me apply HPE research findings to educational practices	91 (32.2)	83 (29.3)	109 (38.5)

^aReverse coded item.

generally more likely to agree that teachers in their organization are reluctant to change educational practices compared to allied health professionals and non-clinicians.

Discussion

In this subset of AMEE members and conference attendees, attitudes toward EIHP are largely positive and for the most part, participants appear ready to change their teaching and assessment practices based on HPE evidence. There is overall agreement that HPE would be improved if educators used the available research evidence in the field. This is unsurprising as respondents are members of an international association of HPE that promotes the conduct and dissemination of quality research in the health professions. Participants reported using research to inform their teaching and assessment practices even though there was consensus that experience plays an important role in HPE. This highlights the notion that experience will likely always guide the manner in which evidence is used in educational decision-making, an important consideration as teachers must ultimately interpret the evidence and assess its readiness for use in a given situation.

Attitudes toward EIHP appear to depend on primary affiliation, graduate education, HPE roles, and the level of HPE experience. Affiliation (primary) with an academic institution is associated with more positive attitudes about using evidence. This finding is consistent with academic institutions' mandates to support research and training of future health care professionals. Our data suggest that attitudes toward EIHP are more positive amongst those with research degrees (e.g. MDs with research master's, PhDs). Whether this is due to professional culture, time constraints, or the inherent competing priorities of an evidence-based approach in clinical care, and an evidence-based approach to HPE requires further exploration.

Those who are primarily responsible for teaching and assessment in the clinical setting (i.e. clinician teachers) consider information gleaned from student evaluations as the primary source of evidence for course review and

revisions. Although student feedback can be used to bring about change to one's teaching and assessment strategies, this information represents only one of several sources of "evidence" that may be utilized to justify such changes (other sources may include longitudinal data on student performance and accreditation results) (Uijtdehaage and O'Neal 2015). Student data should be used with some degree of caution given the evidence that students often complete course evaluations in a mindless manner without due attention to whom they are evaluating and how a faculty member is actually performing. Although it is uncertain why this may be the case, we could speculate that given that student feedback is provided for a specific teacher and for a specific teaching and learning experience, it provides a form of "evidence" that is meaningful and contextually relevant and therefore likely to influence subsequent instructional decisions. Interestingly, those in policy-making positions (e.g. accreditation, licensure) make high-stakes decisions for which a high level of accountability is required. Such individuals may embrace an evidence-informed approach to HPE and perceive it as critical for justifying educational policy decisions.

Seasoned teachers viewed EIHP more positively and reported using the evidence significantly more than less experienced colleagues. The value attributed to HPE research and its use in educational practices may increase as educators gain experience. This finding, however, contrasts with the research on EBP in that the longer clinicians were in practice, the less skilled they were in conducting appraisals of research (McCluskey 2003) and the less likely they were to rely on published research to make clinical decisions (Cameron et al. 2005; McCluskey and Lovarini 2005; Copley and Allen 2009; Copley et al. 2010).

Based on the method used to curate our sample, many participants reported regularly attending educational conferences and participating in faculty development activities, a form of KT (Thomas and Steinert 2014). More than half of respondents reported using systematic reviews and results from original research to support their educational practices, and only one third did so for the purposes of educational

administration decisions. This may be due in part to the quality of many reviews of HPE research (Maggio et al. 2018). Most remarkable is the large proportions of participants (larger proportions than those reported in the literature on EBP; Thomas and Law 2014) that regularly search the HPE literature (more than 75%) and who report being involved in HPE research (more than 50%). These promising findings may be leveraged to increase capacity in HPE research and build partnerships between clinicians and researchers as such partnerships are recognized as having the potential to promote more scholarly approaches to practice (Jagosh et al. 2012; Jull et al. 2017; Witteman et al. 2018).

Our findings suggest that the number of years of experience and type of work setting are associated with HPE practices. Experienced educators are more likely to use research to inform their educational practices than their younger counterparts. As is the case with attitudes toward EIHPE, this contrasts with the research on EBP having shown that experience negatively influences the use of scientific evidence in clinical contexts (McCluskey 2003; Cameron et al. 2005; Thomas and Law 2013). We posit that educators may be learning about the rising body of evidence as they progress in their careers, but they may also be more exposed to the research by attending scholarly conferences (e.g. AMEE). This is an encouraging finding, and with the appropriate faculty development (Thomas and Steinert 2014), resources, and supports (time, access to scientific databases, support to attend conferences) these educators can effectively model the behaviors of the scholarly educator that embraces and applies an evidence-informed approach to HPE.

