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Eight Years of Specialist Training of Dutch Intellectual Disability Physicians: Results of Scientific Research Education

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Abstract Training in scientific research methods and skills is a vital part of Dutch specialist training in intellectual disability medicine. The authors evaluated results of such training at one Dutch university medical facility that had an obligatory research program involving projects conducted by the physicians-in-training (topics, teamwork, acquired competencies, and products). Since 2000, 28 research projects were started, and 24 of them were completed by teams made up of two to five trainees. Project topics included syndrome-related comorbidity ($n = 8$), lifestyle ($n = 2$), specific medical conditions ($n = 5$), diagnostic methods ($n = 5$), and care by intellectual disability physicians ($n = 8$). Sixteen of the study designs were cross-section observational, five were retrospective file reviews, one dealt with instrument development, three were qualitative, and three were literature studies. Structured exit evaluation interviews with 57 trainees (20 teams) showed that teamwork was appreciated positively by 17 of the teams, negatively by one, and mixed by two teams. While skills in literature search were reported as competencies present prior to the specialist training, additional basic scientific competencies were reported as acquired or improved by over 50% of trainees (including translating clinical into research questions, literature appraisal, protocol writing, data collection in the field, data entry, critical–analytical competency, and dealing with feedback and criticism). Trainee end products include 16 written reports, three journal articles in Dutch-language publications, eight articles in international journals, and 14 international congress presentations/publications.

Keywords: intellectual disabilities, intellectual disability medicine, medical training, scientific training, specialist training

INTRODUCTION

In April 2000, the new specialization of intellectual disability medicine was formally recognized by the Dutch Ministry of Health. At the same time, a chair was founded in the Department of General Practice at the Erasmus University Medical Center in Rotterdam, the Netherlands, and in December a three-year specialist training program was begun. The curriculum of the specialist training had been developed several years earlier by a working party of intellectual disability physicians and mentors (see http://www.erasmusmc.nl/avgopleiding). The format of the training program was similar to that of the Dutch general practitioners' training: trainees work in clinical practice four days a week, supervised and educated by a didactically trained senior specialist, whereas one day a week they follow a training program at the university consisting of exchange of experiences with peers, professional courses, practical training sessions, supervision and "intervision" (i.e., peer learning), scientific training, and involvement in a quality improvement project. Clinical work is carried out in intellectual disability care during the first and third year and during rotating traineeships in related specialties during the second year. Before 2009, the Ministry of Health permitted admittance of 10–12 trainees per year. In 2009, because of a shortage of trained medical workers in the field, this number was increased to 20 new trainees annually.

As this specialist training program was being set up, it was felt important that training in scientific research competencies should be an integrated part of the curriculum as intellectual disability medicine was a medical specialty in a field with a limited academic tradition and with many unanswered or even unidentified clinical questions. It was felt also that trainees should be aware of the import of research and should be stimulated to combine clinical work with research activities. It was considered important that all new trainees should become and remain critical to their daily professional performance and keen to continually improve it. Moreover, only highly professionalized new specialists would be able to convince well-rooted other medical specialists of their value and gain a key place in the existing healthcare system. Table 1 illustrates the basic scientific

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TABLE 1
Basic scientific capacities relevant to clinical practice

1. To be able to be skeptical about things
2. To be able to translate doubts into questions
3. To recognize the necessity of clear questions
4. To be prepared to go in search of answers
5. To know different ways to obtain answers
6. To be able to systematically order, analyze and critically appraise data.
7. To be capable to keep up to date
8. To be disciplined and not to turn away
9. To be able to take a self-critical position and to accept feedback
10. To be convincing to others

competencies, as listed in the 1996 curriculum plan, which were considered relevant to such a professional attitude.

