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Research Article

# Oncology Training Medical Tools: Investigation Based on A Prospective Cohort of Undergraduate Medical Students and Postgraduate Residents' Population

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**Abstract**

**Background:** different studies have identified gaps in oncology training of medical students and residents. The impression that emerges is a delay between the clinical practices and the concepts taught to the students, making them obsoleted. The purpose of this investigation was to analyze the knowledge of oncology training tools in cohort of undergraduate students and physician residents inside academic's French hospitals. **Methodology:** one hundred anonymous questionnaires were administered to undergraduate students, to specialty medicine residents and medicine specialists (senior and junior) implicated in oncology. Three indexes were identified: guidelines index (GLi), research index (Ri) and training index (Ti). **Results:** all questionnaires were collected, 40 from students, 34 from medical residents, 26 from medical specialists: seniors (12) and juniors (14). The three groups showed a significant different ($p<0.05$) for all three indexes. **Conclusion:** this study confirmed the lack of updating oncology teaching, not only in medical students, but also in postgraduate residents, albeit with a lesser impact.

**Key Words:** Oncology Educational Tools; Medical Education; Investigation; Oncology Teaching.

## Introduction

Cancer is a leading cause of death worldwide, accounting for 10 million deaths in 2020 [1]. The ongoing research and continuous development of news drugs, making oncology a fast evolving field of medicine. The US Food and Drug Administration (FDA) and the European Medicines Agency (EMA) approved over 30 new oncology agents and new indications for previously approved agents during the third quarter of 2022. It is evident that medical oncology is a relatively new discipline in constant evolution. Being constantly informed on the evolution is not easy for a senior physician specialist and much more difficult for residents and undergraduate students. Furthermore, it remains difficult to provide teaching update documentations for the students.

The access to continuing education, such as participation in national and international congresses, becomes more and more complex and difficult for medical specialists, almost impossible for French residents. In addition, the training of tools that can give access to scientific journals is unconsistent. Indeed, it was observed that the undergraduate oncology teaching present an inadequate coordination, insufficient resources and heterogenic educational paths globally [2-8]. Different oncology teaching methods have been tested [9], but there is no significant evidence to a better approach. A very interesting undergraduate oncology course program has been developed by Australian Cancer Society [10], with an innovative multidisciplinary approach and original process of updating student teaching.

In this article, we explored medical students' current access to innovative and latest information and we investigated the knowledge of oncology training medical tools in residents and undergraduate students' cohort in Academic's Hospitals of Paris Nord Val de Seine (APHP HUPNVS).

## Methods

From April to July 2019 a questionnaire was submitted through weekly oncology multidisciplinary team meetings in APHP

HUPNVS. This anonymous questionnaire was distributed to all senior and junior specialists involved in oncology and to undergraduate students, to residents from various medical departments (oncology, gastro-enterology, digestive surgery, urology surgery, gynecology, general medicine, radiology, anatomo-pathology and nuclear medicine). The questionnaire was in an English version and was characterized by demographics answers, by 14 educational answers with four point for Likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly) and by 1 negative and positive answer (Annex 1). This questionnaire was related to investigations about knowledge levels of oncology tools, stratifying for professional degree, age and specialty. The answers were grouped into three different areas: guidelines index (GLi), research index (Ri) and training index (Ti). The GLi corresponded to the sum of 5 questions about knowledge of general clinical guidelines: local hospital (APHP) guidelines, national guidelines (INCa - Institut National du Cancer - France) and international guidelines (NCCN - National Comprehensive Cancer Network - U.S.A., ASCO - American Society Clinical Oncology, ESMO - European Society for Medical Oncology). The Ri corresponded to the sum of 4 questions about the knowledge and familiarity with English language. The Ti corresponded to the sum of 5 questions about educational training in oncology (attending conferences, workshops). The difference among groups was significantly assessed using ANOVA ranking test. All differences with a p-value below 0.05 were considered significant. The analysis was performed with Sigmastat 3.5 (Systat Software, Inc.).

