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Case reports and case series

Case report: A novel model for educating radiation therapists in small countries: Case study of the "Train the Trainer" initiative in Israel

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ABSTRACT

Introduction: Israel, as a small country faces many challenges to deliver quality RTT education. As technologies evolve, the need for RTT education becomes acute. This resulted in the Ministry of Health, IAEA and ESTRO running the train the trainers (TTT) program in a unique format.
Method: An expanded TTT program was run in Israel. This resulted in the establishment of the National Center for Radiotherapy Education (NCRE). Key elements of the NCRE include national leadership, high-tech teaching environment, simulation based teaching methodologies, and evidence based education.
Educational outcomes of the RTT course run in the NCRE were measured and statistically analysed.
Results: The measurement of educational outcome was highly significant ($p < 0.00001$). The feedback from the course was very positive, with a high aggregate data mean score for all questions pertaining to the effect the course has on work, and efficient use of time.
Discussion: The success of the RTT course of the NCRE is evident from the results. The impact of the TTT program went beyond RTT education, as the NRCE is a national radiotherapy education resource, utilized by all radiotherapy professionals.
Conclusion: More knowledgeable RTTs may be able to work in advanced roles, taking on tasks from other sectors in the department; this could improve the efficiency of patient care and improve the safety of radiotherapy delivery.

Introduction

The challenge of dedicated radiotherapy education for RTTs is complex since Israel is a small country, where the required number of new RTTs may be too few to justify the establishment of a separate RTT school.

Currently, most RTTs are formally trained as diagnostic radiographers who complete a 3-year bachelor of arts degree. The radiotherapy component is extremely limited, thus RTTs receive on-the-job training as apprentices with limited opportunities for formal education.

This lack of formal education became more critical as techniques evolved into the complex and precise treatments administered currently. Furthermore, a local satisfaction survey of working RTTs in 2011 found that 50% of RTTs were not satisfied with the education received prior to starting work.

This situation culminated in the Ministry of Health (MOH) and International Atomic Energy Agency (IAEA) running the "Train the Trainers" (TTT) initiative in Israel in a unique format.

Method

The TTT initiative occurred over a 2-year period, commencing in 2010 under a project of the MOH supported by the IAEA. This TTT initiative differed to the traditional IAEA model in that it was conducted locally and initially involved 20 RTTs, with representatives from each radiotherapy department in Israel and the Palestinian Authority. This was largely due to the MOH understanding the need for the education of RTTs and thus making this initiative a priority.

The first stage of the TTT initiative attempted to identify a cadre of RTTs motivated to create a change in the education of RTTs through the recommendation of department heads.

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To specifically identify the gaps between diagnostic and therapeutic radiography knowledge, a series of in depth interviews with experienced RTTs were carried out in preparation for the TTT workshop. The six main domains considered lacking were: physics for radiotherapy, radiobiology, treatment positioning and immobilization, treatment planning, patient information and support and quality assurance.

Over the 2 year period, the TTT initiative culminated in 18 RTTs delivering a series of six 2-day workshops on the six domains outlined above.

The success of the program both identified potential RTT leaders, and highlighted the need for an educational facility dedicated to radiotherapy. The national center for radiotherapy education (NCRE) was established as a natural growth in the progression of radiotherapy education in Israel.

Key elements of the NCRE

National leadership

The NCRE was inaugurated (2012) in cooperation with the MOH, the Israel Center for Medical Simulation (MSR), and all the RO departments. A steering committee consisting of the department head (RO) of the radiotherapy departments in the country, as well as representatives from the MOH was formed to facilitate growth, research and a sentiment of national cohesion.

High-tech teaching

The school is located within a large radiation oncology department and equipped with a fully operational treatment planning lab (with 12 student workstations). The innovative VERT™ (Vertual Ltd.) simulator creates a virtual environment of a treatment room in which students can err safely as well as enabling the illustration of core radiotherapy concepts.

Curriculum development

In order to create a curriculum that serves the needs of Israeli RTTs who received minimal formal education, both local and international syllabi were reviewed. Local syllabi included the curricula of the diagnostic radiography schools. International syllabi included the ESTRO European Core Curriculum [1], the IAEA syllabus [2], as well as curricula of various other institutions.

Furthermore, the current role of RTTs in Israel was examined in contemplation of instituting the optimal curriculum which would facilitate RTTs in gaining tangible knowledge and lead to an improvement in clinical practice.

Teaching methodology

The essential need for a concise high-impact curriculum was recognized by the steering committee as the initial stage of RTT education involved releasing RTTs from busy departments which was a challenge.

Accordingly, simulation-based training was chosen as the preferred teaching methodology. In order to reach the national goal of high-impact RTT education, the benefit of collaboration between the Israel Center for Medical Simulation (MSR) and the NCRE was evident. MSR, a world leader in simulation-based medical education [3], assisted in developing an optimal curriculum.

The need for a strong connection to clinical practice was attained through the use of case studies based on real-life incidents/near incidents reported in both local (e.g. Sheba Medical Centre risk management reports) and international databases such as the Safety in Radiation Oncology (SAFRON), an IAEA initiative.

The case studies serve both as a springboard for dynamic, interactive discussions as well as aid in emphasizing clinical relevance to theoretical topics. This was hypothesized to be particularly useful to our target audience of students who although clinically experienced, were lacking the knowledge to understand the background "hows" and "whys" of their clinical experience. The virtual treatment unit and treatment planning workstations of our facility enabled us to further illustrate and reinforce the importance of theoretical knowledge and safe, competent clinical practice.

Additionally, standardized patients (SP) were used for simulation-based education in scenarios dealing with both clinical and communication aspects of the profession.