Individuals affiliated with a university and those in educational policy positions conduct more HPE research and report using HPE research to inform their teaching and assessment practices. Those involved in numerous types of HPE activities across several settings may be afforded various opportunities such as research and support in terms of administration and curriculum design. In contrast, there may be fewer opportunities and less available time for educators based primarily in community settings; as a result, they require more support and outreach to engage in research and use HPE evidence to support their teaching practices. Efforts to increase successful uptake of HPE research in all areas of HPE (e.g. curriculum design, teaching practices) will need to consider the mandates of those various contexts and design KT interventions that are tailored to individuals' needs within those contexts.

Our results suggest that there are three main factors that appear to act as supports for EIHPE: participants are confident in their ability to be evidence-informed educators and to appraise the HPE scientific literature, they have access to the HPE literature (although it was not clear if access was granted at the workplace or elsewhere) and their colleagues are supportive of their efforts to use the evidence. These factors may serve as winning conditions in the pursuit of EIHPE.

As expected, there were a number of barriers to EIHPE including competing priorities, the volume of HPE literature and the availability of research at the work place. Interestingly, although almost half reported that colleagues encouraged them to use evidence in their educational practices, an equal proportion reported that their peers and managers were reluctant to change the status quo.

Our findings mirror those reported by Onyura et al. (2015) who found four main barriers to research use: poor quality and availability of evidence, inadequate knowledge delivery approaches, work and role overload, and faculty and student resistance to change. Together, our joint findings can guide the design, implementation, and evaluation of tailored KT interventions to promote the uptake of HPE research (Thomas and Bussieres 2016a).

We offer two possible explanations for the findings on the barriers to EIHPE. First, as with attitudes, the groups are quite heterogeneous. What is viewed as a barrier in one group (or context) may be an enabling factor in another. Hence, the importance of conducting this type of research in more homogenous groups where educators may face similar barriers. The second possible explanation lies with the notion of specificity of "*evidence-informed HPE practices*"; in this study, we asked questions about supports and barriers to EIHPE *in general*. We did not refer to a particular assessment or teaching best practice. This may have led to some confusion and/or uncertainty on the part of participants. In clinical research, KT investigators study the supports and barriers to a specific evidence-informed practice (e.g. the use of a specific assessment or treatment intervention for a patient group with a specific condition). Respondents can, therefore, anchor their answers to that particular practice. In the absence of questions asking about a specific educational practice, it is possible that our participants could only provide a very general response on what would help or impede their use of research in practice, lying somewhere in the neutral range.

Limitations

We received responses from close to 320 AMEE members and/or conference attendees. While it is not possible to establish the degree of overlap between these two groups, this represents a 10% response rate, which is deemed acceptable for a heterogeneous sample such as the one in this study (Cook et al. 2000) and for a study of an exploratory nature. The second limitation is the heterogeneity of the population and by extension, the sample. AMEE data are solicited using a number of different demographic categories, many of which may not be mutually exclusive. For example, a member that self-identifies as both a clinician (e.g. physician) and a holder of a graduate degree is classified in more than one category. This adds a layer of complexity when determining the demographic categories involved in the analyses and using these as independent variables for statistical modeling. The third limitation involves items related to attitudes. Despite using best practices in survey design and a rigorous process of building validity evidence for the survey instrument, this construct remains challenging to measure.

Conclusions and future directions

As an HPE community, we must ensure that our graduates are ready to transition to the workforce and provide state of the art care to patients and their families. This requires that the educational environment provide learners with the knowledge, skills, and attitudes needed for clinical practice. Many of our educational decisions impact high stakes

matters such as admissions, assessment, promotion, and curricular reform. Our pursuit of educational excellence and accountability to our stakeholders should include educational practices informed by, and grounded in, rigorous educational research.