## Results

### Participant Characteristics:

Overall, 100 questionnaires were collected, 40 from students, 34 from residents, 14 from senior specialists and 12 from junior specialists. The median age of student, resident and junior physician was respectively 23.1, 27 and 32.8 years old, while the median age of senior physician was 46.7 years old. This cohort was relatively balanced in terms of gender with 54 men and 46 women. Among all the respondents (n=93) only 7 participants were members of medical oncology societies, and they were all senior physicians (Table.1).

| Qualification | Gender (Male/Female) | Age (y/median) | Oncology Societies |
|---|---|---|---|
| | | | (Y/N) |
| student | 19/21 | 23.1 | 0/40 |
| residents | 19/15 | 27 | 0/34 |
| junior physician | 7/5 | 32.8 | 0/12 |
| senior physician | 9/5 | 46.7 | 7/7 |
| TOTAL | 54/46 | 29 | 7/93 |

**Table 1:** Baseline Characteristics.

### Questionnaire Results:

The answers to questionnaires were then piled into three groups: student's group, resident's group and physicians' group (seniors and juniors together). The three groups showed a significant difference regarding all 3 indexes. The Gli median score was respectively 6 for the student's group, 12 for the resident group and 19 for the physician's group with significant difference ($p<0.05$) through all groups (Figure.1). Ri score showed also a significant difference through all groups ($p<0.05$), the median was 4.5 for the student's group, 6 for the resident group and 13 for the physician's group (Figure.2). Finally, Ti score showed a significant difference through all groups ($p<0.05$), with a median of 9.5 for the student's group, 13 for the resident group and 18 for the physician's group (Figure.3).