Evidence based education

To analyse the impact of the educational programme, pre & post programme tests were developed. The pre-test consisted of 17 multiple choice questions (MCQ) in the domain of clinical practice, treatment planning and radiobiology. The post-test included the same 17 questions and an additional 33 MCQ and short-answer section. In order to assess the knowledge outcome, the17 pre-test questions and identical post-test were compared using the paired students *t*-test.

For the first two cohorts, the students were requested to fill in an anonymous quantitative feedback form.

Results and discussion

The RTT course focused on four main topics from the ESTRO European Core Curriculum – dosimetry, radiobiology, essential clinical tools (positioning and immobilization, IGRT) and patient communication (see Fig. 1).

As previously mentioned, RTTs were released from clinical duties (a third of the course was on the weekend in order to increase the feasibility of the course) and as such, the course had to be concise from a time perspective, yet broad enough to make a real impact in the RTTs knowledge and clinical practice.

Course participants

The only eligibility requirement of the course was RTTs with a minimum of 6 months vocational experience. There were no exclusion criteria. As such several of the students had participated in various training courses prior to attending this course. The capacity of the facility for simulation-based training is 24. Thus far, the course has been completed 4 times (5th cohort in progress).

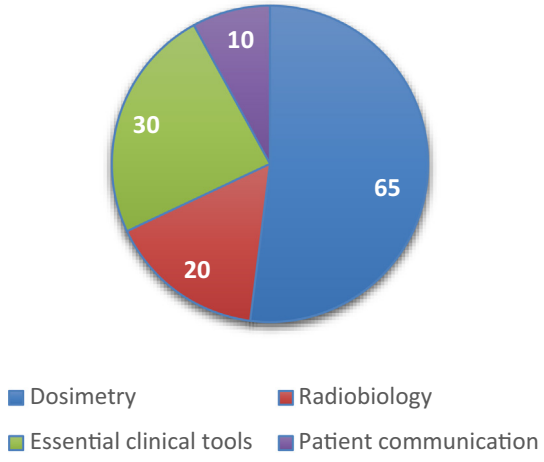

Fig. 1. Summary of curriculum in hours.

Table 1
Pre and post test scores (M = mean, SD = standard deviation).

	Pre- Course (17 MCQ) (N = 76)		Final Exam (17 MCQ) (N = 76)		
	SD (%)	M (%)	SD (%)	M (%)	
Test result	11.7	35.8	4.9	96.8	P < 0.00001

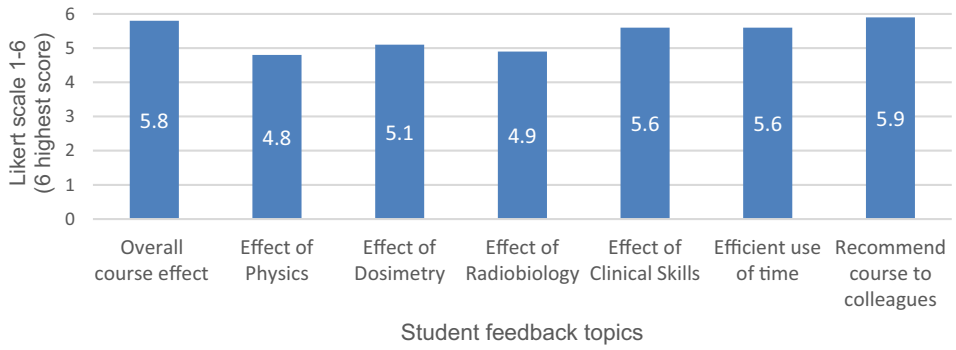

Fig. 2. Aggregate data means of student feedback as pertaining to course.

Evidence-based education

Educational outcome

The educational outcome of the course is shown in Table 1. The pre and post test scores were found to be statistically significant ($p < 0.00001$).

Feedback results

The student feedback of the effect of the course on their work is summarized in Fig. 2. The main criticism of the course was related to time constraints.

This report describes the establishment of a national center of radiotherapy education following an expanded TTT initiative of the MOH, IAEA and ESTRO in Israel. Identification and consolidation of local RTT leaders, prioritization by government health authorities and leadership of our RO department heads, and collaboration with advanced simulation based health education initiatives were key components of the process.

The improvement of knowledge as reflected in the pre vs. post test results and the satisfaction metrics suggest that the program outlined above for educating RTTs has been successful.

The impact of the national school is beyond the scope of RTT education and includes a Continuing Medical Education program for RO residents as well as a new comprehensive examination for physicians and medical physics residents which includes assessment of clinical skills. Additionally, a multi-disciplinary (Radiation Oncologist, Medical Physicist, RTT) Inter-Regional course on Quality Assurance in radiotherapy was run for IAEA member states through the school.

Conclusion

The model described is an important first step forward to comprehensive and dedicated radiation therapy education in small and mid-size countries without a dedicated Bachelor degree. As RTTs acquire more knowledge, capabilities improve, and the potential for creation of advanced practitioner roles has emerged. This will in turn empower RTTs to take on routine tasks from physicians and physicists, thus improving both the efficiency of patient care and the safer delivery of radiotherapy. The Train The Trainers program was funded by the IAEA, and the Israel Ministry of Health. The Sommerfreund Foundation funded the establishment of the National Centre for Radiotherapy Education with support from the Israel Ministry of Health.

References

[1] Coffey M, Mullaney L, Boejen A, Vaandering AGV. Recommended ESTRO core curriculum for RTTs (Radiation Therapists) – 3rd edition. Radiother Oncol 2012;103:103–8 [Supplementary data file 3].
[2] A syllabus for the education and training of RTTs (radiation therapists/therapy radiographers). Vienna: IAEA; 2005.
[3] MSR Israel Centre for Medical Simulation. https://eng.msr.org.il/about_Msr [accessed 04.05.18].