Scientific training is a component of the obligatory part of the curriculum. Currently, it consists of a research course, standard hours of literature appraisal, and requirement for the completion of a small, preferably quantitative, research project carried out within a team of trainees. This scientific course component was designed, continually improved, and executed by the authors, one serving as the methodologist overseeing the research methods and the other serving as the clinician for all other tasks. A waiver from this requirement could be obtained, but was only granted to a minority of trainees, because most of the previous research experience of the students was primarily in doing case file studies or participating in data collection and analysis as part of broader projects. Thus, such waivers were infrequent, as it was felt that data collection in intellectual disabilities care settings has its own characteristics, involving a client system and requiring careful preparation and communication.

DESIGN OF THE SCIENTIFIC MODULE

Within this program, a five-day research course is given early in the first year, divided in two blocks of two and three days each, six to eight weeks apart. Topics include study design, statistical analysis, literature search, appraisal of literature, data entry, ethical testing, and special requirements for informed consent. As part of this course, trainees are instructed to prepare a small research project in such a way that at the end of the five-day course teams have been formed and agreement on research topics has been obtained. The trainees are responsible for both the choice of topics and the composition of the groups, but this process was guided by one of the authors and a psychologist from the educational staff. Generally, three to four groups of two to four trainees are formed each year under this protocol.

Although time allocated for the research course component is limited and thus only permits small projects to be undertaken, trainees are nevertheless required to go through all stages of conducting research—beginning with conducting a literature review, formulating a research question based on a clinical problem, choosing an appropriate study design, writing a study protocol, submitting for ethics review and obtaining informed consent, collecting data in the field, organizing data entry, conducing a statistical analysis, and writing a project report. Given this, observational research is preferred over case file studies. During the latter months of the first year, teams write their study protocols in a monthly rhythm of guided classroom presentation and discussion, followed by the writing of a next section of the protocol at home. Each text part is closely read and commented upon by the scientific staff and difficulties are discussed with individual teams, whereas methodological aspects (i.e., power calculation, data collection and entry, statistical analytic methods) are subject to review by the methodologist overseeing methodology.

During the second year, two months are reserved for data collection, analysis, and writing a first draft of the report or article. Groups may choose different schedules, either one two-month period or two months some time apart, dependent on the nature of their data collection or on practical circumstances (such as pregnancy of a group member—a frequent occurrence). Data collection usually takes place within the care organization where the trainee has worked during the first training year. Based on the data file completed by the team, the statistical analysis is performed and elucidated by the staff member overseeing methodology in a session with all team members. After that, the report or article has to be completed before the end of the second year, guided by two rounds of comments by the scientific staff.

To train students in oral presentation capacities, each team presents its methods and results annually to the collective groups of trainees and staff as well as interested supervisors. Trainees are required to take turns presenting at these meetings, as well as stimulated to present their results within the care organizations and at national and international meetings.

A structured evaluation format was introduced in 2002. It is based on judgments of oral presentations and written research reports, as well as a semi-structured one-hour exit interview with each research team. The exit interview consists of open-ended questions concerning collaboration, appreciation of team work, working style, acquired basic scientific competencies, criticisms, and recommendations. Team members receive the format in the first training year with the information for the research course. During the interview, in free discussion, answers are formulated by the team members. The final evaluation report, if necessary after some modifications, is then approved by each team member.

RESEARCH CURRICULUM ASSESSMENT

The research training component of the specialist physician program was assessed using data collected over the eight-year period. The following questions framed the assessment: (1) What topics were addressed in the research projects? (2) How did trainees evaluate teamwork (collaboration, added value)? (3) How did trainees evaluate acquired scientific competencies? and (4) Which were products of the module? To conduct the assessment, a retrospective overview of chosen research topics (study question 1) was conducted, drawing from data available on student groups during the period 2000–08. The other study questions (2–4) were assessed based on evaluation reports of the

trainee groups in place from 2001 to 2007, as the structured program evaluation was first introduced in 2002.

