

Barriers and Facilitators in Continuous Medical Education Related to Allogeneic Stem Cell Transplantation: A Qualitative Study of Physicians

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Keywords

Allogeneic stem cell transplantation · Continuous medical education · Semi-structured interviews · Qualitative research · Physician training

Abstract

Introduction: This study explored qualitatively, in a sample of German hematologists working in clinical allogeneic hematopoietic stem cell transplantation (alloHSCT), perceptions of barriers and facilitators to participate in continuous medical education (CME), to provide detailed information on how to improve participation in CME activities related to alloHSCT, which may also be applicable to other areas of medicine. **Methods:** Based on a recruitment campaign of the German Association for Hematopoietic Stem Cell Transplantation (DAG-HSZT), 21 semi-structured telephone interviews were conducted, transcribed, and analyzed using framework analysis. **Results:** Three clusters of barriers were identified that explain why alloHSCT physicians may or may not participate in CME: individual constraints (e.g., better networking, young physicians being overwhelmed by the complexity of alloHSCT), structural constraints (e.g., time and financial issues, tailoring CME courses according to the targeted audience), and content-related constraints (e.g., requirement of CME

sessions, provision of an overview of CME courses, more flexible offers). We discuss the ten most frequently raised issues, including the use of incentives and the need for support at the start of residency, staff shortages, and requirements for learning sessions. **Conclusion:** There is a need for a paradigm shift in CME related to alloHSCT toward a more individualized and needs-based approach. Close monitoring of residents' needs and learning progress, as well as feedback systems, could help identify appropriate CME courses that should be integrated into a tiered learning system. CME should be more targeted to specific audiences (i.e., residents, fellows, and attendees) to provide training that is tailored to individual CME needs. On-demand courses can help balance work and family obligations. Finally, peer-reviewed, up-to-date information platforms should be expanded.

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Plain Language Summary

This study asked 21 German doctors who treat blood cancer what makes it difficult or simple for them to take continuing education classes on stem cell transplants. The aim was to gather suggestions on how to increase participation. The primary obstacles were split into three groups:

Personal obstacles – new doctors are struggling to learn transplant medicine. Social gatherings and networking enhance contribution. Structural obstacles – not having enough time and money are limiting factors for attending courses. The courses should be tailored to specific experience levels. Barriers related to content – although mandating specific courses is helpful, physicians desire more choice. Providing an overview of options and more flexible ways of taking courses would be beneficial. Further investigation into the top 10 common issues revealed the need for incentives and support for new trainees. Staff shortages make it difficult to take time off. More options for learning sessions are needed beyond the ones that are compulsory. Suggestions have been made such as monitoring and providing feedback to residents to help them find appropriate courses. The courses themselves should suit the particular stage people are at in their training. Online courses that can be accessed on-demand would facilitate fitting education around everyday commitments. Additionally, there should be a greater quantity of learning resources that have been subject to peer review and are up-to-date. Key finding: doctors who are busy treating blood cancers with stem cell transplants need more tailored and practical ongoing education to help them deliver an effective service.

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Introduction

Allogeneic hematopoietic stem cell transplantation (alloHSCT) is one of the most rapidly evolving areas of medicine, beginning only 50 years ago and now considered the standard of care for hematologic malignancies [1]. Consequently, treatment guidelines frequently change, and new treatment approaches emerge. Also, despite frequent medical innovations in this field, there is a high burden of treatment for patients including significant morbidity and mortality [2]. Therefore, continuous medical education (CME) is essential to provide high-quality care [3].

Physicians worldwide use CME to improve performance and clinical outcomes, as well as for license renewal [4, 5]. However, not all physicians actively seek out CME or other postgraduate training opportunities for various reasons [6], including physician workforce shortages and the resulting increased workload and lack feedback from supervisors [7], as well as disruption of a functional work-life balance [8, 9]. Further previously identified barriers include increased expenses and travel time to attend CME [10–12]. Facilitators for attending CME include organizational and peer support [13]. An additional constraint in alloHSCT is the frequent lack of specific interest of residents and fellows in CME who work in transplant units only temporarily as part of their routine residency and fellowship programs [14, 15].

