Global haematology

Global paediatric haematopoietic stem-cell transplantation training and access: providing strategies to overcome challenges

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Recognising the problem

The provision of a good paediatric haematopoietic stem-cell transplantation (HSCT) service requires significant skill and a coordinated team effort. The acquisition of this expertise has been shown to be heterogeneous both in terms of the pathway to become a paediatric haematologist and the way in which knowledge is acquired. This heterogeneity was depicted in our previous publication from the European Society for Blood and Marrow transplantation Trainee Committee (EBMTTC), where substantial variation in training duration was shown worldwide. Some countries require specific training and examinations in haematology and HSCT, while others only require a specific period of time spent in the discipline.

To further explore variations in HSCT training pathways for paediatricians in different countries, we created a survey with input from EBMTTC members. An electronic survey using REDCap (Research electronic data capture) was distributed to all members of the EBMTTC, who were also asked to distribute the survey to their local societies and colleagues. Ethical approval was obtained by the University of Witwatersrand Research Ethics Committe, Johannesburg, South Africa. The five parts of the survey focused on basic undergraduate, post-graduate, and HSCT training; structure, access to, and human resources of the HSCT service (if present); and they way costs of HSCT services are covered. We collected 83 complete responses to the survey (appendix p 1): the majority of participants were from Europe (39 [47%] of 83), South America (13 [16%]), and Africa (12 [14%]).

The global variability of HSCT access and funding

The first clear split between high-income regions (HIR) and middle-income regions (MIR) emerged in the number of HSCT units per country, specifically catering for children younger than 19 years. Although more than ten units per country were observed across Europe (28 [74%] of 38 participants), Asia (7 [78%] of 9), and North America (9 [100%] of 9), ten (91%) of 11 participants from Africa and seven (54%) of 13 from South America, described fewer than five units per country in their respective regions (appendix pp 3, 9). Similarly, participants from both these regions confirmed difficulty in accessing HSCT (11 [92%] of 12 in Africa and 10 [77%] of 13 in South America), either due to a paucity of transplantation centres (12 [100%] of 12 and 11 [85%] of 13, respectively), lack of donors (11 [92%] of 12 and 8 [62%] of 13) or costs (11 [92%] of 12 and 10 [77%] of 13; appendix pp 3, 7). The HLA diversity and the paucity of available donors in South Africa has been discussed, and in Brazil, people with higher proportions of African genetic ancestry have been shown to have the lowest probability of finding a matching HLA donor, compared with people identifying as mixed or white. This observation has been confirmed even in HIR where access to an HLA-matched donor is a challenge for people from non-European ancestry. Repercussions of these described barriers to HSCT are a marked reduction in the number of transplantations performed, with nine (75%) of 12 participants from African centres declaring fewer than 20 paediatric (<18 year) allogeneic HSCT performed per annum (appendix pp 4, 7).

These discrepancies are further elucidated in the number of chimeric antigen receptor (CAR) T-cell infusions administered per year for paediatric patients (appendix pp 4, 9). The majority of HIR participants declared at least 30 infusions per year in their countries (13 [54%] of 24 respondents in Europe and 6 [75%] of 8 in North America), whereas this number is often below ten a year in MIR (5 [83%] of 6 in Asia and 2 [66%] of 3 in South America; appendix pp 4, 8). The worst situation was noted in Africa, where CAR T-cell therapy is not available at all for paediatric patients (appendix pp 4, 7). Finally, when asked how HSCTs are funded within their countries, most physicians from Europe (31 [91%] of 34) and South America (10 [83%] of 12) stated that universal health insurance is available, with the state covering all transplantation-related costs (32 [94%] of 34 responders from Europe and 7 [58%] of 12 from South America), with a far different picture in Africa, Asia, and, surprisingly, North America (appendix pp 4, 9). The provision of equitable HSCT services within these latter regions would thus be plagued by inequalities to access, with insured patients automatically benefitting from more resources.

The role of global professional memberships

Even in Europe, 22 (56%) of 39 participants felt that professional societies' memberships were not easy to obtain, and these sentiments were shared by African, Asian, and South American participants (appendix pp 3, 6). Historically for EBMT, membership to the society was linked to HSCT centre participation, and individual membership platforms did not exist until more recently. Cost was cited as a reason for difficulty in accessing membership for at least one third of participants from these regions, revealing that better strategies might need to be employed

to attract new trainee members (appendix pp 3, 6). As a consequence, when asked about the awareness of EBMT and The American Society for Transplantation and Cellular Therapy (ASTCT) recommendations for a curriculum in HSCT and cell therapy, the majority of replies from all regions noted a complete absence of knowledge or only an awareness of "..something about it.." rather than confirmation of its existence (appendix pp 2, 6).