RESULTS

During the eight-year period from 2000 to 2008, 89 trainees enrolled in the specialist training program (80 females, nine males). Eleven trainees were excused from participation in the research training module as they had already undertaken original research activities and had demonstrated independent research proficiency. Of these, six had previously undertaken other specialist training, one had completed a study as part of a PhD thesis, and four were in the process of undertaking a PhD research study. Over this time, the remaining 78 trainees were involved in 28 research projects, working in teams of two to five. Information on former scientific activities had been systematically collected at the start of the training program, but could now only be retrieved for 37 trainees enrolled during 2006–08. Of these, 13 (35%) reported graduate theses only, 12 (32%) reported other under- and postgraduate research activities, seven (19%) reported research during former specialist training, and five (14%) other research activities. Eight of these trainees (22%) had specifically conducted research involving people with intellectual disabilities.

An overview of chosen topics for the total 28 projects, categorized according to aspects of relevance to the field of intellectual disability medicine, is presented in Table 2.

Study designs were cross-section observational ($n = 16$), retrospective records studies ($n = 5$), qualitative ($n = 3$), and instrument development ($n = 1$). Not included in the design count were three projects done in the first year that were literature studies. One of the observational studies also included a qualitative part involving semi-structured interviews. Of the 28 projects, 20 that were completed by the groups in place between 2001 and 2007 (involving 57 trainees) were evaluated systematically.

Teamwork

In 20 of the research projects, collaboration went smoothly within 11 teams, required some attention (which was addressed more or less adequately by team members) within five teams, was problematic and solved with help of a psychologist staff member in one team, and remained unsolved within three teams. However, a modus was found to complete the work in all cases. Seventeen out of 20 teams (85%) felt unanimously that working within a team had provided added value to their project, including the team that had asked for help with their collaboration problem. One team of two trainees with unsolved collaboration problems had not experienced added value, whereas the other two teams with unsolved collaboration problems had mixed opinions about the outcomes. Table 3 provides information on the trainees' perceptions of critical aspects of the value of the team process. Their opinions about what way that added value had been experienced are grouped in five outcome categories: overcome difficulties together (20 remarks), learn from collaboration problems (4), learn from each others' strengths (14), provide practical advantages (15), and achieve better results (19).

Acquired Scientific Competencies

An overview of acquired scientific competencies, as reported individually by 54 trainees, is presented in Table 4. Three trainees did not participate in this data collection phase.

Products

To date, the results of 24 projects (including those of the first year) included 16 written reports, three articles published in Dutch-language journals (Dijken-Visser & Evenhuis, 2003; Duffels, van der Velde, & Evenhuis, 2003; Kalmthout & Tiems,

TABLE 2
Topics of research projects ($n = 28$)

Syndrome-related comorbidity	**8**
Down syndrome	4
Prader-Willi syndrome	4
Lifestyle aspects	**2**
Overweight	1
Physical activity	1
Specific medical conditions	**6**
Cardiovascular disease	3
Chronic constipation	1
Dysphagia	1
Occluding ear wax	1
Diagnostic methods	**5**
Defecation list	1
Pulmonary function	1
DNA diagnosis using buccal smears	1
BMI Silhouette Test	1
Health-related QoL in children with SGCP	1
Care by ID physician	**7**
Menstruation regulation	1
Premedication for dentist	1
Pharmacologic treatment of sex offenders with ID	1
Safe medication over age 65	1
Complications of PEG catheters	1
Hypothermia screening	1
Children with SGCP in Surinam	1

ID = intellectual disability; BMI = body mass index; SGCP = severe generalized cerebral palsy; QoL = quality of life; PEG = percutaneous endoscopic gastrostomy.

