Academic Training of Medical Students in Transfusion Medicine, Hemotherapy, and Hemostasis: Results of a Questionnaire-Based Status Report in Germany

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Keywords

Transfusion medicine · Hemotherapy · Hemostasis · Curricula · Academic training

Summary

Background: As a consequence of the German Transfusion Act and the corresponding Hemotherapeutic Guidelines of the German Medical Association, the National Advisory Committee Blood approved a recommendation (votum 29) in 2003 to specify students' training in transfusion medicine, hemotherapy, and hemostasis. The objective of this study was to assess the current status of teaching in these fields. **Methods:** A questionnaire-based evaluation was performed at the medical schools in Germany (n = 34). Responses were analyzed by descriptive criteria, except for weekly semester hours of teaching. **Results:** Responses were obtained from 30 medical faculties (88%). Among them, 18 had conducted votum 29 (12 'completely', 6 'essentially'), while 7 had done so only 'in part' and 5 'not at all'. 13 of 30 sites (43%) reported that no faculty-related curriculum in transfusion medicine and hemostasis (hemotherapy) exists. At 28 of 30 medical schools (93%), teaching in transfusion medicine, hemotherapy, and hemostasis is integrated into cross-curricular topics of interdisciplinary programs, including lectures. The corresponding semester hours of teaching per week ranged from 0.5 to 12 h/week. **Conclusion:** Votum 29 is incompletely established. Consequently, academic teaching in transfusion medicine, hemotherapy, and hemostasis requires structural and conceptual improvement to fulfill legal specifications and regulatory constraints.

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Introduction

Translation of scientific and medical progress into clinical practice and patient care represents an ongoing challenge to academic teachers and physicians. This is also true for the training of medical students. Consequently, in the past 10 years, both the National Advisory Committee Blood of the German Federal Ministry of Health and the Committee of Academic Chairmen in Transfusion Medicine and Hemotherapy have addressed the academic training and tuition of medical students in transfusion medicine, hemotherapy, and hemostasis. Along with that, in 2003, the National Advisory Committee Blood approved a recommendation (designated 'votum') entitled 'Student Training in Transfusion Medicine and Haemostaseology (Haemotherapy)' (votum 29) [1], as required by the German Transfusion Act [2–5]. Specifically, the Committee of Academic Chairmen in Transfusion Medicine and Hemotherapy (Hochschullehrerkonferenz Transfusionsmedizin – Hämotherapie), a non-governmental association of university professors in this field, has repeatedly discussed formal and practical issues of academic education to implement and evaluate standards of teaching and training in transfusion medicine, hemotherapy, and hemostasis. A major concern results from the fact that neither transfusion medicine nor hemotherapy are compulsory subjects of the current Regulation Governing the Licensing of Medical Doctors (Approbationsordnung für Ärzte) [6], including recent amendments and revisions [7, 8]. Facing this background, the Committee of Academic Chairmen in Transfusion Medicine and Hemotherapy initiated a review on the current education of MD students in transfusion medicine, hemotherapy, and hemostasis at the medical schools in Germany. This inquiry was conducted by the National Advisory Committee Blood of the

Table 1. Questionnaire. The departmental representatives were asked to respond to this 9-item-questionnaire as specific as possible

- 1) Did you implement votum 29 (V29) of the National Advisory Committee Blood at your faculty? Is the curriculum ‘Student Training in Transfusion Medicine and Hemostasis (Hemotherapy)’ with the ‘catalogue of teaching contents’ (items 1 through 8), attached to V29, completely offered to clinical students?
- 2) In which way are transfusion medicine and hemostasis (hemotherapy) integrated in the teaching program, e.g., as an elective subject?
- 3) Did you implement a faculty-related curriculum?
- 4) Do you examine the subjects of this curriculum? Do the students have to take an oral examination or a written test?
- 5) Are compulsory student courses (according to the Regulation Governing the Licensing of Medical Doctors, Approbationsordnung für Ärzte) offered in transfusion medicine and hemostasis (hemotherapy)?
- 6) Are transfusion medicine and hemostasis (hemotherapy) integrated into cross-curricular topics of interdisciplinary educational programs encompassing different medical disciplines (according to the Regulation Governing the Licensing of Medical Doctors, Approbationsordnung für Ärzte)?
- 7) Are teaching contents of transfusion medicine and hemostasis (hemotherapy) provided by lectures (according to the Regulation Governing the Licensing of Medical Doctors, Approbationsordnung für Ärzte, ÄAppO § 27)?
- 8) How many semester hours of teaching per week in transfusion medicine and hemostasis are provided?
- 9) How and by whom are student courses performed in transfusion medicine, hemostasis, and hemotherapy at medical schools that have a blood donation center and a transfusion service only but no chair or established professorship in transfusion medicine?