Standardisation of training must become a priority

The survey confirmed that training requirements to become a paediatric HSCT specialist vary widely among regions. Furthermore, the majority of participants from Europe (28 [74%] of 38), Africa (11 [92%] of 12), and South America (7 [54%] of 13) claimed that paediatric HSCT training is not well incorporated into HSCT training (appendix pp 2, 5). Physicians working in Asia (3 [60%] of 5) and North America (4 [50%] of 8) declared that a formal paediatric HSCT programme often exists in their universities and is usually incorporated into the haematology–oncology residency programme, with an additional fellowship. This situation highlights that even in HIR where there is ease of access to HSCT, differences in proficiency training exist and must be addressed. In the absence of formal training programmes, respondents from all regions reported learning transplantation skills from colleagues and informal training programmes as the main ways in which HSCT competency is established (appendix pp 2, 5).

There is a strong overall theme of support for improvement in standardisation of training programmes, confirmed by 62–92% of all respondents agreeing that EBMT–ASTCT recommendations should be implemented, with a specific focus on paediatric HSCT (appendix pp 2, 6). The majority of physicians declared that several positive adjustments could be made for improving paediatric HSCT training: first, a joint residency programme between two different centres or countries, which includes mobility of residents between centres (67–100% of participants), and secondly, networking with other HSCT or cellular therapy centres for e-learning modules (67–100% of participants (appendix pp 2, 6). Indeed, a standardised curriculum with training experience and accreditation across countries was defined as a key factor for attracting young paediatricians to pursue a career in paediatric HSCT and cell therapy, and promote expertise and quality care for paediatric patients worldwide (77–100% of respondents; appendix pp 3, 9).

Defining the way forward

The disparate training of paediatric HSCT specialists has many widespread disadvantages, including, but not limited to, a lack of global competency standards and difficulties in collaborating and harmonising treatment protocols. We have recognised substantial differences in access to HSCT, particularly evident in Africa, and a separate stream of collaborative channels might be required to address particular needs in this area. The recognition and shift towards global standardisation of knowledge and skills have already been noted in multiple other specialty areas (eg, in surgical oncology) as a means to address substantial global training variability. WHO has also attempted to standardise global medical training but acknowledges the difficulties associated with such an undertaking. The standardisation we hope to achieve, and particularly the provision of training across borders between HIR and MIR, will allow a more harmonised approach to HSCT while simultaneously addressing obstacles. This approach will enable colleagues from MIR to gain access to a wide HSCT support network in HIR, thereby facilitating collaboration while also enabling HSCT specialists from HIR to be exposed to the difficulties faced by those working in MIR, leading to a better overall understanding of the challenges that need to be overcome. We recognise that our survey was limited by its inability to identify individual countries from within the broad global regions and further differences here might also need to be addressed.

What is evident is that the EBMTTC, which began as a peer education initiative, has evolved into a shared space for global knowledge sharing and is in a particularly advantageous position to capitalise on the networks it has created to establish a global standard of knowledge and competency in the field of paediatric HSCT. This progress might initially take the form of online learning and training, and the Chimera e-learning programme is a good example of this. Subsequently, international exchange fellowships and a global standardised curriculum for paediatric HSCT training is our aim. Improved training and access might also improve HSCT donor awareness, particularly in MIR, and thus increase diversity of donors in the world marrow donor programme. While acknowledging the obstacles that we will face, facilitating more homogenous treatment and management protocols, and attempting to reduce the differences in training that exist globally, is a dream that we must actively work towards.

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For more on **requirements for a haematopoietic stem-cell transplantation service** see *Bone Marrow Transplant* 2018; **53:** 1548–52

For the **previous EBMT publication** see **In Focus** *Lancet Haematol* 2023; **10:** e492–94

For the **electronic survey** see https://redcap.core.wits.ac.za/redcap/surveys/?s=JECWKRCHNLAJP4HX

See **Online** for appendix

For the **definition of high-income regions and middle-income regions** see https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

For more on the **situation in South Africa** see *Cytotherapy* 2021; **23:** 548–57

For more on the **situation in Brazil** see *Front Immunol* 2020; **11:** 584950

For more on **access to an HLA-matched donors in high-income regions** see *Blood Adv* 2019; **3:** 939–44

For more on **standardisation of knowledge and skills in surgical oncology** see *Eur J Surg Oncol* 2016; **42:** 754–66

For more on **The WHO standardisation of global medical training** see *Global Health* 2021; **17:** 96

For the **Chimera e-learning programme** see https://www.ebmt.org/chimera