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Original Research

Exploring stakeholder perspectives regarding the implementation of competency-based medical education: a qualitative descriptive study

Explorer les perspectives des partie prenantes concernant la mise en œuvre de la formation médicale axée sur les compétences: une étude descriptive qualitative

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Abstract

Introduction: Competency-based medical education (CBME) offers perceived advantages and benefits for postgraduate medical education (PGME) and the training of competent physicians. The purpose of our study was to gain insights from those involved in implementing CBME in two residency programs to inform ongoing implementation practices.

Methods: We conducted a qualitative descriptive study to explore the perspectives of multiple stakeholders involved in the implementation of CBME in two residency programs (the first cohort) to launch the Royal College's Competence by Design model at one Canadian university. Semi-structured interviews were conducted with 17 participants across six stakeholder groups including residents, department chairs, program directors, faculty, medical educators, and program administrators. Data collection and analysis were iterative and reflexive to enhance the authenticity of the results.

Results: The participants' perspectives organized around three key themes including: a) contextualizing curriculum and assessment practices with educational goals of CBME, b) coordinating new administrative requirements to support implementation, and c) adaptability toward a competency-based program structure, each with sub-themes.

Conclusion: By eliciting the perspectives of different stakeholder groups who experienced the implementation processes, we developed a common understanding regarding facilitators and challenges for program directors, program administrators and educational leaders across PGME. Results from our study contribute to the scholarly conversation regarding the key aspects related to CBME implementation and serve to inform its ongoing development and application in various educational contexts.

Résumé

Introduction: La formation médicale axée sur les compétences (FMAC) offre des avantages et des bénéfices perçus pour les études médicales postdoctorales et la formation de médecins compétents. Le but de notre étude était d'apprendre des personnes impliquées dans l'implantation de la FMAC dans deux programmes de résidence afin d'informer les pratiques de mise en œuvre en cours.

Méthodes: Nous avons réalisé une étude qualitative descriptive pour explorer les perspectives de plusieurs parties prenantes impliquées dans la mise en œuvre de la FMAC dans deux programmes de résidence (la première cohorte) visant à mettre en place le modèle Compétence par conception du Collège royal dans une université canadienne. Des entrevues semi-structurés ont été menés auprès de 17 participants issus de six groupes de parties prenantes, notamment des résidents, des chefs de département, des directeurs de programme, des membres de la faculté, des éducateurs médicaux et des administrateurs de programme. La collecte et l'analyse des données étaient itératives et réflexives afin d'enrichir l'authenticité des résultats.

Résultats: Les perspectives des participants se sont organisées autour de trois thèmes clés, à savoir : a) contextualiser les pratiques de curriculum et d'évaluation avec les objectifs d'apprentissage de la FMAC, b) coordonner les nouvelles exigences administratives pour soutenir la mise en œuvre, et c) s'adapter à une structure de programme axée sur les compétences, chacun avec des sous-thèmes.

Conclusion: En recueillant les perspectives des différents groupes de parties prenantes ayant vécu les processus de mise en œuvre, nous avons développé une compréhension commune des facilitateurs et des défis pour les directeurs de programme, les administrateurs de programme et les leaders éducatifs dans la formation médicale postdoctorale. Les résultats de notre étude contribuent à la conversation savante concernant les aspects clés liés à la mise en œuvre de la FMAC et servent à informer son développement et son application en cours dans différents contextes éducatifs.