Despite the obvious need for CME, the German health care system does not require residents and fellows to participate in CME, whereas other European countries, such as Ireland or the Netherlands, employ mandatory CME programs that include regular assessments of performance [16]. In Germany, after completion of fellowship, specialists are required to participate in a number of CMEs independent of their specialty in order to maintain their license [17], which limits the effectiveness of CME [18].

Furthermore, the COVID-19 pandemic resulted in a rapid increase of online CME [19, 20], which improved accessibility since previously 60% of physicians reported that travel time was one of the main reasons to refrain from CME courses [11]. However, previous studies have shown that face-to-face training is valued for personal interaction, especially in more advanced residents or fellows [11, 14, 21].

Despite its critical importance, little is known about the perspectives of alloHSCT physicians on CME. To address this gap, we performed a qualitative study among transplant physicians to explore their needs and expectations related to CME in order to identify barriers and facilitators to CME participation and suggest ways to improve CME activities.

Methods

The qualitative study was conducted in German transplant centers using an interview guide (see Appendix), which was developed by an interdisciplinary team from various backgrounds (communication scientist, sociology, oncology, internal medicine), including physicians involved in alloHSCT. The interview guide can be found in the online supplementary material B (for all online suppl. material, see <https://doi.org/10.1159/000536429>). Purposive sampling was chosen to include participants from various sociodemographic and professional backgrounds. The sample consisted of residents, fellows, and attendings with diverse clinical characteristics, e.g., size of transplantation center, scholarly activity, and years in practice. No incentives or compensation were offered for participation. Respondents were informed prior to the interview that the data would be pseudonymized to reduce reporting bias.

Ethical approval was obtained from the Local Ethics Committee prior to data collection (approval no.: 20-1663-101). All participants signed an informed consent form prior to the interview. Physicians were eligible to participate in the study if they were clinically involved in alloHSCT in Germany at the time of the interview. Physicians who performed only experimental alloHSCT were not eligible. Recruitment of eligible participants was facilitated by the German Association of Hematopoietic Stem Cell Transplantation (Deutsche Arbeitsgemeinschaft für Hämatopoetische Stammzelltransplantation und Zelluläre Therapie e. V.), which informed potentially eligible physicians about the study via mailing lists. Cluster bias was minimized by mapping the participating centers. Due to the COVID-19 pandemic, all interviews were conducted by telephone between 2020 and 2022 by a researcher experienced in qualitative research methods.

Interviews were digitally recorded and transcribed verbatim. Data collection ceased when data saturation was deemed to have been reached [22, 23]. Interviews were analyzed using MAXQDA 2020 software. Analysis was conducted using framework analysis, which provides a comprehensive and systematic approach to processing and interpreting qualitative data [24–26].

Results

Sample Characteristics

A total of 13 alloHSCT centers were recruited, with a response rate of 68%. Sample characteristics are summarized in Table 1. Interviews lasted a median of 27 min (range 10–43 min). At the end of the interview, participants were given the opportunity to provide additional comments or questions.

Ten themes were identified as barriers and facilitators to CME participation. They were clustered into individual (I), structural (S), and content-related (C) aspects and ranked according to reported frequency. Results are summarized in Table 2. Quotes from participating physicians can be found in the online supplementary material A (see <https://doi.org/10.1159/000536429>).

Expenses

Lack of time and funding were identified as the main reasons for not attending CME courses. Interestingly, larger centers seemed to be more reluctant to provide financial support, while smaller centers seemed to be more generous in this regard. Residents frequently reported that only CME courses that were necessary for their daily practice were reimbursed. Larger hospitals, on the other hand, often offered in-house CME courses to health care providers (HCPs). Young residents who had recently joined the department’s research program or clinic were often unable to attend national or international conferences without a pharmaceutical sponsor. Subsidization of CME activities was more often seen as a token for good work, including scientific work.

The Rotational Curriculum of Residents and Fellows

Most internal medicine and oncology fellows and residents spend a limited time (i.e., approx. six months) in the transplant program and commonly have no particular interest in the topic. Identifying a career focus (e.g., supported by a mentor/attending physician) may help boost transplant-specific CME engagement.

