Original article

SURVEY ON THE DEMAND OF SICILIAN PHYSICIANS FOR A SPECIFIC TRAINING ON HUMAN CADAVERS AND ANIMALS.

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ABSTRACT
Currently, surgical training of physicians in Italy has limited possibilities. Surgical training can be performed on dissection of human bodies as well as in animal laboratories, but experience is very poor. We conducted a survey through an anonymous questionnaire in order to evaluate the opinions of post-graduate physicians on their need for experience training on both human and animal bodies during their medical studies. A total of 165 young Sicilian physicians responded to the survey. Only 14 of them (8.5%) declared they had specific training on a live animal, while 46 (27.9%) reported they already attended cadaver labs. Over 70% assigned the maximum score to the utility of such courses as integration of medical academic offer. Our results showed that the majority of the subjects interviewed expressed a need for training using these practices and that it might be necessary to investigate patterns to promote the opportunity for direct practice on human and animal bodies.

1. Introduction

The dissection of human bodies has been used as a teaching tool in anatomy for thousands of years (1). One of the most ancient and greatest examples is the School of Medicine of Alexandria, during the 3rd century B.C., in the ancient Greece (2). The introduction of Christianity across Europe during the Middle Ages coincided with prohibitionism imposed by clerical authorities and it wasn’t until the end of the 12th century when the practice of dissection was officially resumed. During this period, different universities were founded across Europe: Paris, Bologna, Padua, Oxford and Montpellier (3) and a new generation of great anatomists who emerged during that period, namely Dubois, Vesalius; even Leonardo da Vinci and Michelangelo Buonarotti were able to take great advantage of direct studies on human cadaveric dissection.

With such an illustrious background, one might expect a large spread of human cadaveric dissections during the centuries to follow. In reality, the number of lessons with direct anatomy teaching by dissection has been gradually falling over time. This phenomenon is probably due to the concomitance of illegal practices and bad reputations linked with the supply of bodies for dissections (4,5) and the progress of technology. Today many university courses provide virtual dissection in a 3-D environment, with an aim to replace cadaver dissection (6).

However, these last centuries can be defined as the so-called “Dark Era” for the human cadaveric dissections, but the scientific community has recently re-evaluated their importance in teaching different disciplines of medicine (7). Researchers focused their attention not only on the increased reports of misadventures with patients caused by a lack of knowledge of anatomy, but also on the evidence of how experience with a direct human cadaveric dissection procedure can improve knowledge of anatomy in students at various levels; both for undergraduates and doctors alike who receive training in specializations where surgical anatomy represents an essential aspect (8).

In light of this reassessment, many universities have reintroduced anatomical surgical training with courses focused on the direct dissection of human bodies. The diffusion of these courses is assuming a greater capillarity and may be even more crucial for specializations that cannot find a proper substitute in a respective animal model (i.e., microsurgery, surgery of the hand, orthopedic, oral surgery, endoscopy, motor rehabilitation, plastic surgery). On the other hand, in recent years experimental studies on live animals, as i.e., imaging and endoscopic procedures, have increased (9) and, more recently, awareness of the importance of integrative, non-invasive or minimally invasive surgical training on live animals (10).

Nowadays in Italy, despite the aforementioned difficulties, there are few examples of courses on human cadaveric dissections, and even fewer on live animals. With such a background, we decided to perform a survey among a sample of Sicilian medical professionals, with the aim of exploring and documenting the potential for specific training needed on both the cadaver and live-animal level.

2. Materials and Methods

An anonymous structured questionnaire (provided in Appendix 1) was designed to collect: a) information on characteristics of physicians recruited in the survey (age, gender, current geographical area of work and/or education, education level, current position or role), and b) answers to questions dealing with items related to training experiences and training need on live animals or cadavers.

Questions included both dichotomous (Yes; No) and ordinal scale (1= minimum score; 5= maximum score) answers. The questionnaire together with a presentation letter of the survey aims were uploaded on a Google Forms platform (11). Between the 10th and 25th of January 2018, a questionnaire was then administered to Sicilian physicians under forty years of age via medical association networks by using both e-mail and thematic social media. We included both residents and specialists with any surgical specialty, including forensic and/or human pathology.

Anonymity of respondents was preserved, while unicity of each respondent was assured by checking tax code duplications and by verifying every single data entry through the detection of its Internet access Protocol. Data and answers collected by the questionnaire were extracted and imported on a password-protected Excel 5.0 to perform descriptive statistics. Results are presented in absolute and relative frequency.
3. Results

We recruited a sample of 165 Sicilian physicians, aged under forty years old (mean age 31.1; S.D.: ±5.3) (Table 1).