Introduction

Postgraduate medical education (PGME) in Canada has undergone significant educational reform in response to societal and patient needs.[1,2] A driving change of this reform is competency-based medical education (CBME), described as a focus on learning outcomes formulated as specific competencies. In this model, attaining these competencies is independent of the length of time in training.[2,3] While a great deal of effort has gone into implementing CBME, it is critical that those with experience in implementing CBME help to inform ongoing practices for those programs that have not yet transitioned or are at different stages in their transition.[4-6]

Competence by Design is the Royal College of Physicians and Surgeons of Canada's (RCPSC) model of CBME. Within a multi-year timeline, all specialty and sub-specialty programs across Canada must transform their teaching and assessment practices from time-based training to a competency-based model of education and assessment. Expected outcomes of CBME residency programs include increased direct observation, improved documented feedback (e.g., quality, specificity, and timeliness), and better identification of and support for residents in difficulty.[7,8] Although CBME offers perceived advantages and benefits for residency education and developing competent physicians, its implementation continues to face significant barriers and presents unique challenges.[4,6,9-12]

Researchers have reported that program directors and learners must overcome several barriers including, a limited understanding of the educational underpinnings of CBME by clinical faculty, lack of time to engage with new assessment methods and tools, inadequate administrative support, and managing an increased volume of assessment data.[13-15] Hawkins and colleagues characterized these areas of concern along several dimensions, namely, theoretical and conceptual, and practical and logistical.[16] The theoretical and conceptual challenges address how competencies have been described and integrated into the curriculum, including approaches to their assessment; broadly, these issues represent the educational aspects of CBME. Hawkins and colleagues also identified practical and logistical challenges subsumed under the umbrella of administrative aspects, referring to the need for a structured approach in the implementation of competencies and the management of administrative requirements. CBME implementation is still in emergence and riddled with assumptions regarding its actualization in practice.[17] Hawkins and colleagues' characterization of the educational and administrative aspects pertinent to CBME implementation provides a springboard for further exploration and empirical inquiry.

Recent knowledge syntheses have underscored the paucity of empirical evidence regarding how CBME is perceived in practice.[17,18] There is an urgency to generate evidence to help stakeholders make informed decisions toward the ongoing development and design of CBME, and effectively implementing and maintaining CBME practices.[19-22] Despite the increased literature documenting aspects of implementing CBME in residency training programs,[23,24] many studies are limited to single stakeholder views (e.g., program leaders, medical learners) and most used primarily quantitative designs to examine assessment practices and behaviours, or satisfaction with program transformation.[17,23,24] Research exploring the perspectives of multiple stakeholders regarding the planning, facilitation and implementation of CBME in their local context remains scant.[17,19,25] Without research to document the contextual successes and lessons learned from the perspectives of multiple stakeholders regarding implementation, educators and clinical academic leaders risk perpetuating a cycle of future "trial-and-error" implementation, leading to unnecessary complexity and the potential misuse of valuable educational and clinical resources.[4,16,23] Acknowledging multiple stakeholders' perspectives can provide a broader and more holistic understanding of the locally contextualized nuances throughout the implementation of CBME. Research documenting this firsthand knowledge should be shared with stakeholders in similar positions to scaffold the learning curve.[20] Therefore, we aimed to gain insights from multiple stakeholders involved in, and/or responsible for, the implementation of CBME in two residency programs (anesthesia and otolaryngology), the first two programs to transition to CBME across Canada.

Methods

We conducted a qualitative descriptive study to explore the experiences of multiple stakeholders involved in the implementation of CBME.[26,27] Qualitative description is the ideal approach to study stakeholders' experience of the CBME implementation because it allows researchers to understand a phenomenon, a process, or the perspectives and worldviews of the people directly involved and link those participants' experiences to existing literature. In this

methodological approach, data are obtained directly from those experiencing the phenomenon and reported using participants' language, ensuring that the data analysis is more likely to remain aligned with the participants' accounts and contribute to ensuring the researchers' own interpretations are transparent.[26,28-30]

By eliciting the ideas and perspectives of each stakeholder group who experienced the implementation processes, we were able to develop a common understanding regarding facilitators and challenges for program directors, program administrators and educational leaders across PGME. Members of the research team included medical researchers and educators with expertise in curriculum design and assessment. We conducted one-on-one semi-structured interviews with 17 participants across six stakeholder groups including residents, department chairs, program directors, faculty, medical educators, and program administrators (Table 1). To protect participants' confidentiality and create space for them to speak openly regarding their experiences, all the interviews were conducted by a research assistant (MZ) trained in qualitative interviewing. The study received ethics approval by McGill University's Faculty of Medicine Institutional Review Board (#A02-E03-18B).