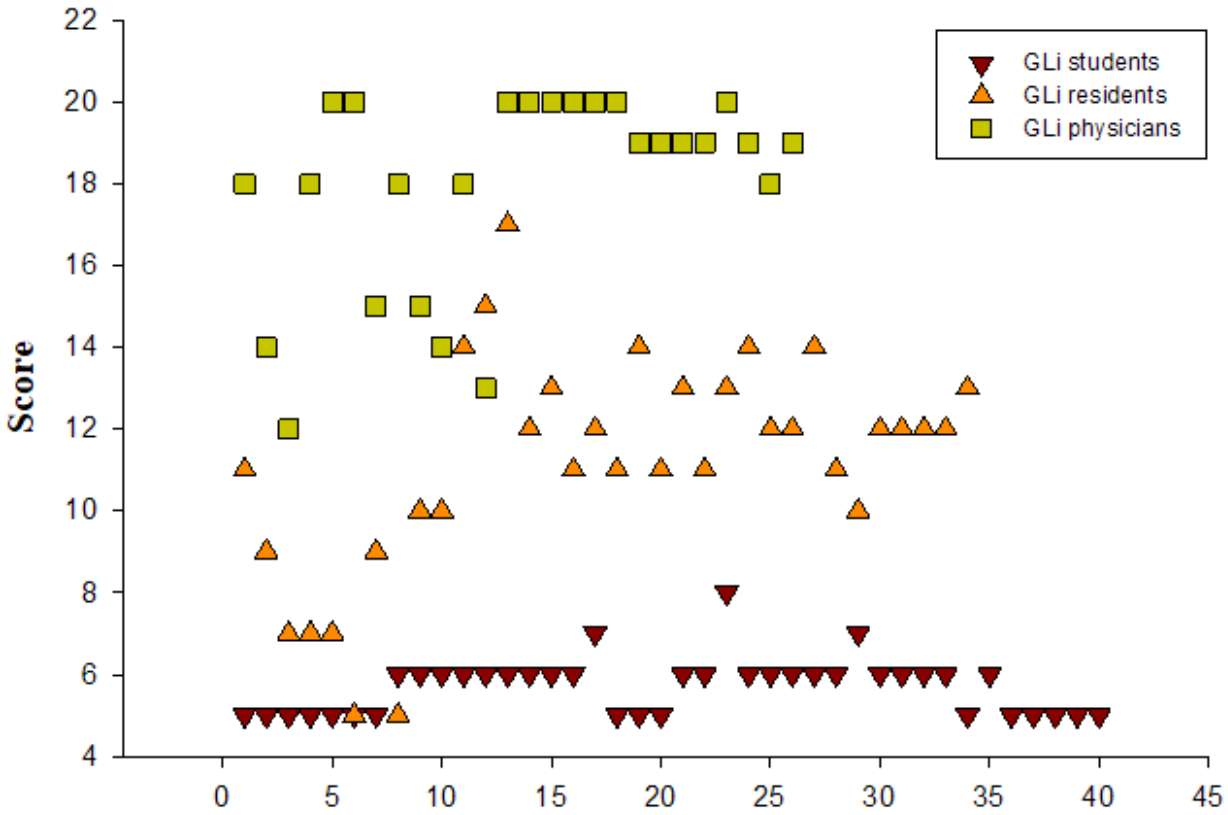


**Figure 1:** GLi graphic representation of 100 respondents' queries divided into three groups.

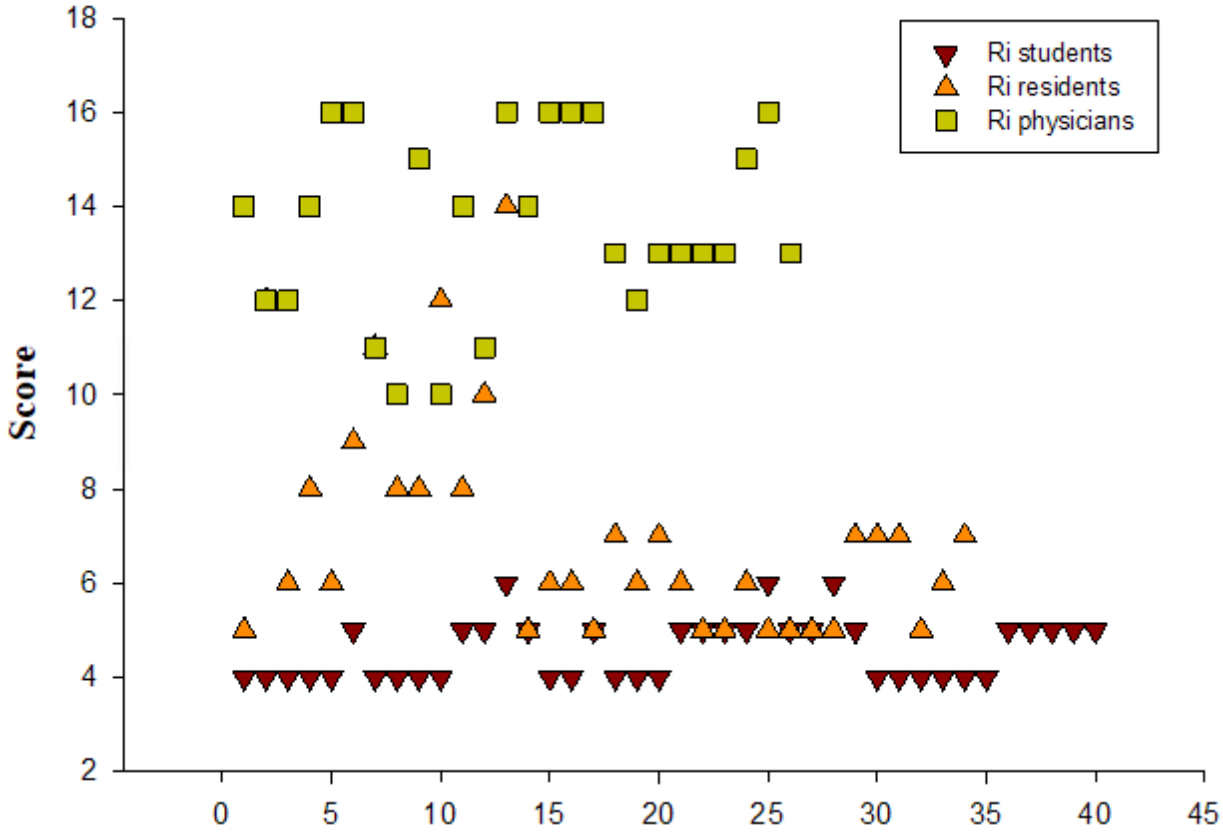


**Figure 2:** Ri graphic representation of 100 respondents' queries divided into three groups.

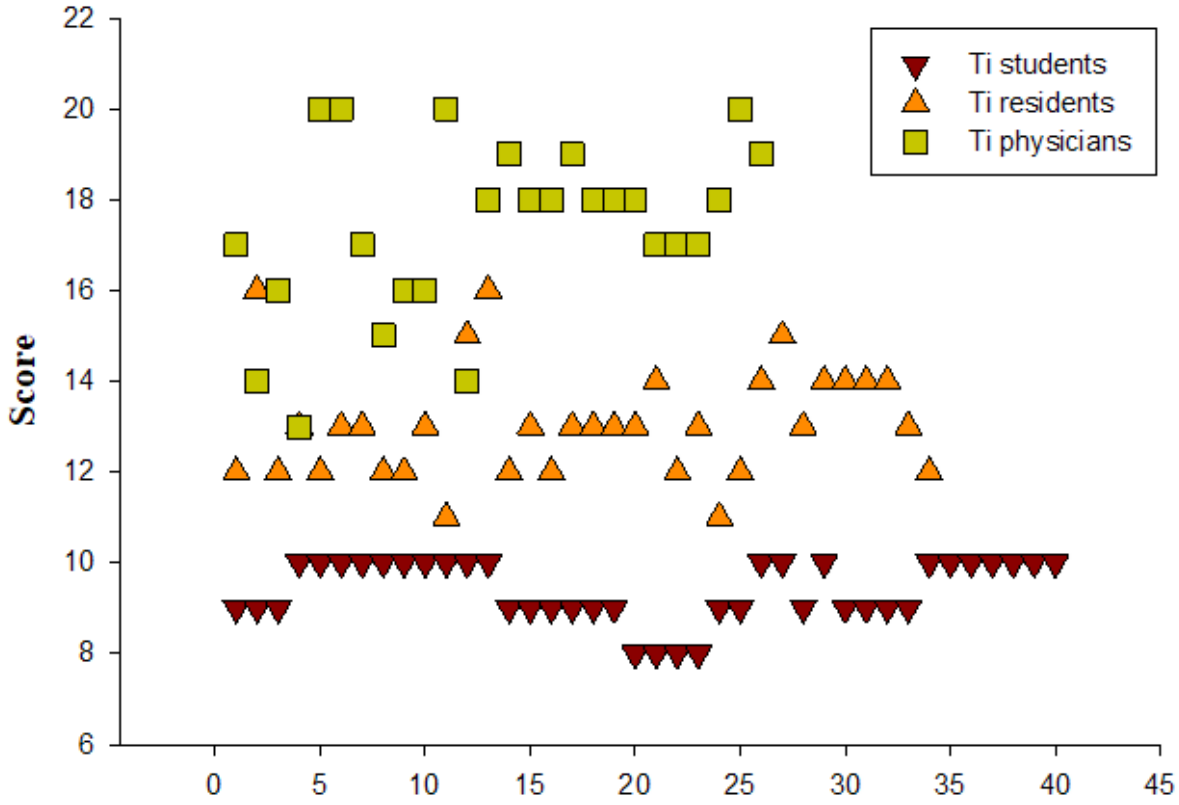


**Figure 3:** Ti graphic representation of 100 respondents' queries divided into three groups.

## Discussion

In the literature, there is not a significant presence of oncology teaching studies [9]. Moreover, there is a lack of international standardized training model for students and residents in oncology. In this small cohort study, a difference of knowledge was highlighted between the categories of respondents. This difference was expected, but it is unacceptable to witness such a huge difference in particular for the students who don't benefit the access to updated data (guidelines, new drugs, new indications). Of course, a classic teaching provides a robust oncology educational cornerstone, but it needs to be completed with an update on continuing training tools.

The difference of knowledge about guidelines, upcoming drugs and new indications is significant in particular among students and residents in comparison with senior physicians. This may be the consequence of not attending multidisciplinary reunions and national/international meetings and conferences. Also, as a motivation, in order to boost oncology research, students and residents should be offered a chance to submit their personal work, with a reward of attending national or international congresses. A good mastery of these tools is necessary in medicine, so let us increase these training. Actually, many tools are offered via internet free for an updating training. At last, residents should be supported to get an easier access to oncology societies consequently to their training.

Students and residents are poorly involved in research and updated programs. This is not mandatory and left to the willingness of each. Students and residents could be more involved in the writing of clinical reports and literature reviews. In addition, unfortunately an insufficient effort of investment in research, in active participation of national and international congresses/conferences is observed. Personal involvement in oncology research means the use by the students of English language and tools that allow the updating and proactive learning of new information. Their poor familiarity is a barrier to train with free tools that are useful for researcher articles or latest guides lines. That is why an English educational training appears to be necessary.

In addition, the knowledge and attitudes of cancer medical residents toward active clinical trial was assessed [11]. Only 12% of residents had previous participation in clinical cancer research

in Jordan [11]. Other studies showed that residents had a basic knowledge of clinical trial methodology and the majority were unfamiliar with a basic terminologies such as "adverse event" and "good clinical practice" [12]. Similarly, primary care physicians had a low knowledge and little experience regarding clinical trial13. In contrast, all the studies highlighted that residents had a positive attitude toward future participation [12-14]. Improving resident's knowledge and skills for clinical trials is a main key for improving health-care services provided to patients.

Furthermore, the implementation of specific courses to teach updating tools is needed. Indeed, as an example cancer bioinformatics, molecular and proteogenomic analysis are changing cancer diagnosis and treatments. The implementation of these training to undergraduate students is mandatory in order modernize patient's cancer managements. In this context an open source online tool was designed for students to improve their bioinformatics skills [15].

To summarize, a refreshment or a new version of the academic teaching is necessary. A global consensus should be found between medical schools and oncology societies to offer educational and training updates of students and residents.

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**Competing Interests**

The authors declare no competing interests.

**ANNEX**

**ONCOLOGY TRAINING QUESTIONNAIRE**

| **Demographic Information** | | |
|---|---|---|
| Gender: | M | F |
| Age: | | |
| Qualification: | | |
| Specialization: | | |

| | **Educational activities** | **Strongly Agree** | **Agree** | **Disagree** | **Strongly Disagree** |
|---|---|---|---|---|---|
| 1. | Knowledge of English spoken and written | ❍ | ❍ | ❍ | ❍ |
| 2. | Have access to peer-review | ❍ | ❍ | ❍ | ❍ |
| 3. | Attend regular clinical guidelines | ❍ | ❍ | ❍ | ❍ |
| 4. | Know APHP oncology guidelines | ❍ | ❍ | ❍ | ❍ |
| 5. | Know NCCN guidelines | ❍ | ❍ | ❍ | ❍ |
| 6. | Know ASCO/ESMO guidelines | ❍ | ❍ | ❍ | ❍ |
| 7. | Know INCA guidelines | ❍ | ❍ | ❍ | ❍ |
| 8. | Attend regular clinical teams meeting | ❍ | ❍ | ❍ | ❍ |
| 9. | Attend regular national/international congress | ❍ | ❍ | ❍ | ❍ |
| 10. | Attend regular literature educational meeting | ❍ | ❍ | ❍ | ❍ |
| 11. | Attend regular internet access to PUBMED | ❍ | ❍ | ❍ | ❍ |
| 12. | Attend regular poster/communication congress | ❍ | ❍ | ❍ | ❍ |
| 13. | Have been offered opportunities to undertake supervised research | ❍ | ❍ | ❍ | ❍ |
| 14. | Have been offered opportunities to write manuscript of literature review | ❍ | ❍ | ❍ | ❍ |
| 15. | Members of scientific society (ASCO, AACR, ESMO etc) | YES | NO | | |

GLi (GuideLines index) = n.3-7

Ri (Research index) = n.1, n.12-14

Ti (Training index) = n.2+ n.8-11

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