The majority of respondents were males (n=89; 53.9%), currently working in public hospitals or private structures and ambulatories, or training in universities in western (49.7%) or eastern (50.3%) Sicily.

Of all the respondents, only 117 (71%) had graduated, while the remaining reported a higher qualification (23.6% post-graduation diploma, 4.8% a Philosophiae Doctor and 0.6% a Master degree).

According to their position held at the time, the majority of the interviewed physicians were residents (61%), followed by hospital specialists (15.8%), freelancers without specialization (10.3%), specialist freelancers (9.1%), while 3.6% of the respondents declared an academic position.

Results of the answers provided by respondents are presented in the Table 2. Only fourteen physicians out of the 165 responders to the questionnaire (8.5%) declared they had a specific endoscopic training on a live animal, while 46 respondents (27.9%) reported to have already attended cadaver labs to get specific training.

Reasons of limitations in attending this specific training were reported by the remaining physicians and can be summarized mostly in unawares or unavailability of similar training initiatives both during academic or professional education, followed by very high fees fixed to access private courses (results not shown).

More than 70% of the physicians assigned the maximum score to indicate both the utility of these courses to integrate the medical educational academic offer, and the importance to continuously integrate professional education with specific endoscopic training on live animals (Table 2). The positive agreement was even higher when indicating both the utility to integrate the medical educational academic offer (83.6%) and the importance to continuously integrate medical professional education (83.0%) with cadaver lab-specific training (Table 2).

Table 1 - Sociodemographics and occupational characteristics of the Sicilian physicians recruited in the survey (n=165).

<table>
<thead>
<tr>
<th>N=165</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age in years (mean; S.D.)</strong></td>
</tr>
<tr>
<td>31.1±5.3</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>89 (53.9%)</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>76 (46.1%)</td>
</tr>
<tr>
<td><strong>Current geographical area of work/or education</strong></td>
</tr>
<tr>
<td>Agrigento</td>
</tr>
<tr>
<td>7 (4.2%)</td>
</tr>
<tr>
<td>Catania</td>
</tr>
<tr>
<td>61 (37.0%)</td>
</tr>
<tr>
<td>Enna</td>
</tr>
<tr>
<td>17 (10.3%)</td>
</tr>
<tr>
<td>Messina</td>
</tr>
<tr>
<td>71 (43.0%)</td>
</tr>
<tr>
<td>Palermo</td>
</tr>
<tr>
<td>2 (1.2%)</td>
</tr>
<tr>
<td>Ragusa</td>
</tr>
<tr>
<td>71 (43.0%)</td>
</tr>
<tr>
<td>Siracusa</td>
</tr>
<tr>
<td>2 (1.2%)</td>
</tr>
<tr>
<td>Trapani</td>
</tr>
<tr>
<td>2 (1.2%)</td>
</tr>
<tr>
<td>Western Sicily</td>
</tr>
<tr>
<td>82 (49.7%)</td>
</tr>
<tr>
<td>Eastern Sicily</td>
</tr>
<tr>
<td>83 (50.3%)</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
</tr>
<tr>
<td>Graduation</td>
</tr>
<tr>
<td>117 (70.9%)</td>
</tr>
<tr>
<td>Post-graduation diploma</td>
</tr>
<tr>
<td>39 (23.6%)</td>
</tr>
<tr>
<td>Master</td>
</tr>
<tr>
<td>1 (0.6%)</td>
</tr>
<tr>
<td>Philosophiae Doctor</td>
</tr>
<tr>
<td>8 (4.8%)</td>
</tr>
<tr>
<td><strong>Current position</strong></td>
</tr>
<tr>
<td>Resident</td>
</tr>
<tr>
<td>101 (61.2%)</td>
</tr>
<tr>
<td>Freelancer without specialization</td>
</tr>
<tr>
<td>17 (10.3%)</td>
</tr>
<tr>
<td>Hospital specialist</td>
</tr>
<tr>
<td>26 (15.8%)</td>
</tr>
<tr>
<td>Specialist freelancer</td>
</tr>
<tr>
<td>15 (9.1%)</td>
</tr>
<tr>
<td>Academic</td>
</tr>
<tr>
<td>6 (3.6%)</td>
</tr>
</tbody>
</table>

Table 2 - Answers to the survey of the Sicilian physicians recruited (n=165).
Lastly, 124 (75.2%) of respondents expressed the need to indicate a procedure or technique to be trained on live animal or cadaver labs (Table 2). Particularly, robotic surgery, endoscopic, laparoscopic and arthroscopic procedures, neuro-imaging and digital 3-D simulations, were more frequently indicated (results not shown).