Table 1. Participants by stakeholder group

Participants (*n* = 17)	Roles and responsibilities in CBME implementation
Residents (7 of 9)	First cohort of residents in CBME model
Department Chairs (1 of 2)	Provide leadership support and facilitate change management
Program Directors (1 of 2)	Leads all aspects of CBME implementation
CBME Leads (2 of 2)	Members of the clinical teaching faculty responsible for leading the CBME transition and implementation process
Program Administrators (1 of 2)	Provide administrative support to the program director and residents; administration of schedules, teaching activities, and assessments
Competence Committee Chairs (1 of 2)	Members of the clinical teaching faculty responsible for resident promotion
Competence Committee Faculty (2 of 7)	Members of the clinical teaching faculty
PhD Educators (2 of 3)	Provide medical education expertise and facilitate faculty and resident development

Participant recruitment

We recruited participants from McGill University's Departments of Anesthesia and Otolaryngology - Head and Neck Surgery, which were the first two residency programs to implement the RCPSC's Competence By Design across Canada.[31] The participants were recruitment using a combination of purposeful, convenience and snowball sampling methods.[32] The goal with purposeful sampling was foremost based on participants' accessibility to the researcher and, subsequently, for their information-rich contributions to the subject matter. Snowball sampling included initial study participants referring the researcher to communicating with potential participants for recruitment. Recruitment emails were sent to potential participants, including a letter of invitation emphasizing the value-added from their participation in the study and the impact their contributions would have on the implementation of CBME in other residency programs.

Data collection

Once we obtained informed consent, we scheduled interviews outside of work and clinical hours to prevent interference with patient care at a location most comfortable for the participant. Interview questions were inspired by Hawkins and colleagues'[16] characterization of educational and administrative aspects, and further refined through discussions with the research team. Within the educational dimension, the questions captured the educational components in the planning and implementation of CBME, whereas the administrative aspects targeted the practical and logistical mechanisms of implementation. Questions were adapted to reflect contextual relevance for each of the stakeholder groups (see examples in Table 2). Changes to the interview questions were made iteratively based on flow during initial interviews, participant feedback, and after debriefing between MZ and TD.

We conducted all interviews between April and July 2018 and ranged between 20 and 68 minutes. The interviews were audio-recorded to allow the interviewer to focus on being attentive to what the participant was saying and for subsequent verbatim transcription. Data collection was iterative to enhance the authenticity of the results. A reflexive component underpinned the research process wherein the researchers documented their observations and reflections by taking comprehensive field notes and reflexive journal writing throughout the study to report their own insights regarding the implementation process.[33] Many of these notes are embedded throughout the

description of the results to add interpretive rigour while placing participants' voices at the forefront.

Table 2. Example of interview questions

Describe your familiarity and knowledge of CBME.
What aspects of CBME stand out compared to the previous approach to residency training?
Describe the implementation of CBME in your program.
What types of support (e.g., PGME, department, peers) assisted you in your role during the implementation of CBME?
Describe the enablers and the barriers to implementing CBME.
What aspects of CBME would have been useful to know more about to assist you in your role?
What recommendations would you provide for those who are implementing CBME?

Data analysis

Data analysis was iterative and integrated across all stakeholder groups. Two independent coders (TD and MZ) conducted thematic analysis according to Braun and Clarke,[34-36] using both an inductive and a deductive orientation for the analysis. The inductive approach started by considering the views of the participants and using a more flexible, open, and organic approach for our coding. Each coder began by independently reading each transcript several times to become familiarized with the data. The next step involved the preliminary coding of the transcripts by making relevant notes for each code and their meanings throughout each transcript. Then, we grouped the coded narratives into potential themes and compared them across all stakeholder groups. From a deductive standpoint, we observed strong connections between developing themes and existing areas of concern related to CBME implementation as identified by Hawkins and colleagues. Hawkins' conceptualizations provided the foundation to reflect on the conceptual ideas we sought to understand through our data and to make sense of participants' perspectives. We reviewed all the previous steps concerning the entire data set, followed by classifying the themes and sub-themes. All members of the research team contributed to the overall data analysis and interpretation of the findings.

Results

The aim of this study was to explore and inform educational and contextual practices of CBME implementation by gaining insights from multiple stakeholders involved in two residency programs. The participants' perspectives organized around three key themes including: a) contextualizing curriculum and assessment practices with educational goals of CBME, b) coordinating new administrative requirements to support implementation, and c) adaptability toward a competency-based program structure. Additional quotes from participants are provided in Table 3.

Contextualizing curriculum and assessment practices with educational goals of CBME

Several discussions were held locally between program directors, program administrators, educators, and residents to facilitate the alignment between curriculum and assessment with the practices and principles espoused by the RCPSC's Competence by Design model. The deliberate nature of these discussions provided justification and clarification as to why some of the learning experiences were structured and sequenced the way they were, to carefully look at what was being taught, how it was being taught, and how it was being assessed, and to ensure that there was alignment between these facets. The sub-themes included: a) engaging in curriculum mapping to facilitate planning, b) integrating methods of assessment relevant to CBME, and c) acknowledging the hidden curriculum.

Engaging in curriculum mapping to facilitate planning. Curriculum mapping was a rigorous process intended to carefully consider each of the entrustable professional activities (EPAs), the associated milestones, and all the assessment details related to the overall program. Engaging in discussions early on during the planning process provided the programs with opportunities to develop a vision for the overall curriculum and how to sequence the learning experiences: "*What are the specifics that are needed to be met? Could this be done in simulation?*" (CBME Lead 2). The mapping allowed each program to consider how the teaching and learning could be made more explicitly directed towards the competencies the residents needed to achieve whilst ensuring that the learning experiences were sequenced appropriately to the stages of the learners and reflective of the realities of clinical service: "*You have to stay on top of it to make sure you can give residents exposure to the EPAs*" (Program Director). The mapping helped to anticipate where the residents were either likely or unlikely to encounter the required volume of clinical exposure and/or the feasibility of being observed and assessed by faculty and peers. Participants underscored the importance of completing the mapping process and its utility as a guide for educators, clinical teachers, and residents: "*we need to have specific maps of how to get through them otherwise you just get lost*" (Resident 4).

Table 3. Additional quotes from participants

Themes	Sub themes	Quotes from participants
Contextualizing curriculum and assessment practices with educational goals of CBME	Engaging in curriculum mapping to facilitate planning	"*A curriculum map to help (residents) not be intimidated by this huge, long list of EPAs and break it down by rotation*" (CBME Lead 1)
	Integrating methods of assessment relevant to CBME	"*It helps me in the sense that I don't waste time on things that is not for me to teach them*" (CCC 1)
	Acknowledging the hidden curriculum	"*I think it [EPAs] might limit them a little bit because they're, sort of, ticking the EPA boxes and they want to get those assessment and that they, kind of, want to get those assessments done*" (Clinical Faculty 1)
Coordinating new administrative requirements to support implementation	Facilitating administrative complexities	"*A dedicated protected half a day a week where I could track all the residents, meet with them, touch bases with all the staff at the different sites, and see how it is going*" (CBME lead 1)
	Dealing with technological challenges	"*The biggest complaint I have is the fact that I can't simply start an app and within 20 seconds have filled out an EPA. It's the worst possible thing. We're surgeons, all my day is efficiency*" (Program Director)
	Providing supportive resources for faculty and residents	"*We received a handbook with all the EPAs. We can go through it. I can have it with me in the OR and just make the staff look at it and make sure that all the criteria are filled*" (Resident 4)
Adaptability toward a competency-based program structure	Engaging in capacity building for faculty and residents	"*You have to go all in, use CBME as a driver for change to promote giving feedback following encounters (…) targeted faculty development in areas with higher volume of exposure*" (Program Director)
	Effectively communicating changes to program structure	"*From other services, we've definitely had some staff say 'I'm not familiar with this, I'm not even…' and essentially refuse to even fill EPAs out for you*" (Resident 5)
	Planning for ongoing program evaluation	"*Something that you don't know until you get there… like any model, you reassess, and you change to make it better*" (Program Administrator)