Feeling Overwhelmed

Most residents felt supported by their attendings but were often overwhelmed during their first weeks in alloHSCT. They often missed introductory courses, and 87% of residents reported that they were unaware of existing introductory courses such as the German Transplant Academy. Few re-

Table 1. Participant characteristics

Characteristics, n = 21	No.	In %
Total number of centers included	13	N.A.
Resident	9	42.86
Fellow	8	38.10
Attending	4	19.05
Gender		
Female	12	57.1
Male	9	42.9
Marital status		
Married	18	85
Single	3	15
Scientific engagement	15	70
	Mean	Median (SD)
Age, years	37.48 (range 33–53)	4.88
Professional years in job	8.3 (range 4–14)	2.89
Years in alloHSCT	4.1 (range 1–10)	3.06

ported an adequate orientation concept at the beginning of the alloHSCT program. Of note, 6 of the 13 centers included in this study were not JACIE-certified (Joint Accreditation Committee: ISCT-Europe and EBMT). As the certification requires structured initial skill adaptation training, study participants from non-certified centers reported more difficulties participating in CME compared to certified centers.

Staff Shortages and Insufficient Time for CME

Greater organizational support for CME seemed especially important for residents, as CME leave is frequently limited to 3 days per year. This was particularly true in larger centers and in accordance with standard physician contracts. Most respondents reported that CME had to be scheduled after work or during vacations, which interfered with personal life, such as family obligations. Four centers managed to integrate CME into their daily routines. However, residents and attendings in this study commonly reported that training during the workday or taking time off for CME was not possible due to staffing shortages, and some predicted that this problem would worsen in the coming years due to demographic transition. This was more often reported by residents, who highlighted difficulties integrating CME into their daily routines, while attendees were more likely to report being able to attend CME during working hours.

Format of CME Courses

Participants reported a rapid loss of concentration during standard lectures. Most residents or young attendings preferred case-based CME with interactive discussions in small-groups. In contrast, attendings were more interested in “meta topics,” such as communication with patients or staff and other interpersonal skills.

Table 2. Summary of results

Ranking	Cluster	Topic	Description
1	S	Expenses	<ul style="list-style-type: none"> Lack of educational grants, lack of travel grants, and compensation of expenses for conferences The sample could show that smaller hospitals offered more generous compensation, whereas bigger hospitals offered more in-house CME
2	S/I	Training curriculum	<ul style="list-style-type: none"> Lack of residents' interest in transplant-specific CME given constant fluctuation of residents, even more observable since the COVID-19 pandemic Lack of career perspective in alloHSCT
3	I/S/C	Overwhelmed at the beginning	<ul style="list-style-type: none"> Lack of support of attendings or inadequate supervision, including lack of appropriate introduction into alloHSCT Lack of continuous, structured CME programs
4	S	Staff shortages and lack of time for CME	<ul style="list-style-type: none"> Three free days for CME during the year are common but not sufficient, and participation in live CMEs is often not possible due to lack of staff and lack of flexibility to attend CME during worktime
5	C	Format of CME sessions	<ul style="list-style-type: none"> Concentration rapidly decreasing in lectures, thus case-based learning, interactive sessions, and small-group learning favored but often lacking
6	S/I	Lack of incentives	<ul style="list-style-type: none"> Researchers are often granted compensation of expenses for more prominent conferences but less for CME Virtual conferences potentially led to a lack of interest in research and CME
7	I/S	Better networking	<ul style="list-style-type: none"> Case conferences involving different centers and staff exchange with other centers often lacking Secure platform for exchange on clinical care in alloHSCT needed
8	C	Better overview of available CME courses	<ul style="list-style-type: none"> Difficulty to find suitable CME courses Content-related spectrum insufficient Internet offers are spamming inboxes
9	C	More flexible offers	<ul style="list-style-type: none"> On-demand CME courses often lacking but particularly needed by physicians with children as parents wish to integrate CME into daily clinical routines
10	I/S/C	Offer tailored CME courses	<ul style="list-style-type: none"> Lack of tailored courses targeted to participants' needs, e.g., residents require different CME compared to attendings

S, structural; C, content-related; I, individual.