German Federal Ministry of Health and processed through official channels. We now report on the results of this evaluation, which were discussed by the members of the National Advisory Committee Blood in their session in September 2013.

Material and Methods

Data Collection

In an official request sent to the ministers of science of the 16 federal states of Germany, the Chairman of the National Advisory Committee Blood of the German Federal Ministry of Health addressed three key questions:

i) How and to what extent are medical students instructed in basics of transfusion medicine and hemostasis, including practical aspects of hemotherapy such as defined indications, type of hemotherapeutics, monitoring of hemotherapy, and assessment potential side effects?

ii) Do the students have to pass an oral or written test, in which the key issues (modules) of the curriculum are being examined?

iii) How and by whom are student courses performed in transfusion medicine, hemostasis, and hemotherapy at medical schools that have a blood donation center and a transfusion service only but no chair or established professorship in transfusion medicine?

This official request together with a specified questionnaire (table 1) was forwarded via deans and educational deans (Studiendekan) of the medical faculties of all universities in Germany to the responsible departmental representatives. Their specified answers were returned in reverse course to the Chairman’s office of the National Advisory Committee Blood and subsequently analyzed. A preliminary report of this survey was presented by the Speaker of the Committee of the Academic Chairmen in Transfusion Medicine and Hemotherapy to the National Advisory Committee Blood in the assembly on September 6, 2013.

Fig. 1. Current status of implementation of votum 29. Responses from 23 medical schools are depicted. Inset: Data from North Rhine-Westphalia (NRW) that were itemized as specific as possible. The term ‘essentially implemented’ was not defined in the statement provided by the ministry.

Fig. 2. a Existence of a faculty-related curriculum in transfusion medicine and hemostasis (hemotherapy). Responses from 23 medical schools are shown. b Examination of subjects according to a faculty-related curriculum in transfusion medicine and hemostasis (hemotherapy). Responses from 23 medical schools are shown.

Data Analysis

The analysis and interpretation of data was performed by descriptive criteria such as ‘yes/no’, ‘performed/not performed’, ‘completely/partially/not at all’, or ‘available/not available’, except for semester hours of teaching per week.

Results

The number of medical schools or medical faculties in Germany comprises a total of 36. No evaluation was performed at Witten-Herdecke. A special case is given in Giessen-Marburg representing two distinct universities but one university medi-

Are teaching contents of transfusion medicine and hemostasis (hemotherapy) provided by lectures?

Fig. 3. Teaching contents of transfusion medicine and hemostasis (hemotherapy) provided by lectures. Responses from 23 medical schools are depicted. Inset: Data from North Rhine-Westphalia (NRW). Note that the teaching portfolio is different in this federal state, as compared to the 23 sites of the pooled analysis, underlining the current diversity in training of MD students.

Table 2. Current status of academic training in North Rhine-Westphalia. Summarized responses from 7 medical schools were provided by the Ministry of Science and itemized as specific as possible

No.	Questions	Responses	
1	Implementation of votum 29?	essentially (n = 6)	partially (n = 1)
2	Integration of transfusion medicine and hemostasis (hemotherapy)?	yes (n = 7)	
3	Does a faculty-related curriculum exist?	yes (n = 7)	
4	Examination of curricular contents?	yes (n = 7)	
5	Are courses offered?	yes (n = 7)	
6	Integration into cross-curricular topics of interdisciplinary educational programs?	yes (n = 6)	no (n = 1)
7	Are lectures offered?	yes (n = 2)	no (n = 5)
8	Semester hours of teaching per week?	4–12	

cal center and one teaching program in transfusion medicine. Thus, the virtual reference input variable was set at 34.

The North Rhine-Westphalia Ministry of Science sent summarized statements to each question after having analyzed the individual responses obtained from 7 medical schools (Aachen, Bochum, Bonn, Cologne, Düsseldorf, Essen, and Münster) in this federal state. Therefore, data from North Rhine-Westphalia were assessed separately. Consequently, the reference input number for a *pooled* analysis had to be set at 27 (total of 34 minus 7 North Rhine-Westphalian medical schools).

Of the 27 medical faculties, no response was obtained from 4, including 3 universities from Bavaria and the Saarland Medical School at Homburg. Thus, complete questionnaires

were available for an analysis from 23 sites, representing 68% of the total. Together with the ‘overall information’ obtained from the North Rhine-Westphalia Ministry of Science, comprising 7 medical schools, the number of responding medical faculties increased to 30 sites, representing 88% of the total.

As depicted in figure 1, among 23 sites, 12 had accomplished votum 29 completely, while 6 had done so only in part and 5 not at all. In 16 of 23 institutions (70%), transfusion medicine and hemostasis (hemotherapy) are integrated as compulsory or elective compulsory subjects (‘Wahlpflichtfach’). 13 of 23 in total (57%) responded that no faculty-related curriculum in transfusion medicine and hemostasis (hemotherapy) exists (fig. 2a); however, at the same time, 17

Table 3. Academic training in transfusion medicine, hemotherapy and hemostasis at medical faculties without chair in transfusion medicine. Responses from 8 medical faculties, including 2 North Rhine-Westphalian sites, having a blood donation center and a transfusion service only but no academic division of transfusion medicine. Locations indicated are blinded for anonymization

1) Transfusion Service plus Institute of Clinical Chemistry and Laboratory Medicine
2) Transfusion Service plus Institute of Clinical Chemistry and Laboratory Medicine
3) Transfusion Service plus Institute of Clinical Chemistry, and Institute of Immunology
4) Transfusion Service plus Institute of Clinical Chemistry and Laboratory Medicine, and Institute of Immunology
5) Transfusion Service
6) Institute of Clinical Chemistry and Pathobiochemistry and Department of Internal Medicine
7) Transfusion Service plus Departments of Internal Medicine, Pediatrics and Anesthesiology, and Institute of Clinical Chemistry and Laboratory Medicine
8) Transfusion Service plus Departments of Internal Medicine and Anaesthesiology, and Institute of Medical Immunology

centers reported that ‘the subjects of this curriculum are assessed by written or oral examination’ (fig. 2b). At 20 of 23 medical faculties (87%), compulsory courses in transfusion medicine and hemostasis (hemotherapy) are offered. Likewise, 22 of 23 (96%) sites reported that transfusion medicine and hemostasis (hemotherapy) are integrated into cross-curricular topics of interdisciplinary educational programs encompassing different medical disciplines. In all but one, teaching contents of transfusion medicine and hemostasis (hemotherapy) are provided by lectures (fig. 3). Among the 23 medical faculties, the semester hours of teaching per week ranged from 0.5 to 12 h/week.

The overall responses from the 7 institutions in North Rhine-Westphalia that, as outlined above, were not subject to the pooled analysis are summarized in table 2. In comparison to the 23 sites, the information provided by North Rhine-Westphalia appeared more uniformly and consistently (see insets to fig. 1 and fig. 3). However, it cannot be excluded that this effect results from an administrative input by the ministry.

At the 8 of 34 medical schools (24%) that have a blood donation center and a transfusion service only but no chair or established professorship, teaching in transfusion medicine, hemostasis, and hemotherapy is mainly practiced in collaboration with lecturers from institutes of clinical chemistry and laboratory medicine (clinical pathology), pathobiochemistry, immunology, or clinics of anesthesiology, internal medicine, or pediatrics (table 3). One center (no. 6 in table 3) is operating without any transfusion service.

Discussion

This survey on the current status of students’ education in transfusion medicine, hemotherapy, and hemostasis at medical schools in Germany provides several key information. Firstly, it is evident from the analysis that the teaching portfolio, including lectures, courses and cross-curricular interdisciplinary programs, is broad but rather heterogeneous. Secondly, several hints suggest that teaching in transfusion medicine, hemotherapy, and hemostasis is not well structured and possibly not adequately focused. This conclusion is based on the individual responses by a number of centers emphasizing

their diversity in teaching. Thirdly, several findings clearly indicate that, at present, votum 29 of the National Advisory Committee Blood of the German Federal Ministry of Health is incompletely implemented, at least at 12 medical faculties (40% of the total).

Thus, the German Transfusion Act [2–5] and the corresponding Hemotherapeutic Guidelines of the German Medical Association [9] are obviously not applied. As outlined specifically in these Guidelines, ‘every physician who is performing hemotherapeutic interventions *must* have necessary knowledge and sufficient personal experience in doing so’ [9]. Consequently, both appropriate education in basics of transfusion medicine and hemostasis and professional skills in practical hemotherapy have to be imparted at medical school and during internship *before* obtaining the license of a medical doctor. However, this fundamental demand is not realized even formally by the current Regulation Governing the Licensing of Medical Doctors (Approbationsordnung für Ärzte), which defines neither transfusion medicine nor hemotherapy as compulsory subjects during academic education.

Another aspect of this status report requires distinct consideration. While questionnaire-based evaluations, specifically those on education and training, may have inherent limitations due to type of inquiry and subsequent responses, the present analysis is affected by several methodological problems.

Firstly, answers of 23 sites only, representing 68% of the reference input variable of 34 medical faculties in Germany, could be used for the pooled analysis. Summarized responses, representing 7 sites in North Rhine-Westphalia, as provided by the responsible ministry of science, did not allow inclusion into the pooled analysis. To prevent underrepresentation, data obtained from North Rhine-Westphalia were analyzed separately (table 2). Information about the 2 North Rhine-Westphalian institutions without academic division in transfusion medicine is included in table 3.

Secondly, a more serious concern is that this evaluation may have been biased by ‘sugarcoated’ responses or ‘too positive’ statements that do not reflect the real situation. In fact, several responses were found to be inconsistent. For example, the discrepancy depicted in figures 2a,b is clearly indicative of a bias due to faulty or inappropriate information. Consequently, one has to assume that the true status of academic

training in transfusion medicine, hemotherapy, and hemostasis is even worse than the overall result of this evaluation. This assumption is also supported by the broad spectrum of semester hours of teaching per week ranging from 0.5 to 12 h/week among the 23 medical faculties of the pooled analysis and from 4 to 12 h/week among the 7 North Rhine-Westphalian sites. It is evident that the multiple topics of transfusion medicine, hemotherapy, and hemostasis cannot be taught within 0.5 h/week. Conversely, 12 weekly semester hours of exclusive teaching in transfusion medicine, hemotherapy, and hemostasis are incompatible with tight timetable of current clinical student programs.

Thirdly, 8 of 34 medical faculties (24%) are without a chair in transfusion medicine. One site has no transfusion service at all. These basic conditions impair academic training in transfusion medicine, hemotherapy, or hemostasis and unveil structural deficits that are incompatible with legal regulations.

In conclusion, despite its limitations, this questionnaire-based review reveals significant structural and conceptual deficiencies in the training of medical students in transfusion medicine, hemotherapy, and hemostasis. Facing both the medical responsibility to patients and the enormous costs associated with hemotherapy, the current status of students' training in this field urgently requires fundamental improvement. Academic teaching of students must fulfill legal specifications and regulatory constraints. Therefore, both concerted and individual efforts for adequate training are needed. Academic teachers should accept this professional challenge.

Disclosure Statement

The authors declare that they have no conflict of interest.

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