Integrating methods of assessment relevant to CBME. One of the unique features of assessment in a CBME model underscored by the participants is the ability for programs to recognize much earlier if a resident is reaching the milestones and/or developing the appropriate competencies before the end of their clinical rotation. Participants highlighted that for assessments to be meaningful, they needed to be deliberately associated with the learning requirements. However, despite being purposively aligned, many participants expressed concerns with the feasibility of the assessment details from a practical point of view: "*for example the EPA has to be six times by four different assessors in three different settings. It's too much, it's really specific*" (Resident 1). Another participant elaborated on the difficulties associated with completing the assessment requirements given the realities of clinical service:

> *That would be the problem, seeing the staff or even your senior, you're running around all the time so it's like, how do you get them to sit down and actually do assessment?* (Resident 3).

Combined, this led to many participants focusing on the EPAs in isolation without any contextual consideration about where the EPAs fit within the broader learning objectives or curriculum map. Participants expressed that implementing CBME from a reductionist standpoint (e.g., a focus only on assessment or curriculum in isolation) was destined to fail.

Acknowledging the hidden curriculum. We observed aspects of the hidden curriculum as unintended learning that takes place outside of the formal curriculum. The participants often discussed the implicit consequences of implementing CBME within their residency programs. For example, one of the clinical faculty shared that:

> *Sometimes feels like you're running to make sure you have all the trees in the forest and losing the big picture of what the forest is. The junior residents are obsessed with having to tick off the EPAs* (CBME Lead 2).

Many participants alluded to the unintended consequences associated with a reductionist perspective that learners and faculty had adopted. Participants voiced concerns that if medicine is reduced to a checklist to be completed, some learners will only focus on those points rather than learning medicine as a holistic endeavor. Some participants discussed having to constantly acknowledge the hidden curriculum to clarify the purpose of EPAs:

> *Avoid checkbox teaching… don't focus on EPAs too much… risks implying that teaching is done for the day… remembering to continue to teach about the art of anesthesia because it's much more art than science sometimes* (Clinical Faculty 2).

Faculty and residents noted that residents modified their behaviour toward completing assessment: "*just do as many* [EPAs] *as you can and don't wait because there's too many to do*" (Resident 1), which is counterintuitive to the intended longitudinal development of competencies.

Coordinating new administrative requirements to support implementation

Participants expressed the need for administrative and logistical planning and resources for the CBME implementation to be successful. Participants also expressed concerns regarding the increase in data being collected from different methods of assessment to gather relevant information regarding competency development. The sub-themes included: a) facilitating administrative complexities, b) dealing with technological challenges, and c) providing supportive educational resources for faculty and residents.

Facilitating administrative complexities. Participants expressed that CBME implementation would not have been possible without a working group comprised of individuals from within the specialty program to take the lead for curriculum and assessment planning, faculty development, individuals with administrative expertise (i.e., clinical scheduling, resident schedules, assessment data reporting) and individuals with academic expertise in medical education. Together, they provided an integration between the clinical, contextual and the educational perspectives. Faculty participants leading key aspects of the implementation expressed a desire for acknowledgement of their increased workload:

> *A dedicated protected half a day a week where I could track all the residents, meet with them, touch bases with all the staff at the different sites, and see how is it going* (CBME Lead 1).