Lack of Incentives

To help them disseminate their scientific work, residents engaged in research often received support for registration fees and travel expenses related to international and national conferences. With the pandemic, these conferences were often held as virtual events, which in turn reduced the motivation of residents to conduct further research. None of the participants in this study received an incentive to attend CME, and most physicians agreed that compensation for attending CME should be provided by the employer. This may also reduce dependence on pharmaceutical sponsors.

Better Networking

Both residents and attendings reported a need for better networking. One participant completed a rotation at another center and reported a significant benefit in

terms of knowledge and networking. Other platforms to exchange information on clinical procedures or further ideas on optimal clinical practice were also suggested. Some centers already had a quality panel, which could be extended to other centers, or inter-center quality circles could be established to improve networking.

Better Overview of Available CME Courses

Most HCPs in our sample complained about difficulties in finding suitable courses, although they appreciated the abundance of courses on offer. It was noted that other disciplines and professional associations, such as the German Association for Intensive Care and Emergency Medicine (DIVI), offer a central website listing all CME courses relevant to a specific topic, including providers not affiliated with the respective association, which eases the process of identifying courses.

Table 3. Advised solutions

Topic	Potential solutions
Need-based CME offers to help overcome staff shortages (cf. section: B, C)	<ul style="list-style-type: none"> • Define a structured curriculum and allow for longitudinal training, e.g., with the Transplant Academy • Subsidize time and grants for CME; increase the number of days for CME in the contract; consider “homecoming days” • Track residents’ progress, e.g., with progress tests and structured feedback from attendings including learning goals
Provide learning space and time (cf. section: D)	<ul style="list-style-type: none"> • Dedicate time for CME; working in small-groups and moderated by a specialist is probably more effective; also teach rounds with an evidence-based basis for clinical discussions • JACIE certification to facilitate CME
Make CME more flexible (cf. section: E)	<ul style="list-style-type: none"> • Increasing CME on-demand offers • Increasing engagement in new learning technologies like AI tutors with self-paced courses • Facilitating microlearning (60 min or less), e.g., with lunchtime learning sessions, virtual journal clubs, case-based discussions, and inter-center collaboration
Networking and online resources are vital structures to facilitate HCP engagement (cf. section: F)	<ul style="list-style-type: none"> • Staff exchanges with other centers or inter-center case conferences • Easily accessible and comprehensive overview of CME offers, with a filtering function according to experience and level of proficiency • Forum (e.g., online) for physicians to discuss current topics and thereby foster inter-center collaboration • Expand often-used resources, like Onkopedia, to include further alloHSCT topics
Content providers need to find more suitable teaching formats and styles (cf. section: G)	<ul style="list-style-type: none"> • Problem-based learning in small-group settings to tackle practice-relevant problems • Specialists may require CME on meta topics like doctor-patient communication

More Flexible Offers

As described above, young physicians and physicians with children particularly emphasized the need for on-demand courses. Young physicians also emphasized the need for CME during work hours, with lunchtime CME formats being particularly popular.

Offer Tailored CME Courses

Many participants complained that CME courses did not match their knowledge and needs. While young residents were more interested in the basic principles and procedures of clinical practice, fellows or attendings were more interested in learning about new developments or specific complications “for when the guideline ends” (physician, 43 years old, male), highlighting the need for targeted and sufficiently described CME courses that provide participants with access to needs-based and tailored learning.

Discussion

Our study could demonstrate that several factors may hinder CME participation, including time constraints and costs associated with CME, as well as a lack of motivation

since COVID-19. First-year residents often felt overwhelmed and needed more guidance in identifying appropriate CME opportunities, which was often exacerbated by staffing shortages. Existing CME opportunities were perceived to be poorly communicated, in part due to a lack of networking between centers. Finally, young families in particular asked for more flexible on-demand options and didactic approaches focused on smaller groups and case-based formats. Table 3 (p. 10) provides a compact summary of possible solutions to the topics identified.

A: Comparison to Other Medical Specialties

Other medical specialties face problems similar to those faced by physicians involved in alloHSCT. Especially during the transition from undergraduate to postgraduate medical education, the changing role and increased responsibilities, along with feelings of incompetence and stress management, play a crucial role for most residents [27]. The practical problems of not participating in CME are similar. E.g., general practitioners complain about the high workload and significant time constraints [14]. Furthermore, in addition, 80% of physicians in Germany complain about unstructured postgraduate training [7].