TABLE 3
Perceptions of added value of team work (20 projects)

Topics	Number of remarks
Overcome difficulties together	**20**
Motivate each other	8
Persevere together	1
Share frustrations	1
Help each other out, take turns taking the lead, remind each other	7
Joint deadlines	1
Find solutions together, fight difficult situations together	2
Learn from collaboration problems	**4**
Get to know yourself better	1
Learn how to solve conflicts	1
Learn how to collaborate	2
Learn from each others' strengths	**14**
Share specific capacities and learn from it	7
Deal with criticism and feedback	3
Learn from each other's working style	1
Use strong qualities of others	3
Practical advantages	**15**
Share experiences	1
Enjoy social contacts	2
Divide tasks/burden	3
Complete more work together, include more participants, more data	5
More input	1
Take turns to keep an overview	1
Take decisions more easily	2
Better results	**19**
Better design	1
Broader perspective/views	3
Different interests/personalities	1
Keep each other focused	1
Formulate better together	2
Avoid blind spots	3
Generate new/more ideas	3
Better reflection on results	4
Feel responsible for joint achievement	1

2008), and eight articles prepared for English-language international journals. Of the latter, four have been published (Louw, Vorstenbosch, Vinck, Penning, & Evenhuis, 2009; Peppink et al., 2008; Pouls et al., 2009; de Winter et al., 2009), two have been rejected and not been submitted again, and two have been submitted and are pending. Some 14 scientific presentations have been given at international congresses, 11 of which were at either International Association for the Scientific Study of Intellectual Disabilities (IASSID) regional or world congresses. Nine presentations were given at Dutch professional meetings. Apart from such scientific presentations, multiple presentations were given at other settings, such as at the host care organizations, or at regional or national meetings of various professional associations. In some cases, the choice of the quality improvement project in the third year was inspired by the outcome of the research project.

Satisfaction, Criticisms, Recommendations

Although the research project requirement had been perceived by most of the trainees as difficult and time consuming, a sense of creativity and satisfaction was felt at various occasions. These included (1) thinking of an original study question or method; (2) finding and being engaged by new literature; (3) becoming aware of the lack of published studies in their area of inquiry; (4) including participants or a control group along original ways; (5) using new diagnostic methods; (6) logistic organization, and finding alternatives for logistic problems; (7) designing client information; (8) visiting unfamiliar settings in the field; (9) finding that results were directly applicable to clinical practice; (10) reflecting on conclusions emanating from the study results; and (11) getting positive reactions of the public after presenting at IASSID congresses and other presentation settings. In retrospect, several teams stressed spontaneously that scientific research training made sense because of the lack of academic knowledge in this field.

The teams offered constructive criticisms and recommendations to improve the scientific module (Table 5), many of which have been realized. Easy accessibility, support, and feedback by scientific staff were explicitly appreciated. The format of the course, which at the beginning of the training had been regularly criticized as too strict and demanding, was explicitly appreciated in retrospect. Explicit attention was asked by one team for the aftermath of the project: what to do in the field with research findings, with information, and implementation?

DISCUSSION

This evaluation of an eight-year experience of scientific research education of Dutch physicians-in-training in a specialty intellectual disabilities training program shows that such a course, if designed and executed properly, significantly contributes to scientific competencies that are relevant to a critical–analytical professional attitude. Especially in a healthcare field with a very limited academic tradition, such an attitude is of paramount importance for professionalization and innovation. Although most trainees already had acquired prior scientific competencies both within and after their medical study, a majority reported to have substantially added to this knowledge. Experience with data collection in the field was new to a majority. Although based on this training, the new specialists have not yet acquired sufficient scientific capacities to function as independent researchers (although staff in their care organizations may tend to think they are), they have gained a more scientific attitude toward clinical problems and an appreciation for examining research reports with a critical eye: the intended goals of the course.

TABLE 4
Trainee reported acquired scientific competencies ($n = 54$)

	Substantially added skills	Added some skills	No new skills acquired	Not applicable	Could do it before	No answer noted
Translate clinical into research questions	43	1		5	5	
Literature search	23	3			22	6
Literature appraisal	47	4			3	
Protocol writing	48				3	3
Data collection in ID care	43	2			3	6
Data entry	39	1		8	6	
(Statistical) analysis	20	10		15	3	6
Critical/analytical competency	33	1			7	13
Deal with feedback & criticism	29		1	9	5	10

ID = intellectual disability.