One of the participants, whose sole responsibility was to plan and co-ordinate administrative aspects of CBME, recognized the need for administrative support to be involved from the outset of planning for implementation to ensure that all aspects related to the program coordination and documentation are covered: "*I think that part is important, so you know what to expect*" (Program Administrator). One of the program leaders shared that one effective strategy for working collaboratively and keeping everyone informed was to: "*Track progress, and what is being done by who*" (Department Chair).

***Dealing with technological challenges*.** With an exponential increase in assessment data being collected, participants recognized the significant challenges associated with introducing a new technology program for assessment purposes. Participants described the technological aspect as a barrier to implementation and expressed their frustration with the impact that any delay could have on their clinical practice and time away from patient care. Participants agreed that more hands-on training with the required technology would have been useful to troubleshoot some of the issues ahead of time. Participants' frustration might have been amplified by the shift away from traditional paper-based assessment to accessing a new technology. However, as one participant stated, some challenges were unavoidable and required adaptation along the way:

> *Maybe you have to roll it out to figure out what the problems are and what kinds of things are going to happen. I think it should be a dynamic process* (CBME Lead 1).

Providing supportive educational resources for faculty and residents. There were instructional resources and tools developed at both the national and local level to assist programs with the implementation. Many of these resources were developed to introduce different stakeholder groups to the key aspects of the CBME model. Participants agreed that these were helpful: "*resources on the Royal College website, like videos that explain and clarify things, and I've relied on those a lot because people will ask me questions*" (CBME Lead 1). This ultimately inspired locally developed resources intended to help faculty and residents navigate through all the learning requirements. Participants described the utility in being able to quickly look up the assessment details for the EPAs:

> *We received a handbook with all the EPAs. We can go through it. I can have it with me in the OR and just make the staff look at it and make sure that all the criteria are filled* (Resident 4).

Adaptability toward a competency-based program structure

Many changes were applied to the overall program structure due to the transition from a traditional program to a CBME model. The transition to CBME provided a sense of urgency to engage with faculty and residents by introducing them to key CBME concepts. One of the major changes that participants highlighted was the need for more frequent direct observation and feedback.

Participants recognized the emphasis placed on the formative aspects of assessment that are more specific and more meaningful. The sub-themes included: a) engaging in capacity building for faculty and residents, b) communicating changes to program structure, and c) planning for ongoing program evaluation.

Engaging in capacity building for faculty and residents. Participants explained that a gradual implementation of CBME was an effective approach to change management. Participants identified the need to empower faculty and residents to get involved during the early planning stages. When faculty and residents became involved in the implementation, they gained a sense of ownership over the process. The sense of ownership provided a purpose for participants and allowed them to influence the capacity building in a meaningful way. For example, one of program leaders established their role in change management:

> *Active involvement in all activities with staff and residents; constant messaging about common goal, purpose and understanding; cheerleader, support, rally the faculty; empower the faculty, lead by example, role model* (Department Chair).

Several capacity building activities were organized by the program director and the CBME lead to engage faculty and residents prior to the implementation. Educators, program faculty, and residents co-developed and co-delivered activities which aimed to introduce and familiarize their peers to the key aspects of CBME. Subsequent sessions comprised role-plays and more hands-on examples of changes to the educational model. Creating spaces for having real conversations allowed faculty and residents to highlight what their concerns were and identify what further faculty and resident development was needed. And, as one of the participants articulated: "*it's a learning process not only for us, but also for everybody*" (Program Administrator).

Communicating changes to program structure. Constant communication revolving around the necessary changes to implement CBME helped to explain the program and process. CBME required a targeted explanation of the changes in the educational model. The following participant underscored the importance of tackling the nuances of the changes to make things more explicit: "*Having someone implementing CBME come and talk to us about what should we expect because there are still some grey areas that we're not sure about*" (Resident 5). Participants found CBME difficult to navigate when most other residency programs remained in the traditional time-based program structure: "*the easy part was communication in our department, the harder part was outside of our department*" (Program Director). Some participants felt they had to justify their position as CBME residents in a hospital setting where some clinical teachers did not fully understand what CBME entailed. Transparent and deliberate communication with other services helped to ensure their clinical teachers were prepared to receive residents who were part of a CBME cohort.