B: Need-Based CME Offers to Help Overcome Staff Shortages

Despite the urgent need for CME in alloHSCT [28], our study found a lack of support (e.g., in the form of travel grants and paid time to attend CME), especially in larger transplant centers [28]. Demographic changes, the COVID-19 pandemic, and the complexity of managing comorbidities in aging patients have led to increased turnover of medical staff in various disciplines, increasing the burden on clinics to find and adequately train staff [29]. Additional time for training beyond the negotiated minimum number of days could help attract and retain new staff. Our findings also suggest that subsidizing time and providing grants for CME courses is often seen as a reward for good work. In contrast, a significant proportion of residents reported a lack of CME opportunities that met their needs. Given that the field of alloHSCT in particular has become increasingly complex and residents often report feeling overwhelmed, this could increase staff turnover and hinder the delivery of high-quality care.

C: Monitor Learning to Engage Learning

Monitoring resident learning is a cornerstone of identifying learning needs and tailoring appropriate CME courses [6, 30]. E.g., the Netherlands has implemented twice-yearly “progress tests” in several of its residency programs to monitor the resident’s learning and help them improve skills, confidence, and self-awareness [31–33]. In Germany, similar feedback systems involving attendance once or twice a year are rarely used [7]. Previous research supports the importance of this low-cost and readily available tool to increase engagement in CME and monitor progress [34]. In addition, setting learning objectives for the year or as part of the training curriculum may be beneficial, and other specialties have moved in this direction [35, 36]. This type of “learning trajectory” could not only help identify appropriate CME courses to provide individualized learning but also create intrinsic incentives for learning and progress, thereby supporting self-management of professional careers [37]. This may be especially beneficial for residents entering the field of alloHSCT. Other programs, such as the Groninger GP curriculum, have introduced a “homecoming” day per week to learn and practice skills or reflect on cases [38]. To our knowledge, such courses have not yet been implemented in Germany. This gap could be closed if introductory courses, e.g., at the Transplant Academy, were expanded into a longitudinal curriculum to accompany residents throughout their postgraduate training. Such longitudinal CME courses have shown promising results in other curricula and have helped HCP to find a platform for postgraduate learning [39, 40].

D: Providing Learning Space and Time

Integrating CME into the clinical routine can be challenging. Trainees need opportunities to learn and “digest” new information, critically reflect on it, and incorporate it into clinical practice. Dedicated learning time, in which residents work in small-groups on specific cases facilitated by a specialist, could help to identify and close knowledge gaps. An alternative strategy could be teaching rounds in which evidence-based rationales for clinical decisions are discussed. Nevertheless, participation in CME remains a challenge due to lack of staff and time. Full accreditation by the Joint Accreditation Committee of ISCT-Europe and EBMT (JACIE) can promote CME, as the certification rules define the critical need for CME, which includes education of all HCP. In addition, JACIE-accredited centers seem to value time for in-house education more than non-accredited centers. Thus, JACIE accreditation may facilitate CME, but it does not guarantee sufficient training, as our study shows.

E: Make CME More Flexible

The majority of residents and fellows in Germany face the challenge of balancing family and work obligations, a fact that has been largely ignored in the past [41]. It is therefore crucial to allow for time flexibility in CME courses and to provide CME on demand. New learning environments, such as AI tutors, are emerging and could help facilitate low-threshold offerings that are more acceptable to residents [20]. Besides, shorter sessions with “learning bites” (i.e., less than 60 min, such as microlearning) could help integrate CME into busy clinic routines [42]. Microlearning has been shown to improve clinicians’ skills and can be delivered in a variety of formats, such as video, podcasts, or news articles [42].