The research reported here represents an important first step in the scholarship of KT in HPE. Although the literature on evidence-informed practices stems primarily from biomedicine, this first large-scale exploratory study of a heterogeneous group of HPE clinicians, educators, decision-makers, and researchers has generated empirical evidence on the attitudes toward and perceived determinants of research use in HPE.

We recognize that the clinical and educational contexts differ in many ways; each has its own set of “actors” (learners vs. patients, teachers vs. clinicians) and its unique set of structures (organization of health services across patient populations and health conditions vs. educational programs across the continuum). Stakeholders in each group may have historically interpreted “evidence-informed practice” to mean different things (Sackett et al. 2000; Wolf 2000; Levinson 2010; Thistlethwaite et al. 2012). Adding to the complexities surrounding different conceptualizations and interpretations of the word “evidence” in clinical practice vs. HPE practice is the recognition that the nature, availability, and quality of the evidentiary base are likely different (van der Vleuten et al. 2000; Norman 2007; van der Vleuten and Driessen 2014; Yardley 2014). We also acknowledge that it is unwise to draw direct comparisons between the decision-making processes in each context. These important considerations notwithstanding, the robust body of literature on EBP and KT in the clinical sciences provided a strong foundation upon which to explore the behavioral determinants of EIHPE as well as for conducting the exploratory research reported in this paper.

As EIHPE gains increasing attention amongst scholars, so are discussions on (1) what constitutes “evidence” in HPE (Yardley et al. 2010; Thistlethwaite et al. 2012); (2) the relevance of educational research in the “real world” (Broekkamp and Van Hout-Wolters 2007; Regehr 2010; Yardley 2014); (3) the quality and strength of available evidence (Norman 2007; Cook and Beckman 2010; Cook 2012); (4) the readiness of evidence for implementation in educational settings (Wolf 2000; Cook 2012); and last but not least, (5) the context-specificity of the educational research, potentially restricting its application in different educational settings and with different levels of learners. These questions will need to be the focus of continued empirical investigation.

This study highlighted several avenues for future research. First, this research is exploratory, and conclusions drawn from the data on attitudes are speculative at best. Given the link between attitudes and behavioral intention, which, in turn, may lead to the adoption of best practices (Ajzen 1991; Bonetti et al. 2006; Godin et al. 2008) as substantiated in the literature on clinical decision-making, it would be worthwhile to further explore this relationship in the HPE context via robust psychometric development and testing of what is likely a multidimensional concept. Second, we could replicate the study with more homogeneous groups of educators in specific contexts and target specific best practices. This would allow for a clearer understanding of what the determinants may be, for example, in

the uptake of an assessment or a selection best practice and it would also provide recent data on actual attitudes and HPE practices. Third, as indicated by Thomas and Bussieres (2016a), the HPE field could benefit from a more systematic approach to KT underpinned by the science of implementation research. This would allow us to (1) identify current practices in order to ascertain whether gaps between available research and best practices actually exist; (2) assess the magnitude of those gaps; (3) identify and understand the determinants of current practices; and (4) develop theory-driven tailored KT strategies aimed at reducing the gaps. Lastly, both AMEE and the BEME collaboration are developing initiatives to support educators in their efforts to provide learners with evidence-based teaching and assessment. We propose that these groups collaborate with all major stakeholders including teachers, researchers, and those in policy positions to achieve a more evidence-informed approach to HPE.

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Glossary

Knowledge Translation: The most widely used definition of knowledge translation was published in 2000 by the Canadian Institutes of Health Research (CIHR): “Knowledge translation (KT) is defined as a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system” (Government of Canada 2012).

Using the CIHR definition as a basis, the National Center for the Dissemination of Disability Research (NCDDR) published this definition of KT in 2005: “The collaborative and systematic review, assessment, identification, aggregation, and practical application of high-quality disability and rehabilitation research by key stakeholders (i.e., consumers, researchers, practitioners, and policymakers) for the purpose of improving the lives of individuals with disabilities” (National Center for the Dissemination of Disability Research 2012).

In 2006, Graham et al. acknowledged the proliferation of related terms for the activity of knowledge translation, documenting 29 different terms used by 33 different health research funding agencies in their publications, including knowledge transfer, knowledge mobilization, knowledge exchange, implementation, and translational research (Graham et al. 2006).

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