Planning for ongoing program evaluation. Participants also emphasized that any implementation is never truly complete. The insights gained from participating in the CBME implementation need to be shared locally amongst other programs, so there is a constant quality improvement: "*I would have loved to have a two-hour meeting with people who have gone through this. What worked? What didn't work? What to avoid? Why we did it?*" (CBME Lead 2). Participants often alluded to what will come next, after the implementation, for example, what will be improved and/or modified as the next step to enhance CBME approaches in the future. Participants expressed a need for programs to adopt a program evaluation mindset to support ongoing CBME implementation including monitoring the alignment between curriculum and assessment practices, as well as the achievement of intended outcomes for CBME (e.g., increase in direct observation, improved documented feedback).

Discussion

We aimed to understand the perspectives of multiple stakeholders involved in implementing CBME in the two residency programs (the first cohort) to launch the RCPSC's Competence By Design model across Canada. Participants provided various and complementary insights toward developing a holistic understanding of CBME, including the facilitators and challenges, strategies to support future CBME implementation, and avenues for program evaluation and future research. Results from our study extend scholarship regarding the core elements of CBME implementation, which include curriculum and assessment reform, academic and administrative support, resident and faculty engagement, and program adaptability. Our findings also underscore the important role that departmental and program leadership can play in influencing culture change whilst supporting an educational paradigm shift within complex health systems.

We extend the scholarly conversation regarding systematic implementation strategies for educational innovations by adding another important aspect: a program's adaptability to a competency-based program structure. Addressing the adaptability of a program to a new program structure via strategies like, engaging in capacity building for faculty and residents, effective communication and program evaluation can serve to contribute to a more coherent implementation. For example, participants in our study discussed empowering faculty and residents to get involved during the early planning stages of implementing CBME to gain a sense of ownership over the process. Ownership in the implementation process has been discussed in large, institutional implementation approaches and suggested to facilitate conversations about CBME and enhance buy-in from stakeholders.[12,24,37,38] Ideally, those responsible for implementing CBME should utilize others' past experiences to avoid repeating mistakes, wasting resources, and facilitating a smoother integration with the buy-in from program leadership, clinical faculty, and residents.[38]

Curriculum and assessment planning must be aligned to achieve the intended learning outcomes for residents.[39,40] We identified two areas that can offer guideposts in developing curricular and implementation approaches that will facilitate the implementation of CBME. These include curriculum alignment and integrated curriculum. Curriculum alignment establishes strong links between the learning outcomes and objectives, the instructional strategies, and the methods of assessment. Specifically, alignment is defined as "a design for teaching in which what it is intended students should learn, and how they should express their learning, is clearly stated before teaching takes place."[41] Integrated curriculum should "promote retention of knowledge and acquisition of skills through repetitive and progressive development of concepts and their applications."[42] For example, throughout the curriculum, there should be deliberate and intentional planning to ensure progression regarding the requirements, complexity, roles and responsibilities, and that align with the assessment requirements for the EPAs. Participants in our study approached the development, implementation and mapping of the CBME curriculum from a ground-up approach.[43] This ground-up approach allowed programs to develop locally adaptable planning and tailor the learning experiences in a deliberate effort to align both curriculum and assessment methods. This approach is consistent with an integrated curriculum where education is organized in such a way that it brings together various aspects of the curriculum into meaningful association to focus upon broad areas of study.[42,44]

Program leaders and clinical academic faculty in our study discussed their efforts to tailor the learning experiences to ensure learners' sequential progression in terms of requirements, complexity, and roles and responsibilities. These findings are consistent with previously published articles describing a stepwise approach of CBME implementation in other medical contexts.[7,40] For example, sequentially mapping learners' progress included intentionally incorporating simulations within specific learner rotations to provide safe, reproducible and accessible learning experiences to achieve less common EPAs while allowing simultaneous expert observation, focused feedback and deliberate practice.[45] Mapping can also help identify which clinical service and sites to send targeted communication (and when) to help better prepare staff to supervise and assess CBME residents.