F: Networking and Further Online Resources as Vital Structures to Facilitate CME

Our results highlight the need for a more comprehensive approach to identifying existing CME courses according to individual levels of expertise. Most participants in our study were not even aware of basic courses on alloHSCT, despite their availability and distribution via the internet. This issue has been addressed by patient advocacy organizations like BMT Infonet (bmtinfonet.org), which promote these courses themselves. This highlights the need for an easily accessible and comprehensive overview of available CME courses and resources. Our study could show a significant interest in more collaboration in the field of alloHSCT at the working level. Networking seems to be particularly important in a field like alloHSCT, which is highly specialized and rapidly evolving but frequently performed in small teams. Staff exchanges with other

centers or inter-center case conferences could help broaden perspectives and familiarize staff with different clinical routines. This may also have a positive effect on attitudes toward work and career development, which in turn could help bind human resources [43]. Participants in our study reported the need for further development a peer-reviewed, certified information platform. In Germany, most hemato-oncologists use “*Onkopedia*,” which according to the majority of participants does not cover all topics in transplantation medicine. To increase self-directed and on-demand learning, currently missing topics could be added, and the platform could be linked to other platforms providing peer-reviewed information, such as the EBMT Handbook (<https://www.ebmt.org/education/ebmt-handbook/>).

G: Content Providers Need to Find More Suitable Teaching Styles and Expand Repertoire

Our findings suggest that the teaching style and formats of many CME courses should be revised to increase participation [5]. In particular, residents preferred problem-based learning in small-groups that address practice-relevant issues such as therapeutic decisions or complication management. Consistent with previous research, problem-based learning may be a way to increase the effectiveness of CME on physician performance and patient outcomes [4, 6, 44], whereas more traditional (didactic) formats, when used alone, have failed to change physicians behavior or increase satisfaction with CME [30, 44, 45]. Other strategies, like serious medical games or more complex virtual environments that encourage participation, e.g., in virtual journal clubs or virtual case-based discussions, showed promising results and could also promote collaboration between centers [46–48]. Attendings also expressed a desire for more “meta” topics such as doctor-patient communication, highlighting the need for targeted CME according to the level of knowledge in the field [4]. The rapid developments related to alloHSCT may provide a suitable context to implement more innovative and on-demand learning formats [48].

Limitations

Although this study included a variety of centers of different sizes and locations and recruited participants with different levels of knowledge, the results must be considered with several limitations. First, there may have been a recruitment bias, as participation in the study may be more appealing to HCPs who are already interested in CME, and therefore, the survey may not have reached physicians who do not participate in CME at all. In line with this, 70% of participants reported being active in alloHSCT research, indicating a specific interest in this area. Social

desirability may also have influenced the results, with HCPs indicating a generally desirable level of interest in CME participation. In addition, there might also be a selection bias, as the majority of respondents were residents. The sample size of attendings is also for a qualitative study quite small. Further research is therefore warranted.

Conclusion

To the best of our knowledge, this is the first qualitative study to explore in depth physicians’ perceptions of barriers and facilitators to CME participation related to alloHSCT in Germany. Our findings highlight the need for a paradigm shift in CME to focus on the needs of specific target populations (e.g., residents and attendings). This could help provide CME tailored to individual levels of expertise and facilitate the integration of CME into busy clinical routines. Within such a new educational framework, close monitoring of residents’ progress and feedback systems could help identify individually tailored CME courses that should be integrated into a stepwise and need-based learning approach. This could include new teaching methods such as microlearning or AI tutors. CME providers should address the need for more on-demand courses to help coordinate CME with other work and personal commitments. Adapting teaching styles to a more problem-based (or case-based) approach using small-groups and implementing inter-center CME networks may further improve HCP performance. Finally, peer-reviewed and evidence-based information platforms need to be expanded.

Statement of Ethics

This study was reviewed and approved by the Ethics Committee of the University of Regensburg, Germany, in accordance with the Declaration of Helsinki; approval number: 20-1663-101. Written informed consent for participation was obtained from all interview partners prior to the interview.

Conflict of Interest Statement

D.W. received honoraria for CME lectures from Novartis, Takeda, Sanofi, and Mallinckrodt. A.H., S.E., G.K., and P.D. have no competing interests.

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Author Contributions

S.E.: literature search, conduct of interviews, analysis of data, and paper written; D.W., N.K., G.K., and P.D.: paper written; A.H.: proposal, ethics, analysis of data, and paper written.

Data Availability Statement

The pseudonymized dataset generated and analyzed as part of this current study is not publicly available due to potential identification of the interview partners but is available from the corresponding author on reasonable request.

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