4. Discussion

This study presents the results of an anonymous survey conducted on a sample of Sicilian medical professionals under the age of forty years old, with the aim to document the potential of a specific training demand for practice on cadavers and live animals. In fact, the questionnaire contained questions not only about dissections or operative procedures on cadavers, but it focused its attention also on the possibility to pursue specific medical procedures, i.e. endoscopy or minimally invasive, on live animal models.

We found that the minority of the sampled physicians already attended a cadaver and/or live animal lab, while the majority of respondents never participated in such educational courses with cadavers or at live animals facilities. Our respondents highlighted the need to integrate the medical educational offer both at the academic level (during the undergraduate period and in the years of specialty degree) and in the following years. These findings support our initial hypothesis on the importance to continuously integrate medical professional education in Italy with specific training using both live animals and cadavers.

Although the execution of surgical procedures performed on animals can present some gaps, the “animal model” remains a very valuable tool to enhance self-confidence and ability to perform certain surgical procedures, in turn possibly increasing patient’s safety. For example, endoscopy and vascular surgery are among the disciplines that rely most on animal models to improve the ability of their students. Not by chance, in the recent years the number of living labs across Europe have increased (12). Within these infrastructures is the conception to support researches in experimental surgery (laparoscopy, endoscopy, arthroscopy) both for veterinary health and for human health, also the didactic component could be valorized.

The use of the animal model in surgical training to complete the model based on cadavers could play a fundamental role in the change of teaching methods, introducing innovative and transferable concepts to the entire scientific community. Toward these ends, we have deeply analysed the answers provided in the survey by some specialized endoscopists declaring their participation in courses on live animals and we have found out a dichotomy: they appeared enthusiastic about the possibility to work directly on a live organism, but at the same time they underlined a critical issue related to the different anatomy of the animals used for the procedure. Despite this, the mentioned respondents highlighted the possibility of increasing not only the practical skills but also the familiarization with the surgical instruments.

It has been postulated that junior doctors in training at Italian Universities often have an incomplete knowledge due to the reduced number of surgical procedures performed during the specialization program. We should keep in mind the different needs of students.

For some of them, the practice on live animals could be sufficient and useful to increase the necessary skills for their profession, while other classes have an indispensable necessity of exercising directly on the human bodies.

Importantly, Italian medical students highlighted how practicing on a real cadaver is totally different from what they would have ever expected studying in books and atlas (13). Nevertheless, the number of universities implementing education and training on cadavers in Italy (i.e. University of Bologna, University of Padua) remains limited, and well-below the needs of Italian medical students. There are also few courses dedicated to health professionals organized by private associations, sometimes in cooperation with foreign partners or universities. Unfortunately, physicians who want to take such courses have to face considerable costs, including registration fee, (possibly long) travel and other expenses. Moreover, the large restrictions on study and research on the human body in Italy, according to an ambiguous legislation, have to be taken into account. The law regulating the use of unclaimed bodies for studies and research purposes is based on a decree enacted on the first decades of the 20th century (Art. 32 of the Royal Decree n.1592 of 1933) and never repealed. It establishes the obligation for all human bodies from hospitals to be subjected to diagnostic verification. The bodies that are not requested by relatives up to the 6th degree of kinship, are reserved for teaching and scientific investigations. In antithesis with such decree, the Italian Penal Code (art. 413) punishes anyone who dissects a human body or parts of it, for scientific or educational purposes with up to six months imprisonment.

The current Mortuary Police Regulation, whose Chapter VI norms the “Release of Cadavers for study purposes”, is based on these legislative bases. It specifically mentions the university anatomical rooms and the human bodies destined for them, as well as the possibility for not well-defined “scholars” of having the anatomical pieces available for a certain time (14).

Of interest, in May 2013, the National Council of Bioethics has expressed a positive opinion about post-mortem body donation for study and research purposes: “Despite the study of anatomy and also the training in surgery which now utilize advanced technologies such as virtual or increased reality, we should consider how direct experience on the cadaver is irreplaceable and that the anatomical dissection plays a key role on the training of students and specialists in the updating of specialists”(15).