Regarding logistical aspects, it is important to recognize that any educational innovation (e.g., curriculum and assessment planning) rarely happens in isolation. Educational innovation results from a concerted effort by dedicated individuals who acknowledge the multidisciplinary perspectives of everyone involved in educating future physicians.[46,47] Our study included multi-stakeholder perspectives, which provided an excellent integration between the clinical, contextual, and educational perspectives. Many participants discussed the importance of partnership when implementing CBME. A partnership suggests that all key stakeholders possess a degree of ownership to plan and implement aspects of the CBME implementation and can serve to anticipate and mitigate potential implementation challenges. For example, leadership in the CBME cohorts recognized the necessity to mobilize administrative resources to coordinate the multiple moving parts of the CBME implementation (e.g., scheduling residents and rotations, monitoring the EPAs, etc.). This recognition led to administrators becoming part of the core CBME implementation team. Their inclusion and expertise further facilitated the data gathering and useability of the EPA assessments, which helped CBME team members make appropriate assessment and promotion decisions to best support resident competency development.

Participants also voiced their displeasure at the disproportionate rate of technological innovations to meet the requirements of their educational innovation. Participants often discussed how the technological delays

negatively impacted their medical practice and patient care. While technology has been discussed to hold promise in medical education[48] and particularly in CBME[16,49] (e.g., learning platforms as efficient links between the assessment process and documentation), this was not the case. There was a delay in developing efficient links between technology and education during our data collection in 2018. Since our data collection, the COVID-19 pandemic has been a catalyst to the widespread adoption of e-assessment practices throughout health professions education that will no doubt increase awareness, adoption and reliance on technology to facilitate CBME implementation.[50,51] Advances in the use of technology might influence transformative changes to innovations in e-assessment and teaching and learning.[52,53]

CBME is continuously being implemented in residency training programs nationally and internationally and is permeating into other health professions programs.[54,55] Researchers have recognized the importance of considering the unique context and tailoring the implementation of CBME accordingly.[56] Sharing lessons learned and real-life experiences play a critical role in improving this educational approach and ensuring its success.[12] The dissemination of knowledge about the implementation of CBME is essential for bridging the gap between theory and practice.[57] By sharing experiences and insights, health professions educators in other contexts can learn from others and improve their implementation. This helps to ensure that the information shared is relevant and practical, which may ultimately contribute to the overall success of CBME implementation.[12] While CBME implementation continues in residency programs across the world, those programs making the transition can benefit from lessons learned, including other health professions seeking to implement a competency-based approach in their training programs.

Limitations

This study is not without its limitations. Our findings are limited to a specific number of potential participants in each of the stakeholder groups, often with only one or two people per group. As a result, we purposively recruited participants who were considered information-rich cases (e.g., program director, administrative coordinator), meaning they could provide valuable insights regarding CBME implementation. The transferability of results may or may not apply in different educational contexts. Finally, the unpredictability of participants' clinical and administrative roles and responsibilities meant that data collection activities could be disrupted. The brevity of some of the interviews were due in part to the participants' busy clinical schedules. However, their responses were concise and elaborate in nature.

Conclusion

Our findings provide insights regarding the planning and implementation of competency-based postgraduate education. The exploration of implementation processes from a plurality of stakeholder perspectives can act as an important mechanism to document and demonstrate the established links between teaching and learning practices and assessment methods from which any residency training program may benefit. Working collaboratively and sharing experiences within and between residency training programs will minimize the effort involved in transitioning residency programs to CBME. Important lessons learned can be shared among programs regarding differences concerning program size, readiness for CBME implementation, and compliance with accreditation requirements.

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