TABLE 5
Recommendations of students to improve the module

Continuous emphasis on the limited size of the project.
More hours for appraisal of the literature.
The option to split up the two months of data collection.
Obligation of clear and strict deadlines, strict time planning (mentioned many times).
Special occasion to be proud at the end of the course, for example, a congress presentation or special meeting.
Optional writing training of scientific articles.
Obligatory publication of summaries in the journal of the Dutch professional association.
More support with preparation of congress presentations.
Second course of statistical analysis directly after completion of the project: students will listen completely different.

Retrospectively, the design of the course appeared satisfactory to trainees, which, based on their collective criticisms and suggestions, has been improved over the years that it has been in place. Other Dutch specialist or general practice training programs offer scientific training but mostly do not include actual research projects, or only require literature studies. The obligation to perform a small but complete, patient-bound research project requires an investment in time of both trainees and training staff and limits time for other topics. Nevertheless, at a recent audit of the specialist training by the Royal Dutch Medical Association, the quality of scientific training was specifically appreciated by the audit committee.

This study also shows that a broad range of topics are relevant to the intellectual disability medical specialist, not limited to conditions that are traditionally considered as specialistic, such as neurology, psychiatry, orthopedics, or clinical genetics. Apart from syndrome-related conditions, lifestyle and other risk factors for chronic disease, conditions that evidently are not diagnosed and treated adequately by general practitioners, new diagnostic methods, health-related quality of life, and specific aspects of medical care were topics chosen for research.

Because of the limited time of two months for data collection, most of our program's observational studies were cross-sectional, although some case file studies collected longitudinal data. Thus, as a result of collaboration and carefully chosen methodologies, even in such a short time frame, many participants could be included and valid results obtained, leading to several international publications and a range of congress presentations. It was encouraging that the management of most care organizations enabled their physicians-in-training to visit IASSID congresses and present their findings. In contacts with provider organization administrators, we were regularly told that these new professionals and their "added value" knowledge were highly appreciated.

Not all, but a good number of the study outcomes (more than actually have been submitted) would have justified publication in scientific journals. However, most trainees preferred writing a project report because a scientific article is more time-consuming. During the third year of training, such time is not easily available. In light of the quality of most studies, we consider this very regrettable because, apart from local information of involved clients, parents, and staff, outcomes of the studies were not made available to peers or to the public. Moreover, a publication really completes the research process. We are considering advancing publication by offering optional writing courses resulting in a submittable article, as has been proposed by one of the teams.

The added value of teamwork, as spontaneously worded by trainees, was considerable and many teams felt that this had added to the quality of their study results. We must stress here that structured evaluation is part of the module and was not performed by outside objective observants or interviewers. Because the key interviewer is also the main professor, the designer of the module, and the trainer, answers may have been tactfully and socially acceptable. It also appeared that during the team evaluations, team members often gave similar answers (e.g., all "could already do it" for a competency) and influenced each other. On the other hand, the evaluation questions were open, discussions were vivid and free, whereas criticisms were stimulated and expressed without apparent barriers.

Collaboration went smoothly in a majority of teams, but not always. Trainees tended to keep silent about collaboration problems and try and find a new modus themselves. However, if this did not work out satisfactorily, an opportunity to learn new strategies was lost. Explicit and repeated attention for collaboration by staff in classes as well as individual contacts and easy availability of psychology staff may help to avoid this problem in the future.

Because research questions were based upon clinical questions, study findings were directly relevant to clinical practice. This fact increased motivation of several practically oriented trainees who originally had been critical to the necessity of scientific training. On the other hand, scientific training and quality improvement, being a central part of the specialist training, appears to attract an increasing number of bright, academically oriented physicians. We conclude that, as a result of a specialist training that is increasingly based upon scientific evidence, the professional quality of Dutch intellectual disability specialty physicians is increasing too. We trust that the sharing of our experiences will be of value to other such training programs across the world designed to increase physician capabilities. Including a practical module on scientific research is an excellent means of broadening the ability of medical practitioners not only to undertake research on their own, but also to appreciate and understand the context of the research reports they read and rely on for their clinical practice.

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