As the survey was restricted to a young target of physicians, despite the several limitations related to the cross-sectional design of the study and to the small sample size, we are confident we obtained a useful picture of the present and future training demand for a specific training in surgical, forensic and pathological dissections on cadavers and live animals, the last ones with regard to endoscopic and minimally invasive procedures.

The results of our survey should encourage political authorities, universities and other institutions to develop inter-institutional and multidisciplinary collaborations in order to respond to the specific education and training needs of health professionals, as previously documented in other health sectors with regard to innovative tools applied to medicine (16-19) and to specific health demands yet to be satisfied (20-23).
Future studies on the topic explored by the present survey should be emphasised to medical students and residents, as was already done in many other medical fields (24-29), paying attention to the role that the participation to anatomic dissections on human bodies could play as well as the attendance of demonstrations in applying specific procedures on live animals.

References

15. Donazione del corpo post mortem a fini di studio e ricerca. Parere del Comitato Nazionale per la Bioetica 19/05/2013.

Appendix 1 - Questionnaire

Introduction to the survey

Gentili Colleghi,

L’Associazione Italiana Giornali Medici (SIGM) - Sicilia e l’Associazione Italiana Medici (AIM) - Sicilia, in risposta alle sollecitazioni ed alle disponibilità provenienti dall’Istituto Zooprofilattico Sperimentale della Sicilia (IZS) e dal Dipartimento BIONIC dell’Università degli studi di Palermo, si sono fatte promotrici di una survey finalizzata a documentare il fabbisogno formativo dei medici siciliani. Nel particolare, è stato predisposto un breve questionario in lingua destinato ai medici abitanti ed in formazione specialistica, nonché a profili specialistici senior, dell’area sanitaria per rilevare sia le esigenze formativa attuali, oltre che un eventualo specifico interesse, in tema di formazione con cadaver (cadaver lab) e su animali vivi (animal lab), questi ultimi per la pratica di procedure endoscopiche.

Vi chiediamo la vostra cortese collaborazione dedicando pochissimi minuti del vostro tempo per rispondere alle domande del questionario, nonché per diffondere l’iniziativa tra gli altri colleghi.

Il questionario è assolutamente anonimo ed i dati sensibili saranno trattati e conservati secondo le norme sulla tutela della privacy ai sensi dell’art.7 del D.Lgs. 196/2003.

Il Consiglio scientifico

Part A – General Information

Enter your first and last name followed by date of birth (eg: Mario Ross, July 19, 1980)

Sex (Male/Female)

Hometown

Current place of work or training

E-mail

Current task

Part B – Questions on live animal lab

1) Do you know the Sicilian Zooprofilactic Experimental Institute?
2) Have you ever attended a specific endoscopic training on live animals?
2.1 If NO, why? (Too expensive, I do not have time, I did not know, other)

2.2 If YES:
2.2.1) Indicate how many courses you have attended in the last three years
2.2.2) Indicate at which centre you attended the last course
2.2.3) How many days did it last?
2.2.4) Did the organizers provide for accommodation?
2.2.4.1) If YES, indicates what kind of support did you have (information, affiliated hotels, etc.)
2.2.5) What did you like most about the course?
2.2.6) What did you like least about the course?

3) Indicate how important it is (1=minimum score, 5=maximum score), in your opinion, to continuously integrate your professional training with specific endoscopic training on live animals.

4) Indicate how important it is (1=minimum score, 5=maximum score), in your opinion, to continuously integrate your professional education with a specific endoscopic training on live animals.

5) Why do you consider it important?

Part C – Questions on cadaver lab

1) Have you ever heard of cadaver labs taken in place in Sicily?
2) Have you ever attended any cadaver lab specific training?
2.1 If NO, why? (Too expensive, I do not have time, I did not know, other)

2.2 If YES:
2.2.1) Indicate how many courses you have attended in the last three years
2.2.2) Indicate at which centre you attended the last course
2.2.3) How many days did it last?
2.2.4) Did the organizers provide for accommodation?
2.2.4.1) If YES, indicates what kind of support did you have (information, affiliated hotels, etc.)
2.2.5) What did you like most about the course?
2.2.6) What did you like least about the course?

3) Indicate how useful it is (1=minimum score, 5=maximum score), in your opinion, to integrate an academic medical educational offer with cadaver lab specific training

4) Indicate how important it is (1=minimum score, 5=maximum score), in your opinion, to continuously integrate your professional training with specific cadaver labs

5) Why do you consider it important?

6) Indicate if are there any surgical procedures or techniques you would like to be trained in on live animals or cadavers.

6.1 If YES, report which ones: