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Thesis entitled

DEVELOPMENT AND EVALUATION OF A TRAINING PROGRAM TO PROFESSIONALIZE MEDICAL RESIDENTS IN HUMANITARIAN ASSISTANCE AND DISASTER RESPONSE.

SSD MED /41 ANESTESTESIA

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Summary

Rationale

While the number of humanitarian emergencies continues to increase, well-trained humanitarian workers are now more necessary than ever. However, health providers have been observed to be ill-prepared during recent disasters due to lack of experience in international relief and inadequate understanding of the local context. For this reason, the international humanitarian community has been drawing attention on the compelling need for competency-based training curricula based on an standard set of cross-cutting and profession-specific competencies. All the more because young doctors have been increasing their presence in international aid projects, good preparation and performance oversight are paramount to guarantee health-based best practice also in poor settings.

Aim

The aim of this research project was to develop and evaluate the efficacy of a course to professionalize medical residents in humanitarian assistance before first deployment in the field.

Methods

Firstly, a preliminary assessment of the target audience in terms of interest and potential involvement was conducted; secondly, an analysis of the educational needs through two different methods (a systematic literature review and field experts opinion survey) was carried out; thirdly, a competency-based course based on current sets of published competencies and jointly developed by the Research Center in Emergency and Disaster Medicine of the Università del Piemonte Orientale and the organization Médecins Sans Frontières was developed and implemented; finally, an evaluation of the training program through the Kirkpatrick evaluation model was conducted.

Results

This research project evidenced that the interest of residents in humanitarian assistance is high and that they would like to be involved in field humanitarian projects by the completion of their residencies. Field experts confirmed that competency-based education is paramount to improve response to international humanitarian emergencies. Three editions of the course took place from 2014 to

2016. A total of 19 participants completed the course and were successively deployed in MSF field projects. The first two editions were offered on a pilot basis and served to refine the course contents. The third edition was used to evaluate the course. After completion of the course, students were highly satisfied, and their knowledge and skills in simulated humanitarian environments improved significantly.

Riassunto

Razionale

Mentre il numero delle emergenze umanitarie continua ad aumentare, gli operatori umanitari ben addestrati sono ora più che mai necessari. Tuttavia, il personale umanitario ha dimostrato di essere impreparato durante la gestione di disastri recenti a causa della loro mancanza di esperienza in ambito internazionale ed una inadeguata comprensione del contesto locale. Per questo motivo, la comunità umanitaria internazionale ha messo in rilievo la necessità di programmi di formazione basati su un set standardizzato di competenze trasversali ed specifiche. Tanto più perché i giovani medici hanno aumentato la loro presenza in progetti di aiuto umanitario internazionale, la preparazione e il monitoraggio delle loro performance sono di estrema importanza per garantire la miglior pratica nell' ambito della salute in contesti a basse risorse.

Obiettivo

L'obiettivo di questo progetto di ricerca è stato quello di sviluppare e valutare l'efficacia di un corso professionalizzante per medici specializzandi in materia di medicina applicata all'assistenza umanitaria prima del loro primo impiego sul campo.

Metodi

In primo luogo è stato studiato l'interesse e potenziale coinvolgimento dell'audience target; in secondo luogo, è stata effettuato un analisi dei bisogni formativi attraverso due metodi diversi (revisione sistematica della letteratura e opinioni di esperti sul campo); in terzo luogo, il Centro di Ricerca in Emergenza e Medicina dei disastri dell'Università del Piemonte Orientale ha sviluppato, in collaborazione con l'organizzatione Medici Senza Frontiere, un corso competency-based sulla base dei set di competenze pubblicati; infine, è stata

condotta una valutazione del programma di formazione attraverso il modello di valutazione di Kirkpatrick.

Risultati

Questo progetto di ricerca ha evidenziato che l'interesse dei medici specializzandi in assistenza umanitaria è alta e che vorrebbero essere coinvolti in progetti umanitari sul campo prima del completamento del loro periodo di formazione. Gli esperti sul campo hanno confermato che l'educazione competency-based è fondamentale per migliorare la risposta alle emergenze umanitarie internazionali. Tre edizioni del corso si sono svolte dal 2014 al 2016. Un totale di 19 partecipanti hanno completato il corso e sono stati rischierati sul campo in progetti di MSF. Le prime due edizioni sono stati edizioni pilota servite a perfezionare i contenuti del corso. La terza edizione è servita per valutare il percorso formativo. Dopo il completamento del corso, gli studenti erano molto soddisfatti e le loro conoscenze e abilità pratiche in ambienti umanitari simulati sono significativamente migliorate.

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1. Introduction

1.1 Need for professionalization within the humanitarian aid community

Over the past half century, disasters and humanitarian emergencies have seen a sharp upward trend, resulting in millions of victims and economic losses [1]. In 1945, the United Nations Charter was signed and with it, the activities of humanitarian aid interventions in future crossborder conflicts were regulated by new International Humanitarian Laws (IHL) and the Geneva Convention (GC)[2].

After the end of the Cold War, unconventional civil and international conflicts became the new norm causing millions of internally displaced people and refugees. Over the last years, political and media-driven uprisings have gained relevance while, in addition, several armed nonstate groups are being surfacing showing merciless violence with no respect for the GC and the internationally-recognized humanitarian principles: neutrality, impartiality, humanity, and independence [3].

In the upcoming years, it is expected that global public-health emergencies entailed by excessive urbanization, climate change, severity of natural disasters, and armed conflicts will critically challenge the capacity of poor populations to tackle the scarcity of drinking water and food. Therefore, most of those internal crises will require in the future more external support than ever [4, 5].

Globally, several medical specialties have been involved in the international response to disasters and complex humanitarian emergencies [6, 7]. However, humanitarian health professionals work in unstable - and often unsecure- environments and are exposed to a vast array of health care needs often complicated by chronic conditions such as severe poverty and malnutrition [3].

In addition, challenges in the field are not only related to the different spectrum of disease and limited available resources but stem also from cultural diversity, at times difficult local rules and the political and social disruption that often characterises humanitarian settings. Therefore, breakdowns in health care are not always related to the lack of technical skills but mainly to the need to acquire additional competencies to achieve high levels of performance in the field [8].

Not surprisingly, lessons learned from relevant international disastrous events— such as Haiti (2010), the Asian tsunami (2004), the Haiyan Typhoon (2013), and the Ebola virus disease tragedies in West Africa (2014)— call for attention to the limited capability of foreign medical teams to meet needs, due to their limited pre-departure training and lack of field experience in resource-constrained settings [9-14]. Accordingly, the U.K. Department for International

Development (DFID) Humanitarian Emergency Response Review, highlighted that there is still "no straightforward professional route into humanitarian work" and "in every major emergency there are still significant numbers of aid personnel who lack some of the skills essential to their jobs" [15].

These concerns have prompted the international community to devise means for the development of professionalism within the humanitarian assistance sector [9, 11] " through an international professional association, the development of core competencies that drives curricula, and the creation of a universal certification system for aid workers" [16].

This professionalization process would ensure that health humanitarian workers, who may differ in background, skills and experience, would gain a broader understanding about the specific context in which the humanitarian crisis occurs [17], the function and tasks of the World Health Organization (Geneva, Switzerland) Health Cluster [18] and the international humanitarian law [9, 19].

In light of the foregoing, the Enhancing Learning & Research for Humanitarian Assistance (ELRHA), an independent network hosted by the NGO Save the Children aimed to improve the outcomes of humanitarian aid interventions by supporting partnerships between academic institutions and humanitarian organizations, launched in 2009 the professionalization movement; its main goal was to *''further enhance the professionalization of the humanitarian sector by bringing together organizations, initiatives and universities from around the world. With experience in training, capacity development and quality assurance for the humanitarian sector, ELRHA works to build an international system for professional development and recognition for the humanitarian sector* '[8].

1.2 Role of doctors in training in humanitarian assistance

In order to find new trategies to better address the threats for the health of the global population in the next century, the WHO has recently undertaken a process of internal reform [20]. The reform process planned for the *WHO emergency response section* will comprise the following six areas: the WHO emergency programme, the global health emergency workforce, the international health regulations core capacities and resilient national health systems, improvements to the international health regulations, research and development and funding.

In spring 2016, the working group appointed by the WHO to draft a plan to strenghten the global health emergency workforce, concluded that there is an "insufficient workforce presence with the

required capacities" [21]. In spite of the 6% annual growth rate of humanitarian health workers, the needs for competent professionals in the field are steadily increasing [3] and recent disasters have been characterized by the deployment of young and inexperienced humanitarian health staff [9] who clearly fell short in meeting good standards of care.

Recently, several researches have highlighted the growing interest in international humanitarian rotations voiced by trainees in different disciplines [22-25] and the benefits that international rotations may have on resident training. For instance, working in low-resource environments strengthens the professional development of doctors and enables physicians to promptly dentify crucial comorbidities rarely found in developed countries [26-30]; this may have relevant implications, as new cross-border diseases and outbreaks (such as H1N1 in 2009 and Ebola in 2014) are becoming the new norm as a result of travels and massive immigration [31].

Of note, doctors in training represent a big pool of health professionals fresh of medical knowledge who are eager to engage in overseas global health projects. Increasing the presence of young doctors in the field may contribute to fill the needs of health professionals in humanitarian projects. Moreover, in countries like Italy where residents are allowed by law to undertake international rotations up to 18 months while maintaining the same financial support, humanitarian organizations could benefit from additional operational workforce at a *lower price*.

However, earlier programs to promote global health among residents found many barriers to the successful implementation in the academic curriculum, such as time constraints, lack of approval and funding concerns [32] and, in addition, *"at least two years of relevant professional experience after completion of the residency*" are consistently listed among the application requirements for internationally recognized humanitarian organizations such as Médecins Sans Frontières (MSF) or the International Committee of the Red Cross (ICRC)[33, 34].

This precondition builds upon the fact that in humanitarian settings, a set of challenges hindering the work of health professionals are implicit (such as unstable environments, shortage of resources, cross-cultural interaction etc) and since no standardized training for humanitarian health staff exists, humanitarian organizations rely on the fact that after at least two years of experience in their own nationstates health workers should be able to safely deliver minimum standards of care.

Therefore, even though opening the application process of international humanitarian organizations to young doctors might offer relevant advantages, the lack of evidence and the

difficulties entailed by humanitarian scenarios lead to a current overall lack of trust on the systematic deployment of residents in the field.

1.3 Gaps in current educational initiaves

For several decades, the demand for better coordination and control has been heard during and after every major international disaster [35]. The unacceptable practices of international medical teams in the health care delivered after recent disasters has raised criticism among the humanitarian community and has prompted the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), the World Health Organization (WHO) and nongovernmental organizations (NGOs) to call for better coordination, quality control, oversight, and international standards for health services.

Since disaster response demands a large health workforce with diverse professional disciplines, subspecialty categories, and levels of professional experience and cultural expertise, recommendations included professionalization through a competency-based curriculum and registry of international provider organizations and their health providers [36].

In addition, training objectives for health workers performing in resource constrained environments differ from the set of abilities gained in medical schools and residency programs in that they are not restricted to a certain job profile (e.g pediatrics, anaesthesia etc) but embrace a vast array of additional medical and not medical disciplines [8]; therefore, regardless of professional background, education for health personnel operating in disaster situations should base on the acquisition of task-related, profession-specific, and cross-disciplinary competencies obtained through accredited education and training programs implemented by academically affiliated centers [17, 18, 35] **[Figure 1].**

Moreover, if international disaster response is to improve, the members of international aid organizations must have a standardized organization and approach, which basically requires an understanding of the features, barriers, weaknesses, and strengths of response operation during catastrophic situations [37-41].

In this regard, competency-based education has already been implemented by several academic institutions worldwide and builds credibility based on the evaluation of trainees' subsequent performance [42]. However, existing educational initiatives often rely too heavily on competencies developed by single training programs [43] and NGO favor internal evaluation for their own workforce; therefore, a part from general guidelines (such as the Sphere Project's Humanitarian

Charter and Humanitarian Standards in Disaster Response) a validaded and internationally recognized set of core competencies for health workers engaged in humanitarian assistance has not yet been defined [44].

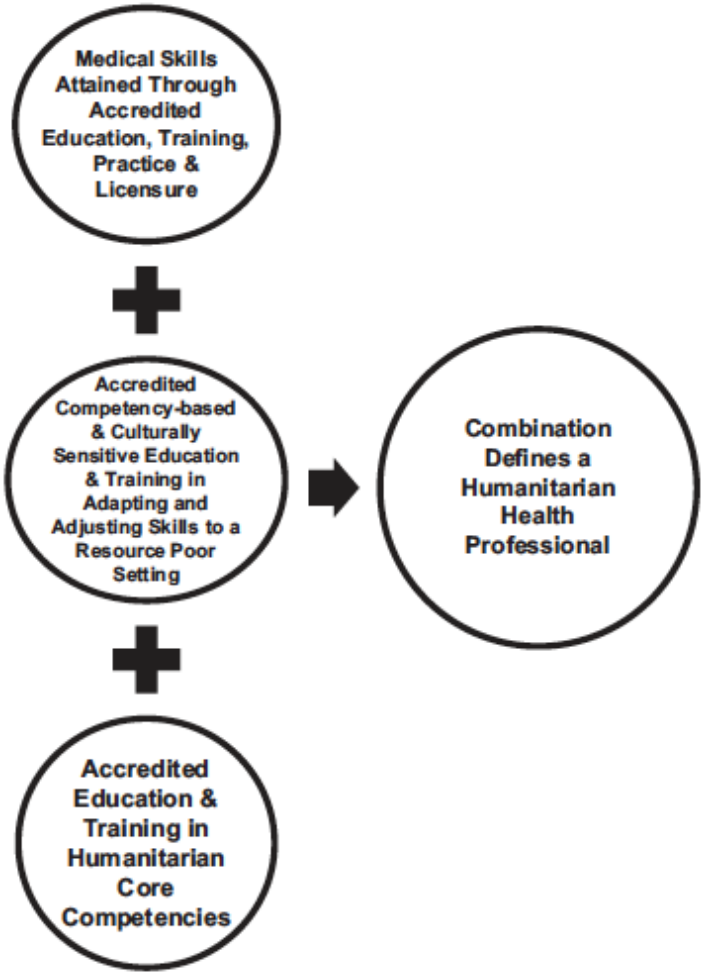

Figure 1. Graphic depiction of the definition of a humanitarian health provider, by Frederick M. Burkle in Conversations in disaster medicine and public health: the profession. Disaster Med Public Health Prep. 2014 Feb;8(1):5-11.

Noteworthy, health professionals must worldwide get through a competency-based training to be licensed to practice in their own nationstates. In order to ensure minimum standards of care in the field, humanitarian health workers should only be allowed to practice outside their licensed states once they have been certified to do so; this requirement should also apply to disasters settings or low-resource environments [8] In this regard, “the standard route to certification is the completion of a competency-based curriculum, demonstrating competency through examination or experience, and producing a learning and development portfolio to document competency through the acquisition of experience and added training” [3].

An agreed-upon set of cross-sectorial competencies would best provide the basis for a standardized educational program framework [17, 19, 35, 45], would allow for the assessment of aid workers' performance and knowledge acquisition based on their designated tasks and would further ensure international recognition and best-practices comparison [46] by regulatory stakeholders [43].

Essential to the preparation process before first deployment are, therefore, clearly defined learning objectives, curriculums tailored to the nuances of disaster and humanitarian settings, state-of-the-art teaching tools including high fidelity simulation and assessment to determine competency [47]. Unfortunately, assessment of competency-based post-education and training skill sets has been sparse to date [48].

1.4 Rationale

Taking into consideration the huge need for health workers in humanitarian projects, the concerns raised by relevant bodies within the humanitarian aid sector regarding the poor preparation of humanitarian health workers and finally, the interest voiced by residents to participate in international rotations by the end of their residencies, the aim of this research project was to test the efficacy of a competency-based training program for medical residents, developed in collaboration with the International humanitarian organization MSF, based on the latest evidence on education for humanitarian health workers and delivered through state-of-art technologies.

2. Aim of the thesis

2.1 Overall objective

To test the efficacy of a training program to enhance the professionalization of medical residents to work in humanitarian aid settings.

2.2 Specific objectives

- To explore the interest of the target audience (medical residents) in humanitarian health in Italy;
- To identify educational needs for the target audience;
- To develop a competency-based training program in collaboration with the internationally recognized humanitarian organization MSF.
- To demonstrate the efficacy of the course.

3. Research activities conducted

Study 1

Survey of residents in Italy

Aim

To conduct a baseline assessment by polling residents[1] on their interest in humanitarian aid and their opinion about the professionalization of humanitarian workers.

Methods

I. Poll, Population, and Administration

In Italy, anesthesia and critical care disciplines are combined in a common residency program covering a training curriculum recently extended to five years. At the date of the poll, the fifth year had not yet been activated, so the poll data refers only to the first four years. From September through October 2012, all the Directors of the 39 accredited anesthesia residency programs in Italy were contacted by e-mail and written consent was obtained to administer the questionnaire among the residents enrolled in their respective programs.

Sequentially, an electronic poll was distributed to the residents using the online commercial software Surveymonkey [49] (Palo Alto, California USA). The e-mail invitation included a brief presentation of the study, the informed consent form, a link to the online questionnaire **(Appendix 1)**, and a link for withdrawal from the poll.

In the presentation e-mail, the term professionalization was defined as the process that provides humanitarian workers with the appropriate knowledge, skills, and attitudes to perform a task with a high level of competence, proficiency, and devotion. Each participant could answer the poll only once. A maximum of five reminder e-mails were further forwarded to nonresponders from October 2012 through March 2013. A retrieval rate of 30% was expected by using a web-based poll request with a reminder e-mail [50].

II. Ethical Considerations

The participation in the questionnaire was voluntary, anonymous, and independent. Confidentiality of information was ensured and no financial incentive to participate in the study was offered. Informed consent was obtained and the participants could withdraw from the poll at any time. Since all data were deidentified and reported in aggregate, the evaluation was deemed

[1] This poll was restricted to residents in anaesthesia because the course was initially intended only for residents in this discipline.

exempt from institutional review approval by the local Ethics Committee (Comitato Etico Interaziendale, Novara, Italy; study number 014.04.29).

III. Survey Contents

A cross-sectional poll consisting of 14 questions was used. Questions were categorized in six different sections to collect information about:

(1) demographics;

(2) interest in humanitarian assistance;

(3) residents' awareness of the humanitarian aid rotations offered by their training programs;

(4) perceived need of professionalization in humanitarian assistance;

(5) prior experience;

(6) career intentions.

A panel of experts composed of five faculty members from the Research Center in Emergency and Disaster Medicine (CRIMEDIM; Novara, Italy)[51] of the Università del Piemonte Orientale [52] and of the faculty of the European Master in Disaster Medicine (EMDM; Novara, Italy) [53] reviewed the questionnaire content for accuracy and provided appropriate modifications to ensure validity of the poll. All five experts were anesthetists with broad prior experience in disaster management, humanitarian aid missions, and training in humanitarian courses, nationally and internationally.

IV. Statistical Analysis

Frequencies were used to describe respondent characteristics.

Data analysis was conducted using Microsoft Office Excel 2007 (Microsoft Corporation; Redmond, Washington USA) and GraphPad Prism v.5. (GraphPad Software; San Diego, California USA). Chi-squared tests were used to compare residents' year of training and residents' gender with items of interest. A P value less than .05 was considered as statistically significant.

Results

Globally, 29 (74%) of the residency programs contacted agreed to participate in the poll. Nine hundred twenty-four out of the 1,362 residents returned the questionnaire, yielding a response rate of 67.8%. Thirty-one declined participation and eight e-mail invitations were electronically returned unanswered. The margin of error estimated for the poll results based on the number of nonresponses that occurred with 95% CI was 1.8% (66.0-69.6).

Most of the participants were female (61.7%) and respondents were homogeneously distributed among all the training years **[Figure 2].** Median age of the participants was 29 (28-31) years (median IQR525-75). A total of 74.7% of the respondents were interested in taking part in humanitarian missions by the end of their training programs. Almost 95% believed that such experiences could positively lead to improved professional development.

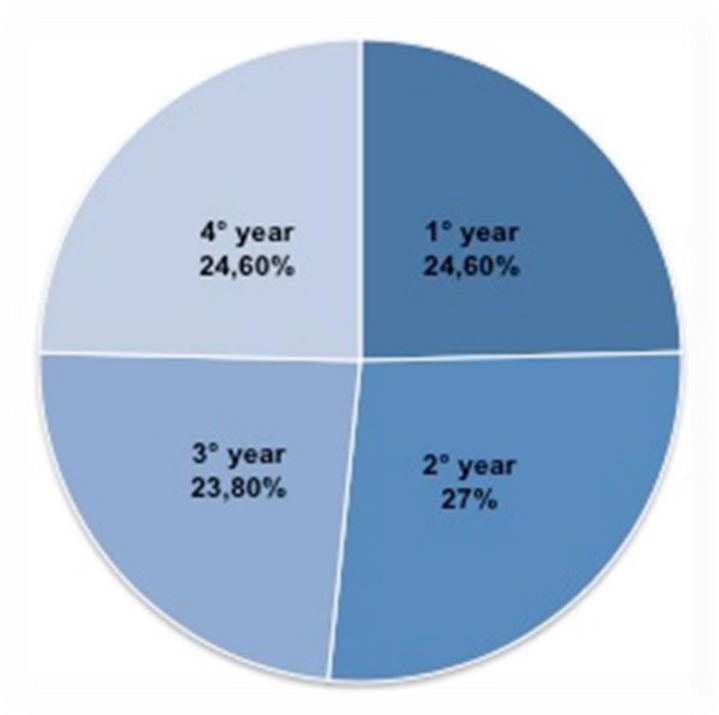

Figure 2. Frequencies of respondents distributed by training year. At the moment of survey, the 5th year of training was not implemented yet at national level due to the recent change in the Italian residency school's regulation.

Only 154 (16.7%) of respondents had attended some instruction courses to enhance professionalization of humanitarian workers. However, 97% of them affirmed that a formal course addressed to prepare residents for the challenges posed by low-resource environments should be implemented; such necessity was also supported by 97.4% of residents with prior experiences in humanitarian aid missions.

More than 96% of respondents considered that humanitarian aid assistance should be professionalized beyond an individual's area of expertise, and all the respondents with prior experiences favored this. Approximately 29% of the respondents had collaborated with humanitarian organizations **[Table 1].**

Survey items	(n) %		
	Yes	**No**	**I don't know**
Prior experience			
Have you ever collaborated with humanitarian organizations at national or international level?	29	71	
Have you ever taken part in humanitarian aid missions?	6.8	93.2	
Interest in humanitarian assistance			
Would you like to participate in an humanitarian aid missions by the end of your training program?	74.7	1.7	26.3
Do you think that humanitarian aid missions could lead to professional development?	94.9	1.8	3.3
Humanitarian aid rotations offered by training programs			
Does your residency program expose residents to humanitarian aid rotations?	20.1	34.5	45.4
If your training program exposes residents to humanitarian aid rotations, is there a preparatory course ?[a]	17.1	36	46.9
Professionalization in humanitarian assistance			
Have you ever taken a course aiming at professionalizing humanitarian workers?	16.7	83.3	
Do you think that a specific course addressed to prepare residents to overcome the challenges usually posed by low-resources environments should be implemented before they take part in humanitarian missions?	97	0.3	2.7
Do you think that the sector of aid workers committed to humanitarian assistance should be professionalized including topics beyond their areas of expertise such as public health, security, communicable diseases... ?	96.2	0.8	3

Table 1. Frequencies of respondents categorized by prior experience in humanitarian assistance, interest in humanitarian missions, awareness of the humanitarian aid rotations offered by their training programs and opinion about the professionalization of the humanitarian aid sector

Most had collaborated with the Italian Red Cross (Rome, Italy), Emergency Medical Services volunteer groups, civil-protection-affiliated agencies, and humanitarian non-governmental organizations **[Figure 3].**

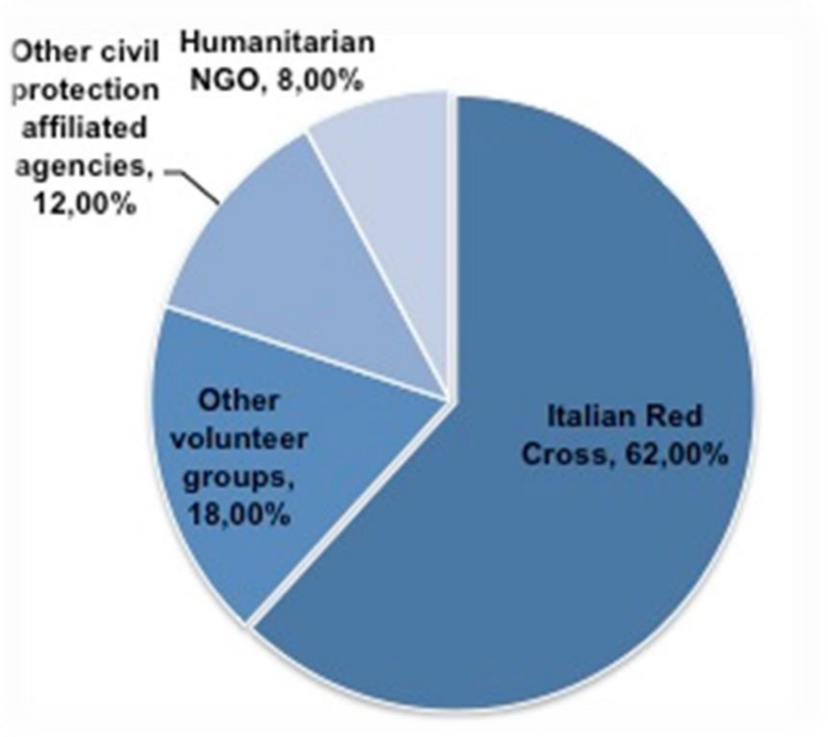

Figure 3. Collaboration of residents with national or international humanitarian organizations in the field.

Prior participation in humanitarian missions for national and international crisis was confirmed by only 6.8% of the participants.

Finally, 69 (7.5%) planned to pursue a career in humanitarian or disaster medicine upon completion of the residency, and 389 (42.1%) would have liked to see a specific pathway implemented within their training programs. Nationally, women and junior residents (first and second training year) were more interested than other demographic descriptors in pursuing a career in humanitarian assistance in their future (P,.05).

Limitations

This poll has several limitations. While a return rate of 30% for a web-based poll was considered acceptable [50] the results have to be interpreted carefully, and the conclusions cannot be extrapolated to every anesthesia/critical care resident in Italy. In addition, even though the questionnaire was internally validated based on consensus of the experts, it was never tested for reliability.

Residency programs in which directors didn't approve the diffusion of the survey were not included in the study; undoubtedly, the responses of residents enrolled in these programs would have supplied additional data. However, this study covered 74% of the training programs in Italy, and

therefore, provided data from the majority of residents.

A selection bias cannot be excluded; residents who were more interested in the topic were probably more likely to reply. However, the authors obtained a high response rate in comparison with similar studies [22-25].

Only a small percentage of respondents had prior experience in humanitarian missions. Nevertheless, the objective of the poll was to explore the interest and to detect opinions of a population of physicians in the early stage of their career.

Additionally, the authors recognize that the participation in humanitarian missions might be interesting in the abstract. The poll did not address in which type of missions residents would be more interested; also, additional factors, such as the specific hazards presented by the host country and the potential extension of their residency to account for lost rotations, might have influenced their answers.

Study 2

Expert Opinion Survey

Aim

To explore and analyze the opinions of disaster management experts about potential deficiencies in current available training and education for humanitarian workers.

Methods

Basic Methods

A questionnaire-based evaluation of experts' opinions and experiences in response to disasters was conducted **[Appendix 2]**. An open-ended questionnaire was designed, approved, and validated by consensus of the CRIMEDIM academic and research evaluation team. The selection of the experts was done using the purposeful sampling method, and the sample size was considered by data saturation. The questionnaire was sent to identified worldwide experts who represented expertise in different fields of disaster management, including health care, search and rescue academic teaching, and humanitarian aid that included field mission experience, military, NGOs, and intergovernmental organizations. The experts were asked to report their experiences and provide opinions about problems and challenges within the response to disasters that they felt must be included in any education and training initiatives; the main focus of which was on the subjects of management, education and training, and national and foreign medical teams (FMTs). Content analysis was used to explore the implications of the data. The completed questionnaire content was reviewed by different faculty and field managers, and relevant data were extracted. Responses of the experts were compared for similarities and differences, and then listed as merged sentences and categories.

Ethical Considerations

Informed consent was obtained and all participants were informed they could refuse to participate or withdraw from the study at any time. Also, names and personal information of the participants were kept confidential and no names or affiliation data were included.

Results

Fourteen experts from the UK, Germany, Italy, Belgium, Portugal, France, the USA, Israel, Iran, and Saudi Arabia participated in this study. All participants were male, and were from different areas of disaster management **[Table 2].**

	Background	n
Field of work	Health/Medicine	7
	Fire and Rescue	3
	Military	2
	NGO/IGO	2
Level of education	PhD/Doctorate	8
	Master of science	3
	Bachelor of science/Diploma	3

Table 2. Background of opinion survey respondents; abbreviations: IGO, intergovernmental organization

The experts' opinion and experience were summarized and slotted into the following categories:

(1) Training and Education;

(2) Leadership, Coordination, and Management;

(3) National/Foreign Medical.

Teams Training and Education.

The participants confirmed that the most important element of disaster preparedness is training and education. In fact, training is the cornerstone of an effective response to disasters. However, experts assert most disaster management training programs are not effective because:

- Disaster training programs are not comprehensive and competency-based.
- The quality and quantity of training programs are insufficient.
- There is neither a worldwide strategy nor standardized curricula for training on disaster management and humanitarian assistance.
- There are no standardized criteria on how to select the trainees for disaster training courses
- There are a limited number of professional trainers.
- Budget limitation is often a serious challenge.
- One result of the lack of standardized training programs is that more lives may be lost inadvertently during or after disasters. Responders, who are usually not well trained, attempt to do their best during disasters, but more damage may result from their unskilled rescue attempts.

- It is necessary to develop a competency-based training curriculum. The quality of training programs and their impact on field operations needs evaluation, which will result in updating and providing a high-quality training program.
- A standardized international training curriculum is greatly needed, but it must form part of the development of international standards for response, competence training, and quality assurance. In the absence of international standards for training and competence, teams train themselves to various standards and quality.
- Sometimes, the teams are well trained in their respective field of expertise, but work without knowledge of the benefits that are gained from interactions among various organizations and activities.

Leadership, Coordination, and Management

The experts believed that leadership, coordination, and management are the core of response operations during during disasters. An effective leadership, comprehensive coordination, and a wellorganized management will control and minimize disaster affects, including human impacts. The experts explored some gaps in the disaster-management process; they were as follows:

- There is lack of coordination among different sectors and agencies involved in disaster response. This challenge is seen in different levels of operations, including local, national, and international. Failure of communication systems intensifies coordination problems.
- Command structure must be defined and standardized with enough flexibility to react quickly to new circumstances; in practice, the command structures are usually unclear, unstable, and inflexible during disasters. This condition results in failure in the integration of similar activities because different structures of leadership are at work at the scene.
- Resource management during disasters is usually weak due to lack of well-organized coordination among different organizations. Because of essential resource shortcomings, and often, failure of a resource-management system, it takes too long to have the required resources at the site of a disaster.
- Lack of real-time and integrated information management systems is a considerable problem with response operation during disasters, especially in the early phase. This failure causes further delay in both assessment and response.

National/Foreign Medical Teams

The respondents knew that the standardized medical teams were a key component of a response system, especially during the first days after a disaster. Well structured, trained, and equipped medical teams could guarantee appropriate medical care during disasters. However, they believe there are couple of deficiencies that need to be considered, such as:

- The international humanitarian system still has a long way to go to achieve a standardized and effective response to disasters. The international coordination process and standards of care need to improve for large disasters, especially in developing countries.
- One of the main problems with national and FMTs is that they are usually staffed by volunteers. A team is always formed ad hoc, and no real team-building can be held in advance. The team leader has to go through the teambuilding process in the field. Usually, members of teams either are not trained enough or not up-to-date. High rotation rate of the teams' staff also adds to the problem.
- The organization and readiness of teams in the field is very different; some teams are highly trained and well equipped, whereas others have little training and lack proper equipment.
- Some teams that label themselves ''heavy rescue teams'' respond with a small number of personnel that is below the stipulated requirement. In fact, they create an expectation of capability that they are unable to deliver.
- Some NGO teams are not certified and do not have the necessary skills and equipment; consequently, they are unable to deliver the expected skill once deployed.

Limitations

Neither the sample size, nor the sample itself, were sufficient to fulfill random sampling criteria. Nevertheless, the selection of participants from different countries who had experiences of different disasters, worldwide, ensures a reasonable reliability of the findings.

Study 3

A Systematic Review of Core Competencies in Disaster Management and Humanitarian Assistance

Aim

To conduct a systematic review of peer-reviewed studies aimed to identify existing competency sets for disaster management and humanitarian assistance that would serve as guidance for the development of the competency-based training program.

Methods

Study Design

A systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist [54]. The review included English language papers published from January 2004 to January 2014 on PubMed, Google Scholar, Scopus, ERIC, and Cochrane Library.

Data Collection

A combination of the following keywords in the title was used: Disaster/s OR Public health emergency/ies OR Crisis/es OR Humanitarian OR Complex emergency/ies AND Competency/e/ies OR Ability/ies OR Knowledge OR Attitude/s OR Skill/s OR Professionalization. In addition, a grey-literature manual search was conducted to identify existing competency sets published on the websites of relevant universities, governmental organizations (GOs), (NGOs), and other professional entities. Finally, an ancestry search was also performed to identify additional references on the reference section of the articles.

Inclusion Criteria

▪ Articles reporting competencies or competency domains, abilities, knowledge, skills, or attitudes for professionals involved in disaster relief or humanitarian assistance.

Exclusion Criteria

▪ Case studies;

▪ Abstracts;

▪ Citations;

▪ Articles not specifically related to abilities or performance

▪ Articles not dealing with disasters or humanitarian assistance.

Titles and abstracts of the identified literature were scanned. Literature not complying with the inclusion criteria was excluded. The full text was obtained for uncertain articles, and references were independently screened and selected by two members of the research working group. When disagreement occurred, the opinion of a third reviewer was sought.

Data Analysis

References were described on the basis of their sectorial (eg, health, logistics, communication) and disciplinary approach (eg, emergency medicine, public health). Within a specific discipline, an additional distinction was made amongst different professional groups or cadres (eg, physicians, nurses, technicians) and proficiency levels (eg, informed worker/student, practitioner, and leader).

Target audiences (eg, physicians, nurses, social workers) were also analyzed. Out of the selected papers, we described how many of them reported either competency domains, competencies, or subcompetencies.

Additionally, we analysed the method used by authors to define the competency domains, competencies, and subcompetencies. When identified, performance objectives were also reported.

Results

The search strategy yielded a total of 1637 references; 3 additional articles resulted from the manual search on the web, and 15 were drawn from the reference sections of other articles. After exclusion of duplicates, 1151 titles were identified for further screening. A total of 1072 titles and abstracts were removed according to the exclusion criteria. This resulted in 79 full-text articles; 4 full-text articles could not be retrieved, and 37 did not meet the inclusion criteria, leaving 38 references for analysis [9, 10, 19, 43, 45, 55-87] **[Figure 4].**

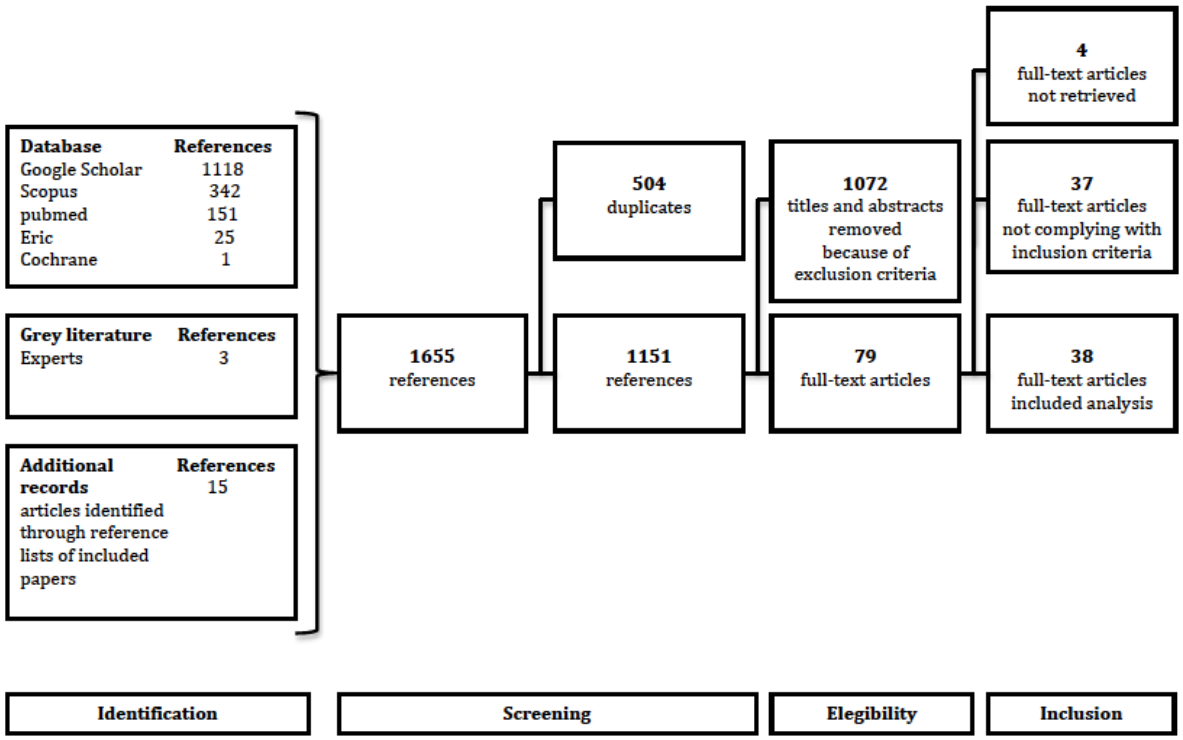

Figure 4. Review selection process flow-chart

Twenty-seven references were peer-review articles [10, 19, 43, 45, 55, 57, 58, 60, 63-65, 67-70, 72-76, 78, 79, 81, 84-87], 1 one was a book chapter [9], 4 were reports [61, 62, 77, 80] and 6 were documents available on the websites of relevant organizations [56, 59, 66, 71, 82, 83].

Articles were mostly referred to a single sector with only 5 (13%) reporting cross-sectorial competencies **[Table 3]**. Most of the articles (81.6%) were health care specific **[Table 4]** and, among them, 1 reported competencies for military health care staff [78]. Thirteen (34%) articles referred to a single discipline, 18 (47%) to at least 2 different disciplines, and 7 (18%) were determined to be unclear as to discipline specificity by the reviewers **[Table 3]**.

YEAR	TITLE	Target audience clearly defined	Multi sectorial aproacch	Multi disciplinary aproacch	Multi professional group aproacch	Include competency domains	Include competencies	Include subcompetencies/competency descriptors	Include performance objectives	Define responsability/ prociciency levels	Method adopted for competency definition Clearly stated
2013	Interprofessional non-technical skills for surgeons in disaster response: a literature review [55]	✓	O	NS	O	O	✓	O	O	O	✓
2012	Cross-Disciplinary Competency and Professionalization in Disaster Medicine and Public Health [9]	✓	O	✓	✓	O	✓	O	O	✓	✓
2008	A consensus-based educational framework and competency set for the discipline of disaster medicine and public health preparedness [10]	✓	O	✓	✓	✓	✓	O	O	✓	✓
2010	A review of competencies developed for disaster healthcare providers: limitations of current processes and applicability [43]	✓	O	✓	✓	✓	O	O	O	O	✓
2012	Core competencies for disaster medicine and public health [45]	✓	O	✓	✓	O	✓	✓	✓	✓	✓
2012	Development of national standardized all-hazard disaster core competencies for acute care physicians, nurses, and EMS professionals [19]	✓	O	O	✓	✓	✓	O	✓	O	✓

YEAR	TITLE	Target audience clearly defined	Multi sectorial aproacch	Multi disciplinary aproacch	Multi professional group aproacch	Include competency domains	Include competencies	Include subcompetencies/competency descriptors	Include performance objectives	Define responsability/ prociciency levels	Method adopted for competency definition Clearly stated
2010	Public Health Preparedness & Response Core Competency Mode [56]	✓	o	o	✓	✓	✓	o	o	✓	✓
2008	Assessing competencies for public health emergency legal preparedness [57]	✓	o	o	✓	✓	✓	o	o	✓	✓
2005	Preparing health professions students for terrorism, disaster, and public health emergencies: core competencie [58]	✓	o	✓	✓	✓	✓	o	o	✓	✓
2012	Core Humanitarian Competencies Framework [59]	✓	✓	✓	✓	✓	✓	o	o	✓	✓
2010	Emergency preparedness and disaster response core competency set for perinatal and neonatal nurses [60]	✓	o	✓	✓	✓	✓	o	o	✓	✓
2011	Recommended Hospital Staff Core competencies for disaster preparedness [61]	✓	o	✓	✓	o	✓	o	o	✓	✓
2006	Emergency Capacity Building Project Staff Capacity Initiative. Humanitarian Competencies Study [62]	✓	✓	✓	✓	✓	✓	o	o	✓	✓

YEAR	TITLE	Target audience clearly defined	Multi sectorial aproacch	Multi disciplinary aproacch	Multi professional group aproacch	Include competency domains	Include competencies	Include subcompetencies/competency descriptors	Include performance objectives	Define responsability/ prociciency levels	Method adopted for competency definition Clearly stated
2011	Crisis Management Competencies: The case of emergency managers in the USA [63]	✓	NS	NS	NS	O	✓	O	O	✓	✓
2005	Development and implementation of a public health workforce training needs assessment survey in North Carolina [64]	✓	O	O	✓	O	✓	O	O	O	✓
2007	Expanding the public health emergency preparedness competency set to meet specialized local and evolving national needs: a needs assessment and training approach [65]	✓	O	O	✓	O	✓	✓	O	O	✓
2004	Core Public Health Worker Competencies for Emergency Preparedness and Response [66]	✓	O	O	✓	O	✓	O	O	✓	NS
2006	Preparing nurses internationally for emergency planning and response [67]	✓	O	✓	O	O	✓	O	O	O	✓
2008	Public health nursing competencies for public health surge events [68]	✓	O	O	O	O	✓	O	O	O	✓
2008	American College of Occupational and Environmental Medicine competencies [69]	✓	O	O	O	✓	✓	O	O	O	✓

YEAR	TITLE	Target audience clearly defined	Multi sectorial aproacch	Multi disciplinary aproacch	Multi professional group aproacch	Include competency domains	Include competencies	Include subcompetencies/competency descriptors	Include performance objectives	Define responsability/ prociciency levels	Method adopted for competency definition Clearly stated
2004	Predoctoral dental school curriculum for catastrophe preparedness [70]	✓	O	O	O	O	✓	O	✓	O	NS
2004	Develop nursing students' disaster competency by working with the american red cross [71]	✓	O	O	O	✓	O	O	O	O	NS
2005	Assessing bioterrorism and disaster preparedness training needs for school nurses [72]	✓	O	O	O	O	✓	O	O	O	✓
2012	Disaster Work in China: Tasks and Competences for Social Workers [73]	✓	O	O	O	✓	✓	O	O	O	✓
2005	Development of a training curriculum for public health preparedness [74]	✓	O	✓	NS	O	✓	O	O	O	✓
2012	What Skills Are Needed to be a Humanitarian Logistician?[75]	✓	O	O	NS	O	✓	O	O	O	✓
2006	Healthcare worker competencies for disaster training[76]	✓	O	✓	✓	O	✓	✓	✓	O	✓

YEAR	TITLE	Target audience clearly defined	Multi sectorial aproacch	Multi disciplinary aproacch	Multi professional group aproacch	Include competency domains	Include competencies	Include subcompetencies/competency descriptors	Include performance objectives	Define responsability/ prociciency levels	Method adopted for competency definition Clearly stated
2008	Integrating Emergency Preparedness and Response into Undergraduate Nursing Curricula[77]	✓	O	✓	O	✓	✓	✓	O	O	✓
2013	Clinical skill and knowledge requirements of health care providers caring for children in disaster, humanitarian and civic assistance operations: an integrative review of the literature[78]	✓	O	✓	✓	O	✓	O	O	O	✓
2005	Disaster competency development and integration in nursing education[79]	✓	O	✓	O	✓	✓	O	O	O	✓
2009	ICN framework of disater nursing competencies[80]	✓	O	✓	O	✓	✓	O	O	O	NS
2008	On academics: training for disaster response personnel: the development of proposed core competencies in disaster mental health[81]	✓	O	✓	NS	O	✓	✓	O	O	NS
2009	Napa County Public Health Divison Public Health Preparedness[82]	✓	O	NS	O	✓	✓	O	✓	O	✓
2009	Humanitarian coordination competencies[83]	✓	✓	NS	O	✓	✓	O	O	O	NS

YEAR	TITLE	Target audience clearly defined	Multi sectorial aproacch	Multi disciplinary aproacch	Multi professional group aproacch	Include competency domains	Include competencies	Include subcompetencies/competency descriptors	Include performance objectives	Define responsability/ prociciency levels	Method adopted for competency definition Clearly stated
2011	A survey of the practice of nurses' skills in Wenchuan earthquake disaster sites: implications for disaster training[84]	✓	O	NS	O	O	✓	O	O	O	✓
2004	Emergency preparedness competencies: assessing nurses' educational needs[85]	✓	O	NS	O	✓	✓	O	O	O	✓
2012	Knowledge and skills of Emergency Care During Disaster For Community Health Volunteers: A Literature Review[87]	✓	O	NS	O	O	✓	O	O	O	✓
2004	Worker training for new threats: a proposed framework[87]	✓	✓	✓	✓	O	✓	O	O	O	NS

Table 3. Summary of data extraction for the selected literature: ✓ yes; O no; NS not specified

Sector	References
Multisector	[59, 62, 63, 83, 87]
Health-care sector	[9, 10, 19, 43, 45, 55-58, 60, 61, 64-72, 74, 76-82, 84-86]
Public/social welfare sector	[83]
Consumer goods/operational sector	[75]

Table 4. References Categorized by Targeted Sector

Eighteen articles (47%) included competencies for diverse professional groups. The most targeted audiences were nurses and disaster medicine and public health professionals **[Table 5].**

Audience	References
Social workers	[73]
Volunteers	[86]
Medical reserve corps	[82]
Humanitarian personnel	[59, 62, 75, 83]
Crisis managers	[63]
Disaster workers	[69]
Military health care providers	[78]
Disaster medicine professionals	[9, 10, 45, 65, 81]
Public health professionals	[9, 10, 45, 56, 57, 64-66, 74, 82]
Disaster health care professionals	[43]
Acute care medical professionals	[19]
Occupational and environmental physicians	[69]
Dentists	[70]
Surgeons	[55]
Hospital personnel	[61, 76]
Nurses	[60, 67, 68, 72, 77, 79, 84, 85]
Health students	[58, 71, 77]

Table 5. References categorized by targeted audience

Of the articles reviewed that specified global humanitarian response, only 18 (47%) articles defined competency domains. However, most of them referred to suggestive and poorly defined labels such as competency subject areas [58], competency areas [85], competency clusters [62]

and simply as competencies alone [69, 71, 77, 82].

Thirty-six papers (94%) provided a list of competencies. Some authors named competencies as knowledge [61, 87], competency description [67, 77, 85], skills [55, 63, 84, 87] skills and knowledge [78, 86] skills and traits [63, 75] or behaviors [63]. Only 5 (13%) of the articles described subcompetencies and 5 (13%) defined performance objectives [19, 45, 70, 76, 82].

Thirty-one articles (81%) clearly described the method adopted to define competencies. A total of 19 (50%) used consensus-building [10, 19, 45, 56, 58-62, 64, 65, 67-69, 76, 77, 79, 81], 3 articles identified competencies by survey or self-assessment questionnaires [63, 73, 84], 6 reported competencies based solely on a literature review [43, 63, 75, 78, 85, 86] and 4 reported or adapted competencies originally described by previously published articles [9, 57, 72, 74].

A total of 12 (31%) defined competencies based on professional "responsibility" levels; 1 article defined competencies for frontline professional staff supervisory and management staff, health officials and governance boards, and senior level professional staff [57]; 1 reported different levels of expected proficiency according to the disciplines being considered [58]; 1 supplied additional behaviors for first-level line managers in humanitarian response; and 2 included category-specific competencies for informed worker/students, practitioners, and leaders [10, 60]. One paper included competencies for basic-,mid-, and advanced-level personnel involved in both chemical and nonchemical environments [61]; finally, 1 split competencies into 4 different levels of performance [62].

Limitations

This search was restricted to English-language articles, which might have narrowed our search spectrum; however, it is a comprehensive systematic review and covers most of competency-based disaster education and training elements in the studies reviewed. This study only included articles published over the last decade. Related studies that could have supplied relevant information but fell outside this time period were not taken into consideration.

Study 4

Development and evaluation of an innovative competency-based course for medical residents before first deployment with Médecins Sans Frontières

Aim

Building on the encouraging results in study n° 1 regarding de high interest of residents in Italy to be deployed in humanitarian settings by the end of their residency, the aim of this study was to develop and implement a competency-based training program based on the findings of study n° 2 and study n° 3.

Methods

Agreement and Institutions involved

In 2013, CRIMEDIM and the international humanitarian organization MSF-italian section (MSF-Italy) set up a cross-organizational collaboration to jointly develop a preparatory course for residents before first deployment in the field. For further details on the convention signed please see **Appendix 2.**

Target population

This course was initially intended for senior residents in anaesthesia but was expanded after its second edition to the disciplines of pediatrics and emergency medicine.

Curriculum

The educational needs were determined through studies number 2 and 3 and round tables with CRIMEDIM and MSF field experts. Since our training program targeted health workers but was also aimed to be extendable in the future to other sectors operating under the umbrella of humanitarian aid, four papers were selected on the basis of their authority, cross-sectorial approach [59] and definition of discipline-specific competencies [19, 88, 89]. Those sets served as foundational basis for the course curriculum and were translated into 10 cross-sectorial and 1 profession-specific competency domains **[Table 6].** Learning objectives were phrased according to the Bloom's Taxonomy and for each, a series of performance objectives were developed. Curriculum, learning and performance objectives were reviewed and validated by consensus between CRIMEDIM and MSF-Italy working groups.

Competency domain	General learning objectives	Examples of performance objectives
1. Disaster medicine	• Understand the definition and different phases of disasters. • Define the nature of injury or illness in relation to different types of disasters. • Describe objectives and features of disaster medicine. • Understand the international disaster response mechanism with involved bodies and organizations.	• List the four phases of disaster management • Name the office of the United Nations responsible for the international coordination in case of disaster or humanitarian emergency
2. Incident Management System (IMS)	• Describe the general principles and different phases of the IMS. • Demonstrate ability to work within an IMS. • Describe the concept and different methods of Mass Casualty Triage. • Define the concept of surge capacity and its role in unforeseen emergencies and disasters.	• Correctly carry out the initial reporting from a simulated disaster site (METHANE) • Assign simulated victims with the correct priority code according to the START triage
3. Communication	• Recognize a disaster in progress, assess and report the situation. • Define and apply the principles of successful communication with local and expatriate staff, within and among organizations and with the media during emergencies. • Describe the radio communication procedures and protocols. • Recognize the importance of postevent reports.	• Implement the basic principles of communication in a public release statement with the media regarding the attack of a health facility by one belligerent party. • Write and present a post-event report after a simulated mass casualty event summarizing the facts occured and the actions taken. • Successfully collaborate with a member of local staff with very limited english speaking skills during the clinical management of a simulated critically -ll patient.
4. Resource management	• Manage supplies, drugs and equipment and other resources for an effective response. • Manage, supervise, and appropriately use local staff and expatriate aid workers during emergencies.	• Consider early blood compatibility testing for relatives of patients in an hemorrhagic shock scenario when whole blood is scarce or not available. • Demonstrate competence in the use of outdated equipment (e.g ventilators) to provide safe anaesthesia in a low-resource-setting.
5. Public health	• Recognise the top priorities for public health interventions during complex emergencies. • Describe indicators used to assess and monitor public health during complex emergencies. • Understand key epidemiological principles and terminology. • Define the minimum levels to be attained in humanitarian interventions	• Describe the information to be gathered during a Initial Rapid Assessment and ellaborate an intervention plan according to the identified public health needs. • Name the minimum quantity of safe drinking water (liters/ person/ day) to be provided in an humanitarian intervention. • List the main anthropometric indices used to assess

	regarding the provision of water, sanitation and hygiene. • Define the minimum levels to be attained in humanitarian interventions regarding the provision of food and nutrition. • Identify which infectious diseases can constitute a major threat following a disaster according to the geographical location and the type of emergency occurring.	malnutrition. • Demonstrate knowledge about the age groups to be covered by a measles vaccination campaign
6. Safety and security	• Understand the need for a safe and secure approach in humanitarian environments. • Analyze the security environment on the basis of the seven pillars of security. • Apply the preventive measures and/or individual or collective responsibilities adapted to each form of stress. • Identify sources of risk, describe risk scenarios and identify risk mitigation measures.	• Demonstrate successful negotiation skills when approaching a simulated check point. • Demonstrate ability to prevent incidents during road travels (e.g carrying ID card, being able to clearly explane the mission of his/her organization etc). • Identify landmine markings during outdoors exercises
7. Ethics and international humanitarian law	• Apply basic principles of medical ethics to disaster situations. • Recognize and react accordingly to the difficulties entailed by humanitarian scenarios where different cultural backgrounds are represented. • Define the concept and understand the origins of International Humanitarian Law • List the main International Human Rights • Describe the role of International Humanitarian Law in in protecting the dignity and rights of the most vulnerable populations during armed conflicts	• • Demonstrate tollerance when dealing with local staff and patients with different cultural background (e.g covered with burqa). • Describe the origin of the Geneva Convention
8. Situational awareness	• Respond appropriately to an ever-changing environment and stress-induced situations. • Adapt to pressure and change to operate effectively within humanitarian contexts.	• Demonstrate avoiding fixation errors during the management of critically-ll patients in simulated low-resource scenarios. • Demonstrate ability to anticipate likely events in crisis situations (e.g a huge number of victims to come after a single patient presents with acute organophosphorus pesticide poisoning in a war context).
9. Psychological support	• Describe the main psychological needs in emergency contexts. • Describe the essential criteria to organize actions in psychological support. • Apply the principles of psychological first aid in emergency situations	• Prioritize actions to ensure the basic principles of Psychological First Aid (regarding the patient and family) are followed when working in emergency and/or disaster scenarios; • Hand over feedbacks on the role of the team as psychological first aid providers after working in emergency and/or disaster scenarios; • Develop self-care practices to be used while working in

		emergency and/or disaster scenarios in order to manage personal stress.
10. Leadership	• Understand the definition of leadership and recognize the importance in an emergency context. • Describe the different management styles. • Understand conflict management and modify one's own management style. • Apply the principles of Non-Violent communication.	• Demonstrate ability to implement a Non-Violent communication when giving a member of the local staff a negative feedback regarding his performance during a recent emergency. • Demonstrate ability to make firm decisions during a critical event: e.g priority of transport for severely injured patients in an hostile environment.
11. **Clinical considerations in the specific field of Anaesthesia, Pediatrics and Emergency Medicine in Low Resource Settings**	• Understand and apply the principles of safe anaesthesia, emergency medicine or pediatrics in low-resource settings acording to the needs and resource available.	• Demonstrate good knowledge in the use of Halothane, ketamine, suxamethonium and pancuronium • Demonstrate ability to perform a newborn resuscitation in a resource-constrained environment • Promptly recognize and treat signs and symptoms of malaria in high risk areas

Table 6 . Competency domains, general objectives and some performance objectives of the course

Delivery methodology

This course intended to expose participants to an innovative blended-learning experience consisting of three months of distance self-directed study and one week of residential instructor-led teaching. E-learning took place through the Modular Object-Oriented Dynamic Learning Environment (MOODLE) educational software hosted by the CRIMEDIM server. The platform worked as a content-driven learning model, hosting 11 e-modules and videolectures and offering a suite of tools and online-multiplayer-virtual exercises **[Figure 5].**

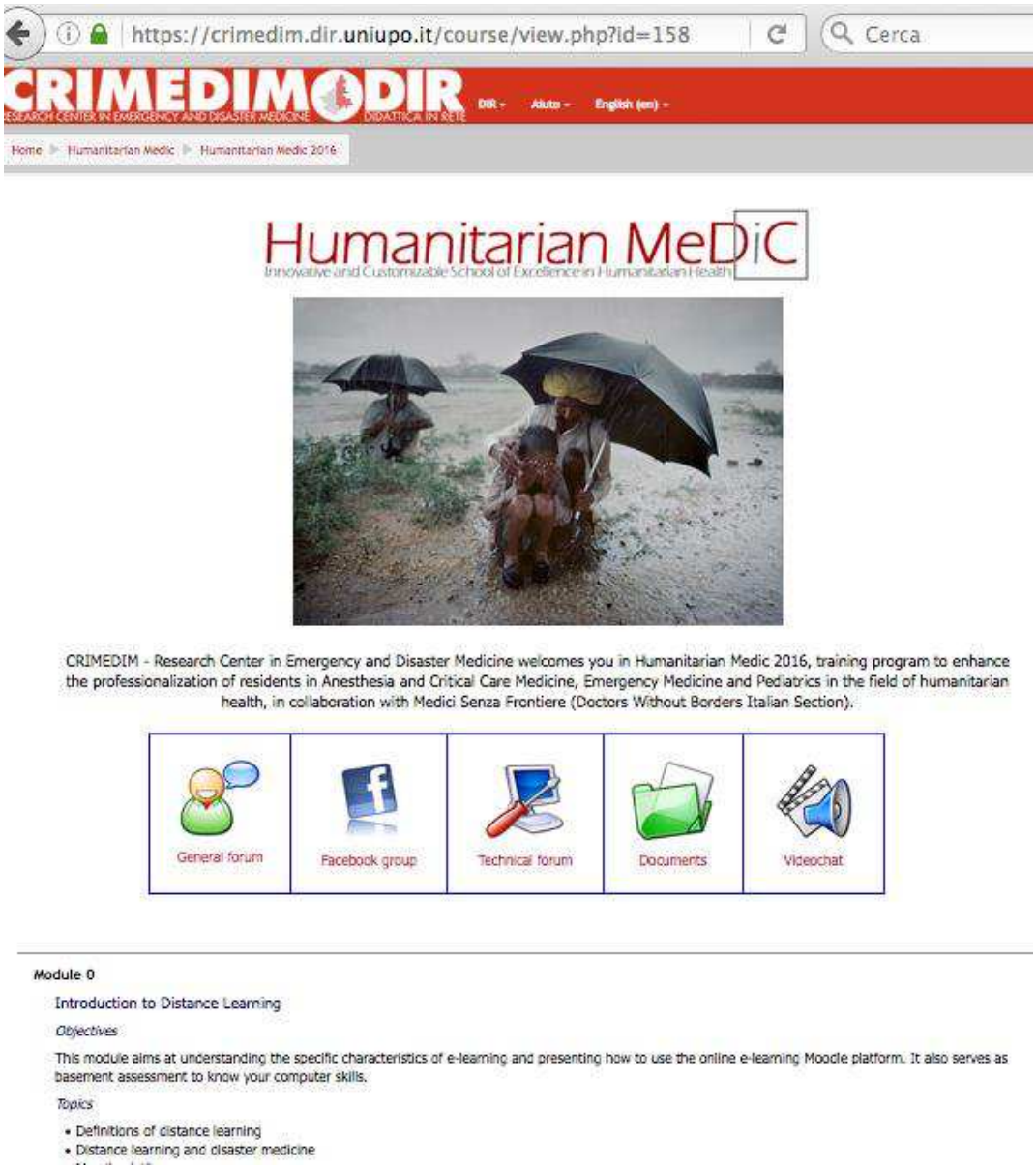

Figure 5. Screenshot of the virtual platform hosting e-modules, video lectures and interactive exercises.

The residential phase took place in the SIMNOVA simulation center in Novara (Italy) and included class-room sessions, workshops, group discussions with a major emphasis in high fidelity and out doors real size simulation exercises **[Figures 6 to 14].** The faculty of the course included members of the CRIMEDIM, MSF, Karolinska Institutet, ICRC and the Italian Army.

During these events, students were immersed into a series of real based scenarios presented through state-of-the-art technologies. Scenarios were designed according to the equipment, drugs and diagnostic tools available in MSF projects and residents were exposed to the most common difficulties encountered in daily activities in the field. In clinical management scenarios, actors complied with the dress code of the country where the scenario was based and were also trained to act as "typical" members of the local staff, for instance, speaking poor English, showing no initiative or pretending not to understand unclear orders.

E-learning materials and "best performances" for simulation exercises were jointly developed on the basis of current international guidelines but, at the same time, taking into consideration the standard available resources in MSF projects. Upon successful completion of both phases, students received a certificate of completion and were then deployed in MSF health projects where acted as local staff supervisors and worked as part of the hospital duty roster.

Figure 6. Welcome day of the residential phase of course at the simulation center SIMNOVA; faculty is introduced to students and the main objectives of the course are presented.

Figure 7. Basic suturing workshop.

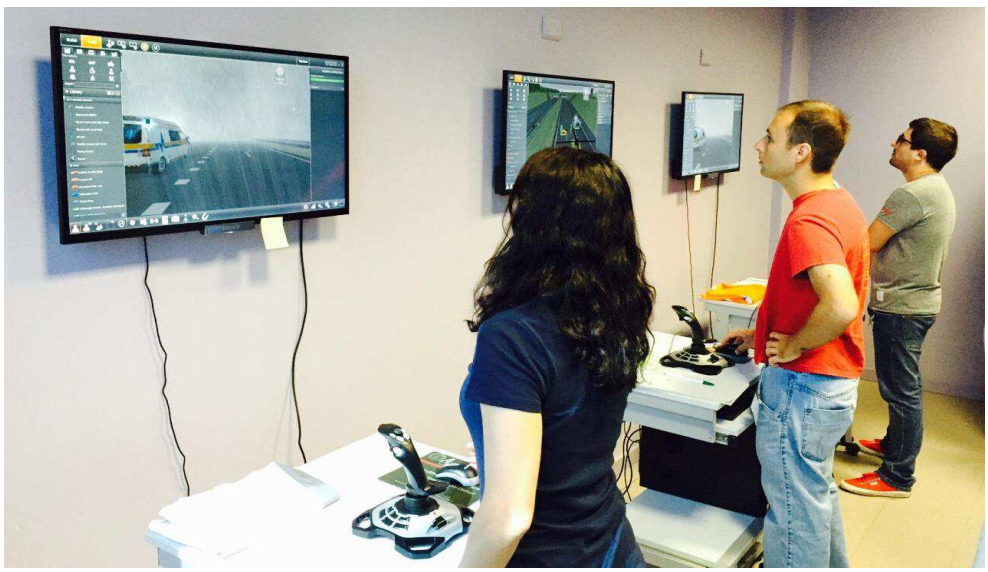

Figure 8. Students put into practice learning concepts of IMS with ISEE^{R} Simulator.

Figure 9. Student managing a postpartum haemorrhage during a high fidelity simulation exercise

Figure 10. Student assessing the condition of a pediatric patient during a mass-casualty event simulation exercise.

Figure 11. Actors preparing their scripts prior to a real size check point exercise.

Figure 12. Student managing a severely injured patient in a simulated terrorist attack. Exercise organized in collaboration with the Italian Army.

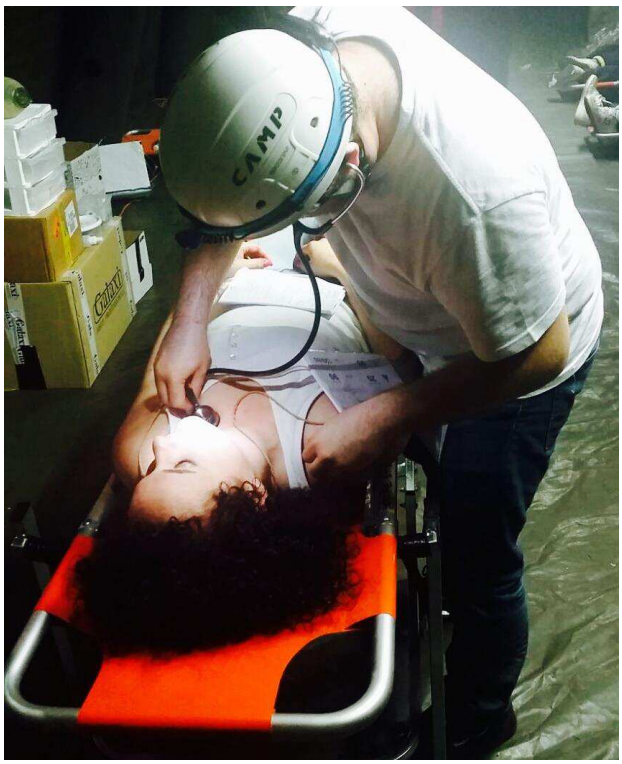

Figure 13. Student assessing the condition of a victim after a simulated bombing in a full-size simulation exercise

Figure 14. Overview of a full size mass-casualty simulated exercise**.** Exercise organized in collaboration with the Italian army.

Advertisement

The first two editions of the course were advertised by the Italian society of Residents in Anestesia while the third was also announced by the Italian societies of, respectively, Emergency Medicine and Pediatrics. Flyers were also delivered at national congresses and when possible, residency program directors were asked to distribute brochures.

Candidates selection

Only senior medical residents (IV-V year) in anaesthesia and intensive care, pediatrics or emergency medicine in Italy could apply. The additional selection criteria complied with the minimum MSF standard requirements for humanitarian workers:

- At least B1 level of language proficiency in French and English (United Nations health languages) according the European Language Framework.
- Full availability for, at least, a 2-months mission;
- Willingness to participate in international humanitarian field projects also in armed conflict areas or after natural or man-made disasters;
- Flexibility and good attitude towards the work in multicultural contexts.

Prior participation in international cooperation projects or humanitarian emergency response programs was considered an asset but was not mandatory for application.

Candidates selection was then carried out in a biphasic fashion by a recruitment commission (RC) composed by two CRIMEDIM investigators and two recruiters of the MSF-Italy human resources department:

1. Candidates were firstly screened on the basis of their curriculum vitae, self-assessed theoretical and practical skills and the results obtained in an on-line French and English language test.
2. The best candidates underwent a personal interview with the RC.

All the candidates who successfully went through the entire assessment process were admitted.

Implementation process

Three editions of the course took place from 2014 to 2016. A total of 24 participants were admitted, 5 participants withdrew and 19 completed the course (5 in 2014, 6 in 2015, 8 in 2016 respectively) and were successively deployed in MSF field projects. The first two editions were offered on a pilot basis and served to test the feasibility of the project from an organizational

standpoint and refine the course contents according to the feedback of students and MSF field supervisors.

Study 5

Evaluation of the training program

Aim

After the first two pilot editions, the third edition of the course was used to test its efficacy in increasing students learning.

Methods

The Kirkpatrick's evaluation model has been recently used to evaluate training programs for health providers [90] and consists on the sequential evaluation of the following levels [91]:

- Level 1- *Reaction:* measures students' satisfaction with the program;
- Level 2- *Learning:* measures improvement in knowledge, attitudes and skills;
- Level 3- *Behaviour*: measures the transfer of learning to the workplace;
- Level 4-*Results:* measures the objective changes occurred as a result of participation in the training program.

To determine the effectiveness of our course, levels 1 to 3 were tested through a prospective observational single cohort study.

- **Participants**

All participants (n=8) of the third course edition were enrolled in the study. Four were residents in emergency medicine, 3 in anaesthesia and 1 in pediatrics; three of them were female and the median age was 31 y.o. Overall, residents participated in a two day face-to-face introductory phase in Novara (April 2016), completed the 3 months e-learning course and attended the residential week (from April to June 2016) and were afterwards deployed in the field. The mean time of deployment was 2.5 months. One resident was deployed in Pakistan, 2 in Afghanistan, 1 in Democratic Republic of Congo, 1 in South Sudan, 2 in Central African Republic and 1 in Yemen.

Evaluation plan and evaluation tools

The evaluation plan was designed according to the recommendations of Kirkpatrick et al [92] as follows **[Figure 15]:**

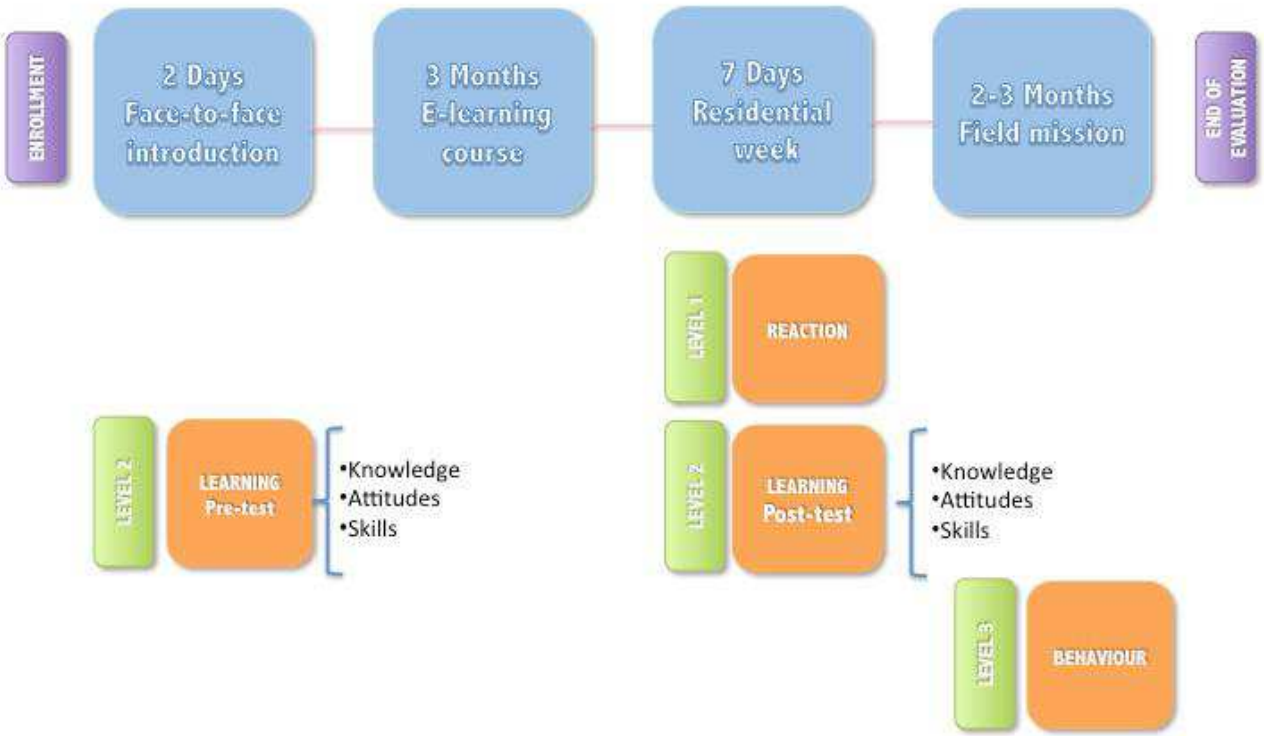

Figure 15. A graphic depiction of the evaluation plan

- *Reaction* was assessed at the end of the residential week through a 5-point Likert scale questionnaire that left space for commentaries and personal opinions **[Appendix 3].**
- The three dimensions of *Learning* were evaluated separately in a pre and post test on the second day of the face-to-face introduction phase and at the end of the residential week, respectively.
  - A 30-question-multiple-choice test based on the course contents was used to assess knowledge **[4].**
  - A 12-question-5-point Likert scale questionnaire was used to evaluate attitudes. In this study, the term *attitude* was defined as the students' positive or negative predisposition towards the competecency domains at the basis of the course **[Appendix 5].**
- Students' skills were assessed through a simulation-based performance test based on the management of a critically-ill patient in a low-resource emergency room; a case example is provided in **Appendix 6.** In these scenarios, every student acted as leading physician. To decrease the role that the repetitive exposure to simulation exercises during the residential

week may play in the improvement of students' performance in the post test, students received a standardized simulation tutorial and managed a number of simulated cases prior to enter the pre test scenario. Pre and post test scenarios progressed on a predefined fashion according to the cue system described by kim et al[93]. Residents performance was videotaped and then rated by an external and independent evaluator through the Translated Italian Global Rating Scale (TIGR)[94] **[Appendix 7]**

- Behaviour was assessed qualitatively at the end of students' missions by their immediate field supervisors (Medical Focal Point-MFP) through the MSF standard evaluation module **[Appendix 8].** MFPs were unaware of the fact that students were still doctors in training and that they had completed a training program before being deployed; therefore, evaluations were carried out as usual for first missioners.

Statistical tests and data analysis

The primary objective of this study was to assess the difference in pre and post test scores on the multiple choice test. The null hypothesis of no difference between the pre and post test scores was tested against the two-sided alternative hypothesis of significant difference. The secondary objective of this study was to assess the difference between the "Overall" field of the TIGR between pre and post training test simulations. The null hypothesis of no difference between pre and post training scores was tested against the two sided alternative of significant difference.

Statistical analysis was performed using "R: A language and environment for statistical computing." (R Development Core Team, Vienna, Austria). Null and alternative hypotheses, and the statistical methodology were completely specified prior to any data collection. Differences between groups for the primary and secondary objectives were assessed using paired ttests.

P values of less than 0.05 were considered significant for all tests. Two sided alternative hypotheses were used in all cases.

Medians were used to describe the Likert scale score from the reaction and attitude questionnaire.

MFP evaluations were collected and reported qualitatively.

Ethical clearance

To ensure anonymity and confidentiality during the entire process, every participant was

assigned a tracking number that was then reported on answer sheets, evaluation forms and videotape labels. All students signed the informed consent**.** This study was approved by the institutional Ethics Committee (date 24-02-2016, study code UPO.2015.4.10).

Results

Reaction

The reaction of students is summarized in **[Table 7]** Overall, the pertinence of the course contents to the students' perceived needs was well recognized; moreover, delivery modality and the residential course were highly appreciated. All students affirmed that the price/quality ratio of the course was excellent. The average median score for the overall course was 5 (excellent) and all residents affirmed that they would recommend this training program to other doctors in training. One student suggested expanding the introductory phase to three days, two expressed that the course schedule was too tight and one suggested adding more training in negotiations techniques. Finally, all residents emphasized the importance of simulation exercises, especially, of high fidelity simulation experiences and full-size simulation exercises .

Questionnaire	Score *
How do you rate the pertinence of the competencies taught to your needs?	5
How do you rate the course schedule?	4
How do you rate the modality used to deliver the course (e learning + residential week)	5
Please rate the course contents	4
How do you rate the residential course?	5
How do you rate the lecturers?	4
What's your overall rating of the course?	5

Table 7. Summary of responses to the reaction questionnaire. For each item, it is reported the median value score in a 5-point Likert scale: 1 = Poor, 2= Fair, 3= Good 4 = Very good, 5 = Excellent

Learning

There was a significant improvement in the post-test multiple choice scores when compared to the pre-test scores (p = 0.0011) (mean effect: 10.4/30, 95%CI: 5.7 to 15.0) **[Figure 16]** and also a significant improvement in the overall performance score (P = 0.000001) (mean effect: 3, 95%CI: 2.4 to 3.6) **[Figure 17].**

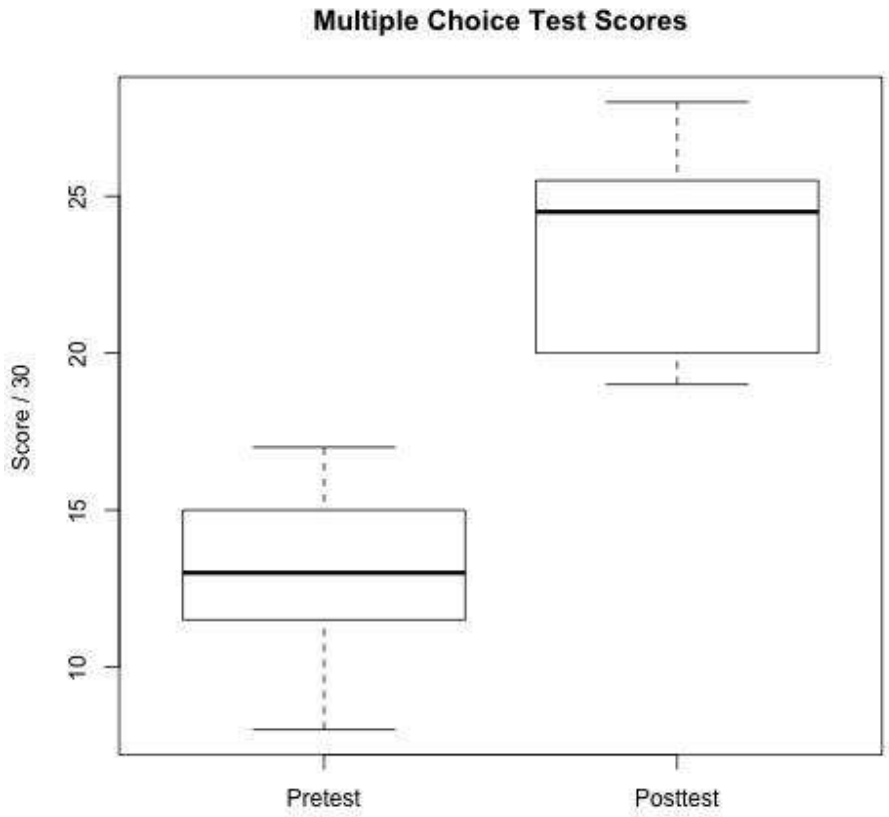

Figure 16. Box plot showing the pre and post-test multiple choice scores.

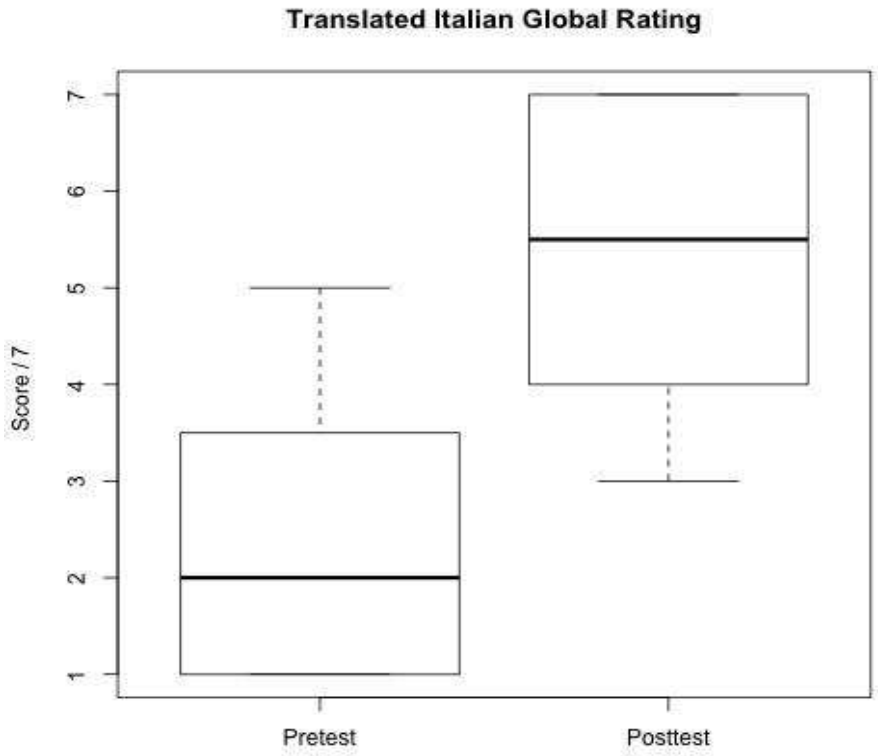

Figure 17. Box plot showing the overall performance score

The median score of all other fields of the TIGR also improved for our participants following the training course **[Table 8].**

	premedian	postmedian	difference
Leadership	2.0	5.3	3.3
Problem Solving	2.6	5.2	2.6
Situational Awareness	2.3	5.3	3
Resource Utilization	2.3	5.8	3.5
Communication	2.6	5.3	2.7

Table 8. Specific changes in median values observed in each of the fields of the TIGR after the training program.

Conversely, no differences were detected in attitudes scores between before and after the course **[Table 9].**

Competency domain	pre	post	difference
I believe that training in disaster medicine is of foremost importance for humanitarian workers	5	5	0
I believe that training about the Incident Management System is of foremost importance for humanitarian workers	5	5	0
I believe that training in effective communication is of foremost importance for humanitarian workers	4	5	1
I believe that training in resource management is of foremost importance for humanitarian workers	5	5	0
I believe that training in public health is of foremost importance for humanitarian workers	4	4	0
I believe that training in safety and security is of foremost importance for humanitarian workers	5	5	0

I believe that training in ethics and international humanitarian law is of foremost importance for humanitarian workers	5	5	0
I believe that training in how to improve situational awareness is of foremost importance for humanitarian workers	4	5	1
I believe that training in mental health is of foremost importance for humanitarian workers	4	4	0
I believe that training in leadership is of foremost importance for humanitarian workers	3	4	1
I believe that training on how to adapt specific skills to operate in underserved environments is of foremost importance for humanitarian workers	4	5	1

Table 9. Attitudes scores before and after the course. For each item, it is reported the median value score in a 5-point Likert scale: 1 = strongly disagree, 2= disagree, 3= don't know 4 = agree, 5 = strongly agree.

Behaviour

The assessments of field evaluators are summarized in **Table 10.** For most participants, the following strengths were highlighted: compliance with MSF standards and principles, flexibility, good team working skills and cross-cultural sensitivity. Their professional competence was never questioned. All residents were recommended for future MSF missions.

Student	Strong competences	Competences to develop
1	Good analytical thinking, well-organized, high working capacity, good training skills, compliance with MSF standards and principles, flexibility, empathy, good mass casualty management skills, good technical skills, hard work, good team working skills, good reource management skills.	Human resource management Tropical medicine
2	Well-organized, good technical skills, good training skills, hard work, good team working skills, good reource management skills, cross-cultural sensitivity, compliance with MSF standards and principles, good negotiation skills, good comunication skills.	Human resource management
3	Cross-cultural sensitivity, good team working skills, good training skills, good people management skills, good leadership skills, well-organized, good analytical thinking, good problem solving skills, good reource management skills, good decision making skills, responsibility, flexibility, good stress management skills, compliance with MSF standards and principles, implement good strategies to ensure security and safety skills in daily work, good comunication skills, hard worker, worked as a person with more experience in MSF.	Participation in monthy reports
4	Cross-cultural sensitivity, good team working skills, good training skills, compliance with MSF standards and principles, good at motivating local staff, good reource management skills, flexibility, multitasking, deep commitment, hard work.	Self-health care
5	Good mass casualty management skills, compliance with MSF standards and principles, good leadership skills, good communication skills, good team working skills, responsibility, good training skills.	Language skills
6	Good analytical thinking, compliance with MSF standards and principles, good team working skills, good at setting priorities, good clinical skills, good team working skills, good comunication skills, flexibility, multitasking, strong will to improve organization within the project.	Too ambitious with local staff setting sometimes unrealistic goals
7	Maximum committment to MSF, compliance with MSF standards and principles, cross-cultural sensitivity, very good attitude towards MSF staff, awareness of the project from a global perspective and not only in own area of competence, committment to promote capacity building, good team working skills, good at motivating local staff, flexibility, implemented an operational research project approved by MSF medical coordination unit.	Self-protection during life saving maneuvers
8	Highly adaptable, good skills to work with limited resources, flexibility, responsibility, good at coaching and support of local staff, good reource management skills.	

Table 10. Summary of students' field evaluations

Limitations

The competency sets and skills lying at the basis of our training curriculum, albeit published and peer-reviewed, have never been validated. However, authors considered that basing the learning objectives of this course on the needs emerged from discussions within different groups of experts and incorporating also the input of trainers working for the NGO partner could be a fair compromise in the absence of a globally recognized competency set for humanitarian workers.

The sample size used to test the effectiveness of this course was limited to 8 participants; nevertheless, both primary and secondary outcomes improved significantly after the course. Regarding the specific changes in each of the fields of the TIGR, a larger study may be useful to confirm the significance of these differences.

This study assessed only the first three levels of the Kirkpatrick model and for level 3 (Behaviour) no pre-test was conducted. Since this course was designed to prepare residents for their first deployment with MSF, exposition to the real workplace could be possible only upon completion of the training. However, it is worth noting that residents obtained a very good rating scores from field supervisors, which is quite inusual for first missioners. For this reason, it could be hypothesized that the training program played actually an important role in the quality of their respective performances in the field.

Level 4 (Results) measures the effect of students' actions which, considering our target population, should have translated into measurement of patients' outcome e.g decreased mortality. Taking into account the rapid turnover of doctors in humanitarian contexts and the diversity in the pattern of disease and affluence of patients depending on country, season and ongoing environmental conditions (armed conflict, natural disaster etc) the influence of this training program on the outcome of patients would have been very hard to interpret.

Finally, this study did not include a control group; according to MSF policy, deploying untrained doctors in the field at this early stage of their professional careers would have gone against the basic principles of best practice.

4. Discussion

This is the first educational research project in disaster medicine and humanitarian assistance where the following steps were sequentially conducted: at first, a preliminary assessment of the target audience in terms of interest and potential involvement was conducted, secondly, an analysis of the educational needs through two different methods (a systematic literature review and field experts opinion survey) was carried out, thirdly, a competency-based course based on current sets of published competencies [95] and developed in collaboration with Médecins Sans Frontières was implemented and finally, an evaluation of the training program was conducted.

The poll conducted in study n°1 represents also the first attempt ever documented worldwide to assess the interest among anesthesia/critical care residents in humanitarian assistance and their perception on the need to receive additional training before first deployment and to enhance professionalization in this specific sector; at the same time, this was the first study collecting the opinion of residents on this matter in Italy.

Interestingly, even though trainees voiced enthusiasm do participate in humanitarian aid rotations by the completion of their training program, compared with overseas residents they engage much less in humanitarian aid missions [22-25]. Plausible explanations for these results might lie on the need for self-funding for traveling and living expenses in hosting countries when working with small NGOs, lack of offers by training programs on well-organized international electives, and time constraints [25, 31].

As expected, most of the respondents, particularly those with prior experience, believe that participation in humanitarian missions can contribute to professional development; accordingly, Drain et al [28] published a detailed description of the role that humanitarian aid rotations play in the professional development of medical students through strengthening clinical, decisionmaking skills, and problem-solving skills. Additionally, performing in poor-resource environments enables physicians to identify promptly crucial comorbidities rarely found in developed countries, appreciate cross-cultural collaboration, attach less importance to instrumental tests, and enhance cost awareness. Therefore, doctors' involvement in humanitarian missions may lead to more qualified physicians, even in their home institutions.

Anesthesiologists working in disaster and humanitarian settings are required to perform high-quality anesthesia in challenging conditions and must be prepared to perform unfamiliar tasks [88] with limited access to resources. Unfortunately, a recent study has demonstrated that

anesthesiologists deployed in complex emergencies still lack important preparedness before deployment [88]. All the more because young doctors have been increasing their presence in international aid projects, good preparation and performance oversight are paramount to guarantee health-based best practice also in poor settings [96].

In addition, this poll indicates that only a few residents have attended courses to enhance their professionalization in humanitarian aid topics. Conversely, Anspacher et al [24] reported that 43% of the pediatric trainees surveyed received preparation for working in underserved countries during their residency. Interestingly, while this request seems to be well-recognized and supported by the poll respondents (97.2%), Dey and colleagues [22] reported that only 60% of the emergency medicine trainees surveyed considered additional training as necessary. Of note, in both cases, this number was higher when only those residents with prior humanitarian health experiences, and therefore, greater awareness about the challenges posed by resource-poor or constrained environments, were considered.

The majority of respondents, supporting previous research [9, 17, 97, 98], asserted that aid workers should be professionalized beyond their specific field of expertise, covering domains such as public health, security, epidemiology, project management, and international humanitarian law. This is aligned with communities' and decision makers' demands of a professionalized generation of crisis providers, especially those in health. Unfortunately, recent crises still revealed challenges for emergency health response, such as improved quality assurance, coordination, and resource allocation [99, 100].

Only a small percentage of respondents had prior experience in humanitarian missions. However, it is considered crucial that 97% of all polled residents perceived as relevant the early professionalization process to work in low/poor-resource environments. This must be taken into consideration by residency program designers since some of these future specialists will take part in actual humanitarian missions, even in the early stage of their career, as already documented [9].

In comparison with other studies [24], the percentage of the respondents who definitively plan to address their professional career to the humanitarian health assistance sector was higher. An intuitive explanation for these findings might be that, at the basis of the medical career, there is the genuine desire to help others. Humanitarian medicine provides an ideal opportunity to satisfy this desire by going to an area where good care is not available, providing services that

can make a huge difference in the health and welfare of fellow human beings, and providing this service freely and without personal gain [101].

A total of 42.1% would appreciate if a dedicated formal pathway in this field was available within their training programs. Of note, the implementation of a humanitarian subspecialty has already been proposed [102, 103]. Respondents would like to see more exposure to humanitarian work during residency and were overwhelmingly in support of being professionalized as humanitarian responders in the early stage of their career.

Since anesthetists are always at the forefront in humanitarian crises, this interest should serve as a motivation for the development of an early, academically supported, professionalization pathway that promptly would provide future anesthesia/ critical care physicians with the knowledge, skills, and attitudes to ensure high-quality humanitarian assistance during their first deployment.

When a disaster impacts a large area of a population, local disaster management systems might be overwhelmed quickly, and national and FMTs, as well as other agencies, are requested to provide assistance in the affected area [104]. In the current century, there have been several disasters, mainly seismic events, which have required international medical response due to their huge human impact. In such catastrophes, international assistance is regarded as a right or obligation [105]. However, these cross-border operations face many challenges, problems, and barriers not only regarding managerial, legal, social, and financial issues, but also in terms of the quality of medical care delivered [106, 107]. Which regards to education, the survey conducted among field experts confirmed that there is lack of competency-based training for disaster responders.

Noteworthy, developing and performing standardized training courses is influenced by shortcomings in budget, expertise, and standards. Indeed, surveyed field experts reported financial shortcoming as a barrier to the development and conduction of standardized training programs in disaster management.

Previous studies have additionally confirmed the negative impact of financial limitations on disaster preparedness, including education of personnel [108-110]. For instance, ELRHA conducted a survey among 1,000 humanitarian workers worldwide highlighting that "*opportunities for training across various continents can be limited by lack of access to professional development, course expense, lack of time and the small number of people selected*

for training by their parent nongovernmental organizations"[8]. Decision makers on disaster planning and preparedness should therefore, take the importance of funding under consideration and provide sufficient budgets for disaster training programs.

However, the personnel working in humanitarian missions is not only composed by health professionals but also logistics, human resource managers, administration personnel etc; therefore, team training is key to attain a high performance in the field. Experts affirmed that the training of a response team is neither purposeful nor balanced. These assertions are also supported by other experiences and studies [111-114].

In some disaster-assistance teams, the level of experience and training of team members vary widely in regard to disaster management, with only some members having previously received well-organized training [111, 115]. To achieve an efficient performance during response to disasters, a well-organized team should be composed by personnel that has enough knowledge and capabilities to perform the required tasks also at individual level. Therefore, all the professionals involved in disaster preparedness and response (eg, logistics, search and rescue, fire brigades, etc) should receive specific training regardless of the professional sector to which they belong [116].

Current results support previous findings [117-119] indicating the lack of both coordination and integration among teams and their activities. Lack of communication, language barriers, information challenges, and failure in command systems could result in insufficient coordination among different activities, such as search and rescue, medical care, and damage assessment, among others, serving in the disaster area. Development of international standards would help all response team members to follow the same principles, therefore, diminishing critical coordination gaps.

Field experts emphasized problems concerning access to relevant resources during disasters. Shortfalls of resources, such as human resources, equipment, and financial resources, among others, often are reported during response to different types of disasters worldwide [40, 117, 120]. Sometimes, this arises due to the lack of a resource management system [117]. A standard list of essential resources, a standardized financial planning instrument, a standardized resource management system, and a standard rapid-need assessment process after a disaster must be considered for the use of international teams.

Lack of reliable information was cited as a major issue during disasters, though some guidelines

and procedures have been developed by research teams [121-124]. Disaster response teams sometimes enter the disaster area without sufficient information about the situation [117]. To solve this problem, the establishment of international centers for disaster information management will assist response organizations and teams before and during disasters.

In addition, the survey indicates that neither NGOs nor international teams fulfill the expectations of the impacted society with respect to capabilities and services. This problem has been previously reported [107, 112, 117, 125]. International teams should be required to provide a precise, standardized report of their capabilities, resources, and services before entering the disasterimpacted country. Working as a component of national teams will ensure that NGOs and international teams provide expected services in the disaster area, filling the gaps in the national disaster-relief effort.

In accordance with existing literature [48, 126], field experts defined competency-based approaches in disaster training and humanitarian assistance as a necessity. Indeed, to be effective, education and training require consensus on a set of core competencies with curricula based on a well-defined package of knowledge, attitudes and skills. Moreover, competency-based training represents the cornerstone in the professionalization of disaster medicine and humanitarian aid [3].

Regrettably, there is still lack of this approach [10, 19, 116]. A study in the EU showed that only 61% of the disaster and emergency training initiatives have a competency-based curriculum design [116]. To have an efficient disaster-response system, training programs in disaster response and humnaitarian assistance need to train in core competencies and all disaster-response teams must consist of staff competent in their duties and tasks [8, 9, 19, 116]. In this regard, the literature review conducted in this research included all the competencies published for professionals involved in disaster relief and humanitarian assistance regardless of their professional sector, discipline, role, or category.

Whereas the term competency embraces the set of knowledge, skills, and attitudes necessary to effectively and efficiently accomplish a task, this review revealed a lack of consensus even among the terminology used through different articles to define competency, competency domains, and so on. Even if it would have been useful and of great interest to develop a comprehensive competency framework on the basis of all the competencies provided by the articles reviewed, the huge number of competencies listed—along with the aforementioned lack of standard

terminology—made this task difficult if not impossible to accomplish.

A “competency statement” best describes the specific observable and measurable activities that individuals are able to perform [57, 80, 127]. Therefore, it would be expected to include an action verb, describing the level of performance (eg, apply, recognize), a description of the subject matter, type of performance, outcome performance, or specific operational task (eg, disaster response or recovery, public health emergency), and the context to which the competency statement is referred [57, 127].

It is paramount to underline that definitional uniformity will also facilitate the establishment of this discipline at an operational level. In a previous study, the disagreement in the terminology used among articles in defining these concepts was attributed to a general lack of understanding of the competency-based education framework or foundation building-process [43], of competencies, subcompetencies, and performance objectives.

While competency statements include a broad description of a task, performance objectives describe a specific outcome that workers are expected to accomplish as a result of their work activity [128]. Furthermore, they define measurable goals that can be used to evaluate learning [76] and, therefore, are necessary to assess whether or not students gain new competencies as result of their participation in education and training programs. However, only a few among the selected articles reported performance objectives.

The lack of homogeneity in terms of competency definition and related characteristics—such as performance objectives or specific expected outcome—poses an additional challenge to educational designers in the field of humanitarian assistance and disaster management. Little agreement on the terminology used was also found in the definition of proficiency levels within target groups. In 2011, an internationally accepted framework to define target audiences on the basis of their level of responsibility was developed: strategic-level (gold), tactical-level (silver), and operational (bronze) [129].

It is important to draw attention to the fact that, while the number of disaster educational programs continues to grow, there are no finalized and common standards upon which these programs are based [43, 130]. Concerning this, a common terminology would facilitate the ongoing standardization process in education, certification (among providers), and accreditation (among academic-affiliated education and training institutions) in disaster response and humanitarian assistance. As this research and previous studies have shown, the essential role of

disaster responders, especially during cross-border response operations, underlines the need for worldwide standards for disaster educational programs.

Remarkably, even if this literature review has been conducted through different search engines, including but not limited to medical databases, the vast majority of articles reviewed still reported competencies directed to the health care sector. Accordingly, similar results came from an analysis on training opportunities in mass destruction weapons (CBRNE), including the following professional sectors: general manufacturing, transportation, health care, emergency response, and skilled support [131]. As such, this expanded the available competencies and resulted in considerably more training opportunities for health care workers compared to other professional sectors.

It is crucial to underline once more that while health care plays a relevant role in disaster response, education must also be extended to other actors equally involved in disaster management. Indeed, international standards on education and training in the field for disaster management emphasize that education and training programs should be both multidisciplinary and transdisciplinary and based on a modular approach [48]; this strongly implies that the definition of relevant competencies must first consider the wide audience the education and training might include.

Most articles were nursing-centric. Since September 11, 2001, numerous efforts have been made to enhance preparedness within this specific professional group, as they are early responders to disasters, represent skilled human resources within the health sector, and play active roles in national preparedness plans [132]. Among the studies that included multidisciplinary competencies, that of the American Medical Association Center for Public Health Preparedness and Disaster Response provides a comprehensive consensus-based set of competencies that integrates all the health specialties involved in disaster medicine and public health [10].

Supporting previous research, the majority of the competency sets were based on consensus building [43]. However, surveys have also demonstrated a method to extract competencies, skills, and behaviors based on the opinion and field experience of a number of providers from the target audience. The combination of both methods could provide good evidence on the existing educational gaps from an academic and operational standpoint.

While searching peer-reviewed literature yielded a number of articles, several papers were reports, and others were webbased resources that were not accessible through the search

engines utilized. This demonstrates that over the last decade, several competency sets for professionals working in disaster response and humanitarian assistance have been developed; however, some of them remain published as grey literature.

The information gathered in the studies n° 2 e n°3 together with input provided by CRIMEDIM and MSF teaching staff, served as foundational basis for the development of a competency-based course for senior residents prior to deployment in MSF field projects.

This should be considered as real novelty, as the implementation and evaluation of a course based on published cross-sectorial and profession-specific competencies, jointly developed by an academic center and a robust humanitarian organization has never been documented [95]. Interestingly, none of the training programs in Europe [133] or North America[8] that define themselves as "competency-based", incorporate competency sets previously published [95, 133].

Moreover, evaluating the effectiveness of training programs is necessary in order to ensure credibility and decide whether they should be continued or not. In this regard, the assessment of a course for humanitarian workers using the first three levels of the Kirkpatrick's evaluation model and including high fidelity simulation is also innovative.

Overall, the students' satisfaction (Level 1) with the program was high, and in particular, the delivery methodology and the residential phase were highly appreciated. It is worth noting that, aside from the course curriculum and students' previous academic background, the structure of the course and the educational environment play also a central role in learning [134]. Over the last years, medical education has shifted towards different delivery modalities in an attempt to achieve better educational outcomes. The combination of face-to-face lectures and online teaching, defined as blended learning, strengthens the interaction between course participants, lecturers and resources [60] and represents a flexible pedagogical system [135].

Our study showed that students' competence (Level 2) in simulated humanitarian scenarios increased after completion of the training. According to the definition of "competency", competency-based trainings must ensure learning through the acquisition of a theoretical understanding of relevant concepts in the field of humanitarian assistance (e.g to learn the START triage algorithm), promotion of a positive predisposition towards the working methods and actions to be adopted in low-resource settings (e.g to recognize the importance to apply the START triage) and development of students' practical skills (e.g to conduct a good quality triage in a mass casualty event).

For instance, Yoon et al [136] used the Kirkpatrick model to evaluate a continuing professional development training for physicians and physician assistants; in this study, a single 5-point Likert scale form filled by trainers and trainees was used to assess learning. It is important to highlight that the inclusion of separated tests for knowledge (e.g multiple choice), attitudes (e.g likert scale questionnaire) and skills (e.g performance test) should be preferred whenever possible [66].

Our results reflect a clear improvement in participants knowledge and overall performance in a high-fidelity scenario, while no change in their attitudes was evident. A plausible explanation may lie on the selection criteria considered for participation in this training program; since all students were highly motivated and decided to take part in this course on a voluntary basis, a positive attitude towards the course contents was expectable even before the course started.

In a recent study Schwartz et al highlighted the prominent role that simulation, and in particular high fidelity simulation, may play in enhancing residents' skills during the management of complex cases they have not previously encountered [137]. Since working in low-resource settings differs from home institutions [138, 139] due to different socio-political contexts, cultural communication, care standards, and epidemiology, simulated environments represent a priceless opportunity to teach crisis resource management (CRM) skills [140] which are are extremely important in humanitarian contexts.

Indeed, some difficult situations commonly occured in the field (for instance due to communication barriers and shortage of resources) can be easily reproduced through simulation tools, giving students the chance to become acquainted, receive feedback and improve their performance with no risks to patients. At the same time, simulation scenarios allow for the evaluation of performance objectives reflecting how students use the concepts learnt as they would in the field [19]. In their review "Transfer of learning and patient outcome in simulated crisis resource management", Boet et al found that CRM simulation not only improves the behaviour of learners in the workplace but, more importantly, improves also patient outcomes [141].

According to Kirkpatrick et al [66], a favorable students' reaction and evidence of improvement in learning do not necessarily lead to the desired changes in behaviour; this is due to the fact that the transfer of learning to the workplace is heavily conditioned by the "work climate". Work climates are clearly determined by the supervisors' reaction towards the students' practical

application of the competencies acquired; to promote an encouraging work environment, bosses and supervisors should be informed about the students' participation in the training program, and preferably, be also involved in the development of the training program itself [66].

It is worth noting that, even if keeping MSF field evaluators blinded was mandatory to prevent biases, the strengths of residents' performances outweighed the weaknesses. The key for this success may lay on the fact that educational needs were decided and endorsed by a pannel of experts that included MSF training staff, which ensured that the practical concepts, organizational principles and techniques taught complied with the organization best practice standards.

Conclusions

Data resulting from our research and existing international literature demonstrate that the interest of residents in humanitarian assistance is high and that they would like to be involved in field humanitarian projects by the completion of their residencies. However, at the time our study was conducted, few among the respondents had actually participated in humanitarian aid missions. Some studies reported lack of opportunities and funding as main factors at the basis of this fact. Doctors in training considered humanitarian aid experiences as an opportunity for professional development and favored the global professionalization of the humanitarian aid sector.

On the other hand, the survey among international experts in disaster response and humanitarian assistance evidenced that foreign medical teams and medically related NGOs do not always provide expected capabilities and services and that teams often are not competent during the response phase because of education and training deficiencies. All deficiencies need to be applied to competency-based curricula.

The systematic literature review conducted has revealed a huge number of competencies published over the last decade for different professional sectors involved in the response to disasters and humanitarian emergencies. Studies reviewed (both peer reviewed and grey literature) were mainly focused on the health care sector and, more importantly, presented a lack of agreement on the terminology used for competency-based definition and phrasing.

Finally, the evaluation of the competency-based course developed by CRIMEDIM in collaboration with the international humanitarian organization Médecins Sans Frontières to prepare senior residents for their first deployment showed that residents were highly satisfied with this training program, and that their knowledge and skills in simulated humanitarian environments improved as a result of their partecipation in the course.

Next steps and future perspectives

This research project demonstrated how the collaboration between an academic center and a solid humanitarian organization allowed to develop and demonstrate the efficacy of a pre-deployment training course in increasing the learning of young doctors to work in underserved areas.

This may have several promising implications:

1. If properly trained, senior medical residents with no prior experience in the field could be deployed without compromising the quality of care delivered.
2. In those countries where residents are authorised by contract to practice abroad for a certain amount of time while maintaining their financial remuneration, NGOs could fill field gaps more rapidly by deploying well-prepared but inexpensive personnel.
3. From an organizational standpoint, agreements between NGOs and training centers would allow humanitarian staff to beneficiate from simulation-based training which is, nowadays, the best approximation to real work in emergency and disaster contexts [95].
4. Well-prepared and motivated residents would represent additonal workforce also to establish new research projects in underserved areas

It is the author's hope that this collaborative initiave will serve as model worldwide to bridge the gaps between academia and field operations and contribute to the growth and professionalization of the humanitarian health sector.

Further engagement to standardize competency-based education in disaster medicine and humanitarian assistance is needed; the development, validation and evaluation of a common competency framework for all the professionals involved in crisis response will represent a decisive step forward for professionalization and certification and will facilitate greater accountability, transparency, and performance oversight.

Future studies should be conducted to assess if training programs actually increase the competence of humanitarain workers in the field and if it translates into improvements of patients outcomes, professional competence in their own nationstates or further advantages for deploying organizations.

Acknowledgements

I would like to thank my husband Gianni, my parents Domingo and Ángeles and my grandmother Aurora, for their unconditional support, encouragement and patience during these three years of hard work.

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In addition I would like to express my gratitude to MSF-Italy representatives, for their initial trust and permanent collaboration since 2013 till now.

Special thanks to Professor Frederick M. Burkle whose expertise, research, enthusiasm and encouragement inspired the realization of this P.h.d.

[Appendix 1]

Demographics

1. Gender

- ○ F
- ○ M

2. Year of birth

3. Training year

- ○ 1rst
- ○ 2nd
- ○ 3rd
- ○ 4th
- ○ 5th

Prior experience

4. Have you ever collaborated with humanitarian organizations at national or international level?

- ○ Yes
- ○ No

5. If you have collaborated or are currently collaborating please write on the box bellow the name of the organization.

6. Have you ever taken part in humanitarian aid missions?

- ○ Yes
- ○ No

Interest in humanitarian assistance

7. Would you like to participate in an humanitarian aid missions by the end of your training program?

- ○ Yes
- ○ No
- ○ I don't know

8. Do you think that humanitarian aid missions could lead to professional development?

- ◯ Yes
- ◯ No
- ◯ I don't know

Awareness of the humanitarian aid rotations offered by training programs

9. Does your recidency program expose residents to humanitarian aid rotations?

- ◯ Yes
- ◯ No
- ◯ I don't know

10. If your training program exposes residents to humanitarian aid rotations, is there a training course to get through before taking part in ?

- ◯ Yes
- ◯ No
- ◯ I don't know

Professionalization in humanitarian assistance

11. Have you ever take a course aiming at professionalizing humanitarian workers?

- ◯ Yes
- ◯ No

12. Do you think that a specific course addressed to prepare residents to deal with the challenges usually posed by low -resources environments should be implemented before they take part in humanitarian missions?

- ◯ Yes
- ◯ No
- ◯ I don't know

13. Do you think that the sector of aid workers committed to humanitarian assistance should be professionalized including topics beyond their areas of specialization such (public health, security, communicable diseases… etc)?

- ◯ Yes
- ◯ No
- ◯ I don't know

Carrier intentions

14. Would you like to address your professional carrier towards humanitarian assistance or disaster medicine?

- ◯ Yes.
- ◯ Yes is a specific pathway was available within the residency program.
- ◯ Yes but I actually don't know how to do it.
- ◯ No

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[Appendix 2]

CONVENZIONE TRA IL DIPARTIMENTO DI MEDICINA TRASLAZIONALE DELL'UNIVERSITA' DEGLI STUDI DEL PIEMONTE ORIENTALE "AMEDEO AVOGADRO" E L'ASSOCIAZIONE "MEDICI SENZA FRONTIERE ONLUS"

TRA

Il Dipartimento di Medicina Traslazionale dell'Università degli Studi del Piemonte Orientale "Amedeo Avogadro" (di seguito denominato Dipartimento), rappresentato dal Direttore, Prof.ssa Fabiola Sinigaglia, con sede in Via Solaroli, 17 – 28100 Novara, autorizzato alla stipula con delibera del Consiglio di Dipartimento n. _____ del _____

E

L'Associazione "Medici Senza Frontiere Onlus" (di seguito denominata MSF), con sede in Roma in Via Magenta 5, C.F.: 97096120585, in persona del suo legale rappresentante pro tempore Dott. Gabriele Eminente

PREMESSO CHE

a) Il Centro di Ricerca Interdipartimentale in Medicina di Emergenza e dei Disastri ed Informatica applicata alla Didattica ed alla Pratica Medica, facente parte del Dipartimento di Medicina Traslazionale dell'Università degli Studi del Piemonte Orientale "Amedeo Avogadro" (di seguito denominato CRIMEDIM), organizza, ai sensi del Regolamento di Ateneo di cui al DR 401 del 01/01/2014, la 1° Edizione del Corso di Aggiornamento Professionale Universitario in "Gestione di Interventi Sanitari in Contesti di Disastro ed Emergenza Umanitaria" denominato "HUMANITARIAN MEDIC" A.A. 2014/2015 (di seguito denominato Corso "HUMANITARIAN MEDIC") descritto nel Bando "HUMANITARIAN MEDIC - Corso di aggiornamento professionale universitario in Gestione di interventi sanitari in contesti di disastro ed emergenza umanitaria A.A. 2014/2015" (di seguito denominato Bando "HUMANITARIAN MEDIC") approvato con Delibera del Consiglio di Dipartimento del 16/10/2014;
b) Il Corso "HUMANITARIAN MEDIC" prevede un periodo di apprendistato sul campo nell'ambito di un programma di risposta di emergenza umanitaria;
c) MSF è stata identificata quale associazione idonea a guidare le attività di apprendistato sul campo espresse dal programma didattico del Corso "HUMANITARIAN MEDIC";

LE PARTI CONVENGONO QUANTO SEGUE:

Articolo 1 - Oggetto

1.1 Il CRIMEDIM ha acquisito particolari competenze nell'ambito della Medicina dei Disastri e delle Catastrofi ed è interessato a collaborare con MSF al fine di consentire la partecipazione dei medici in formazione specialistica iscritti al Corso "HUMANITARIAN MEDIC" alle attività istituzionali di MSF.
1.2 Riconoscendo le particolari competenze, MSF accoglie la richiesta di favorire la partecipazione diretta alle proprie attività medico-cliniche del personale medico in formazione specialistica iscritti al Corso "HUMANITARIAN MEDIC".

Articolo 2 - Qualifica e natura giuridica della Convenzione

2.1 Viene espressamente esclusa l'instaurazione di qualsivoglia rapporto di lavoro tra i medici specializzandi iscritti al Corso "HUMANITARIAN MEDIC" e MSF;
2.2 I medici specializzandi iscritti al Corso "HUMANITARIAN MEDIC", pur mantenendo tale qualifica professionale, saranno considerati a tutti gli effetti operatori umanitari di MSF all'atto del loro coinvolgimento nei progetti MSF;
2.3 I medici iscritti al Corso "HUMANITARIAN MEDIC" saranno tenuti a rispettare tutte le regole poste da MSF nei contesti di missione;
2.4 I medici specializzandi iscritti al Corso "HUMANITARIAN MEDIC" sono consapevoli che il mancato rispetto di queste regole, in particolar modo quelle riguardanti la sicurezza e alle attività operative, può comportare il rimpatrio immediato.

Articolo 3 - Ruolo e Responsabilità del Dipartimento

Per l'intera durata dell'Accordo, il Dipartimento anche con le risorse finanziarie, umane e tecniche fornite dal CRIMEDIM, si impegna a:

3.1 Mantenere la responsabilità della gestione legale e amministrativa dei medici specializzandi con contratto di specializzazione iscritti al Corso "HUMANITARIAN MEDIC" appartenenti solo alla Scuola di Specializzazione in Anestesia, Rianimazione e Terapia Intensiva dell'Università del Piemonte Orientale. La gestione legale e amministrativa dei medici specializzandi con contratto di specializzazione iscritti al Corso "HUMANITARIAN

MEDIC" appartenenti ad altre Scuole di Specializzazione Italiane è di responsabilità della Scuola stessa di appartenenza;

3.2 Promuovere la partecipazione degli specializzandi iscritti al Corso "HUMANITARIAN MEDIC" ai progetti di MSF. La partecipazione è su base volontaria e sottoscritta dagli interessati al momento dell'ufficializzazione dell'iscrizione al Corso "HUMANITARIAN MEDIC", in accordo con il piano formativo, secondo quanto formulato nel Bando "HUMANITARIAN MEDIC";

3.3 Richiedere agli specializzandi iscritti al Corso "HUMANITARIAN MEDIC" il rispetto degli impegni didattici e formativi espressi nel Bando "HUMANITARIAN MEDIC";

3.4 Comunicare a MSF una lista iniziale di candidati per lo svolgimento delle attività sul campo come espresso dall'Art. 7 del Bando "HUMANITARIAN MEDIC";

3.5 Richiedere la verifica prima dell'ufficializzazione dell'iscrizione al Corso "HUMANITARIAN MEDIC", da parte di MSF, dei criteri di idoneità dei candidati a svolgere una missione in un progetto di MSF come espresso dall'Art. 7 del Bando "HUMANITARIAN MEDIC".

Articolo 4 - Ruolo e Responsabilità di MSF

Per l'intera durata della Convenzione, MSF si impegna a:

4.1 Convocare i possibili candidati al Corso "HUMANITARIAN MEDIC" a sostenere la valutazione conclusiva di idoneità a svolgere una missione in un progetto di MSF come espresso dall'Art. 7 del Bando "HUMANITARIAN MEDIC", a propria insindacabile discrezione e secondo i criteri dell'Organizzazione;

4.2 Identificare le missioni o i progetti che possono essere sede dell'impiego dei medici specializzandi;

4.3 Fornire anticipatamente le informazioni dettagliate di contesti di missione così come le linee guida, i protocolli e le necessarie informazioni per il lavoro sul campo;

4.4 Garantire la partecipazione diretta dei medici specializzandi alle attività cliniche e la graduale assunzione dei compiti assistenziali in modo coerente con le attività della missione secondo gli obiettivi formativi previsti;

4.5 Fornire, al termine della missione, una valutazione finale dei medici specializzandi attestante il contributo tecnico-professionale e personale. Tale documento sarà redatto direttamente nel Paese in cui il medico è stato impiegato;

4.6 Provvedere alle spese di viaggio, visti e alloggio dei medici specializzandi impiegati sul campo, così come ai costi connessi ai trasporti in loco alle medesime condizioni stabilite per gli Operatori Umanitari di MSF;

4.7 Provvedere alle spese di vitto attraverso un contributo "per diem", definito secondo il Paese di svolgimento della missione, alle medesime condizioni stabilite per gli Operatori Umanitari di MSF;

4.8 Provvedere alla copertura assicurativa per rischi professionali, copertura sanitaria, copertura per la responsabilità civile verso terzi, gli infortuni e le malattie derivanti dall'esercizio delle attività assistenziali svolta dai medici specializzandi, alle medesime condizioni stabilite per gli Operatori Umanitari di MSF;

4.9 Individuare tra i responsabili delle attività cliniche di MSF un tutor che possa fungere da riferimento per la supervisione teorica e on-the-job per il/i Medici Specializzandi durante tutta la durata della missione.

Articolo 5 - Comunicazione

Eventuali contatti con la stampa e qualsiasi altra forma di comunicazione dell'iniziativa devono essere preventivamente concordati per iscritto fra le parti.

Articolo 6 – Durata del contratto

Le parti riconoscono che la durata della presente Convenzione si intende secondo i tempi definiti nel Bando "HUMANITARIAN MEDIC".

Articolo 7 - **Rescissione prima del termine**

L'eventuale rescissione della Convenzione prima del termine previsto all'articolo 6, dovrà avvenire tramite notifica scritta con almeno un mese di preavviso. Sono escluse ogni tipo di indennità e/o penalità in capo al recedente.

Articolo 8 – Trattamento dei dati personali dei soggetti da contattare

MSF riceverà i nominativi dei soggetti da contattare direttamente dal Dipartimento.

Il Dipartimento dichiara che i dati forniti a MSF sono stati raccolti nel rispetto delle disposizioni normative vigenti e dei provvedimenti del Garante per la protezione dei dati personali in particolare per quanto riguarda il rilascio del consenso, e che pertanto l'utilizzo di essi da parte di MSF, per gli scopi della Convenzione, è perfettamente lecito.

Il Dipartimento si impegna ad eseguire la cancellazione immediata dei nominativi di quei soggetti che esercitino i diritti di cui all'art. 7 D. Lgs. 196/2003 nel momento in cui la richiesta pervenga dagli interessati.

Nel caso suesposto il Dipartimento comunicherà entro 5 giorni a MSF la richiesta da parte degli interessati.

Articolo 9 - Controversie

Per ogni eventuale controversia derivante dall'instaurazione, esecuzione e conclusione della Convenzione sarà esclusivamente competente il Foro di Torino.

Qualora sia disposta l'interruzione della missione nel progetto MSF, il medico specializzando non avrà diritto ad alcun rimborso delle quote di iscrizione al corso.

Novara,

Dipartimento di Medicina Traslazionale dell'Università degli Studi del Piemonte Orientale "Amedeo Avogadro"
Il Direttore
Prof.ssa Fabiola Sinigaglia

Medici Senza Frontiere Onlus
Il Direttore Generale
Dott. Gabriele Eminente

[Appendix 3]

Humanitarian Medic

Reaction questionnaire

[Level 1 Kirkpatrick's model of training programs' evaluation]

Dear participant,
please give us your frank reactions and comments on the course delivered. They will help us to evaluate this program and improve future editions.

1) **How do you rate the pertinence of the competencies taught to your needs?**

[Excellent - Very good – Good – Fair – Poor]

Comments:

2)

3)

4)

5) **How do you rate the course schedule?**

[Excellent - Very good – Good – Fair – Poor]

Comments

6)

7)

8)

9)

10) **How do you rate the modality used to deliver the course (e learning + residential)?**

[Excellent - Very good – Good – Fair – Poor]

Comments

11) **Please rate singularly the module units:**

- *Introduction to Disaster Medicine*

[Excellent - Very good – Good – Fair – Poor]

Comments

- *Clinical Features of Different Types of Disasters*

[Excellent - Very good – Good – Fair – Poor]

Comments

- *Mass Casualty Incident Management*

[Excellent - Very good – Good – Fair – Poor]

Comments

– *Public Health in Disasters and Humanitarian Crisis*

[Excellent - Very good – Good – Fair – Poor]

Comments

– *Safety and Security for Humanitarian Aid Workers*

[Excellent - Very good – Good – Fair – Poor]

Comments

– *Basics of Infectious Diseases in Emergency Settings*

[Excellent - Very good – Good – Fair – Poor]

Comments

– *Psychological Support in Disasters and Humanitarian Crisis*

[Excellent - Very good – Good – Fair – Poor]

Comments

– *Communication in Disaster Settings*

[Excellent - Very good – Good – Fair – Poor]

Comments

– *International Humanitarian Law*

[Excellent - Very good – Good – Fair – Poor]

Comments

– *Anaesthesia/Emergency Medicine/Pediatrics in Low Resource Settings*

[Excellent - Very good – Good – Fair – Poor]

Comments

12) How do you rate the audiovisual resources (video conferences etc…)?

[Excellent - Very good – Good – Fair – Poor]

Comments

13) How do you rate the level of assistance received for the e-learning platform?

[Excellent - Very good – Good – Fair – Poor]

Comments

14) How do you rate the residential course?

[Excellent - Very good – Good – Fair – Poor]

Comments

15)

16)

17)

18) How do you rate the coordination of the course?

[Excellent - Very good – Good – Fair – Poor]

Comments

19)

20)

21)

22) How do you rate the lecturers?

[Excellent - Very good – Good – Fair – Poor]

Comments

23) I think the price/quality ratio of this course is

[Excellent - Very good – Good – Fair – Poor]

24) What's your overall rating of the course?

[Excellent - Very good – Good – Fair – Poor]

25) I will recommend this course to other residents

[5------4------3------2------1]

Strongly agree Strongly disagree

26) Please, write any suggestion to improve future editions

[Appendix 4]

Pre-test_Knowledge_ PART 1

CANDIDATE NUMBER _____

1. **Which of the following assertions <u>best</u> defines the concept of disaster?**
    a) Situations or events caused by natural environmental factors leading to a tremendously high number of casualties
    b) Situations or events caused by natural environmental factors that require international assistance
    c) Only situations or events that require international assistance.
    d) Any situation or event causing a high number of casualties (>1000)
    e) **Any situation or event causing a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.**
2. **For victims of disasters, the probability to be rescued alive decreases abruptly after:**
    a) 6-12 h after the event
    b) **24-48 h after the event**
    c) 48-72 h after the event
    d) 4 days after the event
    e) Depends on the type of disaster
3. **The emergency management activities conducted in the ambit of disaster management can be categorized into the following phases:**
    a) Response-recovery-alert-preparedness
    b) Response-evaluation-alert-preparedness
    c) Response-evaluation-mitigation-preparednes
    d) **Response-recovery-mitigation-preparedness**
    e) Action-recovery-evaluation-preparedness
4. **The Office of the United Nations responsible for the coordination in case of disaster or humanitarian emergency is:**
    a) UNHCR
    b) **OCHA**
    c) WHO
    d) UNICEF
    e) WFP
5. **You're the Medical officer on shift in a project that provides assistance to victims of an ongoing belligerent conflict. There has been an attack nearby and several wounded are being carried to the hospital. Some victims present superficial bruises but they are mostly unresponsive, present seizures, fasciculations, miosis, salivation and wheezing.**
    a) **It is likely to be an acute organophosphorus pesticide poisoning so I put on gloves and mask, place an intravenous access and give bolus of 1–3 mg of atropine; 5 min later, I check the pulse, blood pressure, pupil size, sweat, and chest sounds. If no improvement has taken place, I give double the original dose of atropine**
    b) It is likely to be an acute organophosphorus pesticide poisoning so I put on gloves and mask, place an intravenous access and give bolus of 1–3 mg of atropine. If the problem does not solve in few minutes, I should think on another toxidrome
    c) It is likely to be an acute sulfur mustard poisoning. As no antidote exists, I will give supportive medical care to minimize the effects of the exposure

d) It is likely to be an acute sulfur mustard poisoning. I will give bolus of 1–3 mg of atropine and supportive medical care to minimize the effects of the exposure
e) There is no indication for drug administration unless the agent causing the syndrome is confirmed. Therefore, I will give supportive medical care to minimize the effects of the exposure

6. The Incident Command System (ICS) is:

a) **a standardized structural design for incident management that is applied by different domains and agencies such as healthcare and law enforcement**
b) a structural design for incident management especifically designned for health care interventions in emergency situations
c) a structural design for incident management especifically designned for health care interventions in emergency situations that can be activated also in non-emergency events
d) a standardized structural design for incident management employed only by military forces in situations of imminent terrorist attack
e) a standardized structural design implemented by the United Nations aimed to coordinate international health interventions in the aftermath of natural disasters

7. The acronym M.E.T.H.A.N.E stands for:

a) **M**oment of arrival of the first emergency vehicle, **E**xternal appearance of the disaster site, **T**ime for evacuation, need for **H**elicopter activation, **A**ccurate assessment, **N**umber and severity of the casualties, need for **E**xternal support (police, fire brigade, military forces)
b) Confirmation of **M**ass casualty incident, **E**xternal support forces present at the disaster site, description of the incident **T**ype, communication of the potential **H**azards, reporting on the **A**ccessibility to the spot, **N**umber and severity of the casualties, need for activation of **E**xtraordinary Measures
c) **M**oment of arrival of the first emergency vehicle, need for **E**xternal support (police, fire brigade, military forces), predicted evacuation **T**ime, need for **H**elicopter activation, **A**ccessibility to the spot, **N**umber and severity of the casualties, need for activation of extraordinary **M**easures
d) **M**oment of arrival of the first emergency vehicle, need for **E**xternal support (police, fire brigade, military forces), predicted evacuation **T**ime, communication of the potential **H**azards, **A**ccessibility to the spot, **N**umber and severity of casualties, need for activation of extraordinary **M**easures
e) **Confirmation of Mass casualty incident, reporting of the Exact coordinates of the disaster site, description of the incident Type, communication of the potential Hazards, reporting on the Accessibility to the spot, Number and severity of casualties, number and type of Emergency services required**

8. According to the S.T.A.R.T triage system, a patient with a respiratory rate of 25 br/min and radial pulse absent should be categorized as:

a) Green Code (Minor)
b) Yellow Code (Delayed)
c) **Red code (Immediate)**
d) Black code (Expectant or Deceased)
e) Only carotid pulse is valid in the S.T.A.R.T triage system

9. Common elements of Complex Humanitarian Emergencies are:

a) Conflict-famine-breakout of communicable diseases- necessity of intervention
b) **Conflict-civilian population at risk-necessity of intervention**
c) At least 2 years conflict-breakout of communicable diseases-predominance of pediatric population at risk
d) At least 2 years conflict-genocide-necessity of intervention
e) Conflict-genocide-necessity of intervention

10. **Which of the following indicators ist used to promptly declare a Complex Humanitarian Emergency (CE)?**

    a) **Crude Mortality Rate**
    b) Maternal mortality ratio
    c) Under-5 Crude Mortality Rate
    d) Life expectancy at birth
    e) Infant mortality rate

11. In a CE, an Initial Rapid Assessment (IRA) is necessary to decide whether an intervention is needed or not; it embraces data collection on all the following aspects except:

    a) Shelter
    b) Mortality
    c) **Baseline vaccination coverage**
    d) Water and sanitation
    e) Food

12. **Measles is still a leading cause of mortality and morbidity for children in CEs. Therefore**,

    a) when signs and symptoms of measles (fever, conjunctivitis, cough, Koplik spots, rash, diarrhoea, etc) have been reported within the affected community, all children up to 5 years should be vaccinated.
    b) when signs and symptoms of measles (fever, conjunctivitis, cough, Koplik spots, rash, diarrhoea, etc) have been reported within the affected community, the vaccine should reach 100% coverage.
    c) vaccination priority should be given to infants up to 9 months.
    d) **every children from 9 months to 12-15 years should be vaccinated regardless of their immunization status**
    e) every children up to 5 years should be vaccinated. Childrens from 5 y.o up to 15 years only if specially at risk

13. Which of the following statements is true?

    a) 2-5 liter/person/day: minimum for survival
    b) **5-7.5 liter/person/day: minimum for survival**
    c) 10 liter/person/day: minimum for survival
    d) 20 liter/person/day: minimum for survival
    e) 40 liter/person/day: minimum for survival

14. **Which of the following biometric indicators is the <u>most commonly used</u> in the early phase of an emergency to screen children for admission to feeding programs?**

    a) **Mid-upper arm circumference (MUAC)**
    b) Body-Mass Index (BMI)
    c) Weight-for-height (WFH)
    d) Bilateral pitting edema
    e) Low birthweight (LBW)

15. Most incidents after kidnapping occur during:

    a) The first 5 min
    b) First 24 h
    c) **First hour**
    d) First 48 h
    e) First week

16. **You're a NGO member travelling on assignment ready to check in the Hotel booked by your organization. The Hotel has 14 floors and is situated in a urban area where civilian unrests have been lately taking place. The receptionist welcomes you and gives you the keys for a room at the ninth floor. You:**

    a) Ask the receptionist to change your room and not to mention the room number out loud again
    b) **Ask the receptionist to change your room for one situated between the second and seventh floor and not to mention the room number out loud again**
    c) You make sure that this room is close enough to the emergency exit and has no balcony
    d) You ask for a room at the ground floor with no direct access to the main street
    e) The ninth floor should be ok but, taking advantge of the fact that the hotel has 14, you feel safer staying in a higher floor

17. **Road travel can be one of the most dangerous activities undertaken by Humanitarian Aid Personnel. Indeed, when approaching a check point you <u>should never:</u>**

    a) Make sure that your driver slows down
    b) Hand your I.D. card
    c) Keep both your hands visible
    d) Take off your sunglasses
    e) **Roll your window down all the way**

18. **Land mines represent often an issue in countries where humanitarian assistance is required. Indeed, the presence of these devices may be indicated in the field by:**

    a) Dead animals or skeletons or uncultivated fields surrounded by cultivated fields
    b) Areas marked with colored tape
    c) Flag or plastic bags hanging from trees
    d) b) and c)
    e) **Any of the foregoing**

19. **The following are all useful tips to preserve your safety in humanitarian missions except:**

    a) Trust your instincts
    b) When possible, walk against the traffic
    c) In the event of you being abducted, build a rapport with your abductors
    d) Put your wallet in a front pocket or under clothing
    e) **Trust some of your domestic staff with the keys of your room or residence so that if you get attacked you can get assisted.**

20. **Malaria represents an endemic disease in many countries and is one of the most important vector-borne diseases associated with disaster-associated epidemics. Therefore:**

    a) **Early recognition and treatment of cases, also using only clinical presentation, without a laboratory-confirmed diagnosis, is important to control the extent of an epidemic**
    b) In settings where the risk of malaria is high, clinical diagnosis should be based on a history of fever in the previous 24 hours and/or the presence of anemia in blood tests
    c) In settings where the risk of malaria is high clinical diagnosis should be based only on a history of fever in the previous 3 days
    d) Early recognition and treatment of cases is important to control the extent of an epidemic. However should always be, regardless of the environment, confirmed with parasitological diagnosis to avoid overtreatment
    e) None of the foregoing

21. **The continuing exposure to possible traumatic events may cause psychological morbidities. Which are the most common psychopathologies presented by aid workers in the field:**

    a) PTSD, Bipolar Disorder, Depressive episodes and Burnout Syndrome

b) **PTSD, Depressive episodes, Anxiety and Burnout Syndrome**
c) Anxiety, Adjustment disorder, Phobia
d) Depressive episodes, PTSD, Paranoia and Burnout
e) c) and d)

22. The fundamentals of the International Humanitarian Law are summarized on:

a) **The Geneva Convention**
b) The Strasbourg convention
c) Paris convention
d) Biafra convention
e) Haye convention

23. **Which among the followings is not considered a basic Human Right?**

a) right to a fair trial
b) freedom from arbitrary detention
c) right to an adequate standard of living
d) freedom of religion
e) **right to minimum average wage**

24. Which of the following recommendations when dealing with the media is false?

a) Never lie
b) Never say that " you don't want to comment on that"
c) **Never say that you "don't know but you will find out"**
d) Pay attention to your body language; it accounts for 75%
e) Never repeat negative comments or words said by reporters

25. You are on the middle of a radio talk when the person to whom you are talking says "ROGER, GO AHEAD". This means that…

a) he/she misunderstood your name and thinks that you are Roger
b) **he/she got your message, understood it and so you go ahead.**
c) Mr Roger must go ahead
d) he/she is done with his/her transmission so you go ahead and start talking now
e) he/she wants you to wait and do not transmit until he/she tells you to

Pre-test_knowledge_ PART 2_emergency medicine

1. In low-resource settings blood availability is restricted. Therefore in your field project you will be mostly using:

   a) Units of red blood cells, fresh frozen plasma and platelets stored in the blood bank.
   b) Units of red blood cells stored in the blood bank
   c) Units of red blood cells and fresh frozen plasma only in selected cases.
   d) **Units of whole blood**
   e) Units of whole blood and fresh frozen plasma only in selected cases.

2. Today you're the doctor on duty in Emergency Room (ER). There have been bombing raids in the city and casualties are being transported to the hospital. The first patient is a 15 years old female, totally dust covered, GCS 5, anisocoric pupils, HR 70, RR 10 with severe chest retractions, SpO2 70%, BP 60/40 and traumatic amputation of her right leg. There are ventilators available so you decide to intubate the patient. The safest induction would be:

   a) **Ketamine 1-2mg/kg + Suxamethonium 1 mg/kg**
   b) Ketamine 2-3mg/kg + Suxamethonium 1 mg/kg

c) Thiopental 5mg/kg + Suxamethonium 1 mg/kg
d) Thiopental 5mg/kg or Ketamine 1-2mg/kg but avoing suxamethonium as it increasses intracraneal pressure.
e) None of the previous

3. Today you're the doctor on duty in Emergency Room (ER). You are handling a 20 years old patient with a severe asthmatic crisis. You gave O2, salbutamol and corticoids but the situation seems not to improve. In the absence of any other drug, you try:

a) Ketamine 50 mg i.m
b) Ketamine 0.05 mg/kg i.v bolus
c) Ketamine 2 mg/kg i.v bolus
d) **Ketamine 0.5 - 1 mg/kg i.v bolus**
e) a) and d) are correct

4. A two years old toddler (body weight 7 Kg) started with vomiting and non-bloody watery diarrhea 5 days ago. He is now lethargic and tachypnoeic and presents marasmus, tachycardia (no murmurs), weak pulse, cold extremities, pale mucous membranes and capillary refill time> 3 sec. Blood sugar is not yet available. The best therapy to start with would be:

a) Ringer lactate 20 mL/Kg i.v bolus
b) Dextrose 10% 5 mL/Kg i.v bolus
c) Ringer lactate + Dextrose 5% 15 mL/Kg i.v bolus
d) **0,45% NaCl + Dextrose 5% 15 mL/Kg i.v in 1 hour**
e) Normal Saline 15 mL/Kg bolus

5. South-East Asia. A four years old child with a history of fever, cough and episode of seizure. The mother reports that this is not the first convulsion episode. She is lethargic, moves after painful stimulus and presents pallor of the mucosae. The body temperature is 38.9 °C.
What has to be done first?

a) Ask the family for further details about the history of convulsions
b) Assess the blood sugar
c) Do the rapid test for malaria
d) **B+C**
e) Give Diazepam intrarectally

Pre-test_knowledge_ PART 2_anaesthesia

1. In low-resource settings blood availability is restricted. Therefore in your field project you will be mostly using:

a) Units of Red Blood Cells, Fresh Frozen Plasma and Platelets stored in the blood bank.
b) Units of Red Blood Cells stored in the blood bank
c) Units of Red Blood Cells and Fresh Frozen Plasma only in selected cases.
d) **Units of whole blood**
e) Units of whole blood and Fresh Frozen Plasma only in selected cases.

2. Today you're the doctor on duty in Emergency Room (ER). There have been bombing raids in the city and casualties are being transported to the hospital. The first patient is a 15 years old female, totally dust covered, GCS 5, anisocoric pupils, HR 70, RR 10 with severe chest retractions, SpO2 70%, BP 60/40, traumatic amputation of her right leg. There are ventilators available so you decide to intubate the patient. The safest induction would be:

a) **Ketamine 1-2mg/kg + Suxamethonium 1 mg/kg i.v**
b) Ketamine 2-3mg/kg + Suxamethonium 1 mg/kg i.v
c) Thiopental 5mg/kg + Suxamethonium 1 mg/kg i.v
d) Thiopental 5mg/kg or Ketamine 1-2mg/kg but avoing suxamethonium as it increasses intracraneal pressure. i.v
e) None of the previous

3. Today you're the doctor on duty in Emergency Room (ER). You are handling a 20 years old patient with a severe asthmatic crisis. He is receiving O2, salbutamol and corticoids but the situation seems not to improve. You know that Ketamine has bronchodilator effect so you try:

a) Ketamine 50 mg i.m
b) Ketamine 0.05 mg/kg i.v bolus
c) Ketamine 2 mg/kg i.v bolus
d) **Ketamine 0.5 - 1 mg/kg i.v bolus**
e) a) and d) are correct

4. For the previous patient, which induction and mainteance of inhalation anaesthesia would be of choice?

a) **Halothane; induction range of 0.5% to 3%; Maintenance 0.5 %-1.5%**
b) Halothane; induction range of 1.5 % to 2%; Maintenance 0.5 %-1.5%
c) Halothane; induction range of 2% to 3%; Maintenance 1%-2%
d) Halothane; induction range of 3% to 4%; Maintenance 0.5%-1.5%
e) Halothane; induction range of 4% to 5%; Maintenance 2%-2.5%

5. Which is the induction dose of pancuronium?

a) **Adults/children: 0.04-0.08 mg/kg i.v**
b) Adults/children: 0.5-1 mg/kg i.v
c) Adults/children: 1.5-2 mg/kg i.v
d) Adults/children: 2.5-3 mg/kg i.v
e) Adults/children: 2-3 mg/kg i.m

Pre-test_knowledge_ PART 2_ pediatrics

1. A two years old toddler (body weight 7 Kg) started with vomiting and non-bloody watery diarrhea 5 days ago. He is now, lethargic and tachypnoeic and presents marasmus, tachycardia (no murmurs), weak pulse, cold extremities, pale mucous membranes and capillary refill time> 3 sec. Blood sugar is not yet available (Please, do not consider the value reported in question n.2).
The best therapy to start with would be:

a. Ringer lactate 20 mL/Kg i.v bolus
b. Dextrose 10% 5 mL/Kg i.v bolus
c. Ringer lactate + Dextrose 5% 15 mL/Kg i.v bolus
d. 0,45% NaCl + Dextrose 5% 15 mL/Kg i.v in 1 hour
e. Normal Saline 15 mL/Kg bolus

2. Same toddler as question n.1. Blood exams show: Hb 7,3 g/dL, glycaemia 56 mg/dL. Spo2 92%.
Which is the next step?

a. Whole blood transfusion 10 mL/Kg i.v
b. Whole blood transfusion 20 mL/Kg i.v
c. Start antibiotics i.v
d. Reassess vital signs
e. C+D

3. You are the only doctor on call in a project based in an African peaceful country. There is only one nurse on duty. A 6 months old baby comes to the hospital unconscious and unresponsive to pain. He presents bulging of anterior fontanelle, nonreactive anisocoric pupils, symmetric breathing with some pulmonary rattles, bradycardia with rhythmic heart sounds and no murmurs. In your health facility, CT scan and mechanical ventilation are not available. The nearest hospital with these diagnostic tools is a 2 hours drive from your place and transport by ambulance has a fee to be payed by the family. The patient's family is wealthy and has its own car.
   What do you do?

   a. Assist the patient and perform endotracheal intubation
   b. Start manually ventilation and explore together with your project coordinator the feasibility of a referral.
   c. Place a nasogastric tube and nasal prongs connected to an oxygen concentrator, give mannitol ev and lie the baby with the head elevated to 30 °. Then, I'll explain to the family the impossibility to treat this kind of condition in our health facility.
   d. After the assessment, I let him go in the family's car to the nearest referral hospital.
   e. None of the previous.

4. South-East Asia. A four years old child with a history of fever, cough and episode of seizure. The mother reports that this is not the first convulsion episode. She is lethargic, moves after painful stimulus and presents pallor of the mucosae. The body temperature is 38.9 °C.
   What has to be done first?

   a. Ask the family for further details about the history of convulsions
   b. Assess the blood sugar
   c. Do the rapid test for malaria
   d. B+C
   e. Give Diazepam intrarectally

5. Burundi. A three years old child complains about chest pain. History of cough and fever (max 39.5 °C) during the last two days. Clinical examination: alert, irritable, pale, dyspnoeic and tachypnoeic, chest and jugular indrawing, tachycardia. Lung exploration: wheezing and crackles at the middle-base of the left lung. Digital clubbing. According to the mother, he receives blood transfusions quite often. Blood exams show an haemoglobin 5 g/dL. He progressively develops bradycardia and bradypnoea. In your facility there is a blood bank and you have also basic tools for intubation (but not mechanical ventilation), iv antibiotics, analgesics, and bronchodilators.
   In this setting and for this kind of illness, which of the following actions should be taken without hesitating?

   a. Blood transfusion
   b. Tracheal intubation
   c. Start analgesics
   d. None of the previous
   e. All the previous

Post-test_Knowledge_ PART 1

CANDIDATE NUMBER

1. A "disaster" can be <u>defined</u> as an event causing widespread human, material, environmental or economic damages which…

   a. always exceeds the ability of the affected community or society to cope using its own resources.

b. never exceeds the ability of the affected community or society to cope using its own resources
c. sometimes exceeds the ability of the affected community or society to cope using its own resources.
d. always require international assistance
e. causes at least 1000 victims

2. The experience gained in the last decades demonstrates that the emergency responses with the best outcomes are those carried out by:
   a. the emergency teams present on site but only if they manage to dig out the victims within 12 h after the event
   b. depends on the type of disaster but usually by international teams
   c. both the emergency teams present on site and international teams because the probability for victims to be rescued alive decreases abruptly after 72 h after the event
   d. the emergency teams present on site rather than international teams because the probability for victims to be rescued alive decreases abruptly 24-48 h after the event
   e. international teams because, in any case, the probability for victims to be rescued alive decreases abruptly 6h after the event

3. Which among the following is NOT a phase of Disaster Management.
   a. evaluation
   b. response
   c. recovery
   d. mitigation
   e. preparedness

4. The main role of OCHA is:
   a. to furnish appropriate technical assistance and, in emergencies, necessary aid upon the request or acceptance of Governments (WHO)
   b. to provide international protection to refugees (UNHCR)
   c. to coordinate in case of disaster or humanitarian emergency and ensure that the relief provided is effective (OCHA)
   d. to advocate for the protection of children's rights, to help meet their basic needs and to expand their opportunities to reach their full potential (UNICEF)
   e. to fight hunger and promote food security, primarily through delivering food to areas affected by emergencies and disasters (WFP).

5. You're the Medical officer on duty in a MSF project in a rural area of Bangladesh. A young peasant is brought to ER by his wife because of confusion and shortness of breath. The patient is very agitated and sweaty, and complaints of blurred vision. The wife tells you that there have been devastating floods this season and they have lost their harvest. They are now in a very difficult economic situation and he was very distressed. The physical exam reveals pinpoint pupils. Vitals: HR 60 BP 100/50. There are no additional tests available. You:
   a. It is likely to be an acute organophosphorus pesticide poisoning so I give bolus of 1–3 mg of atropine. However, if the problem does not solve in few minutes, I should think on another toxidrome
   b. At this stage, there is no way to distinguish between acute poisoning of sulfur mustard agent and organophosphorus pesticide. Therefore I wait to see how signs and symptoms evolve before giving any drug.
   c. The patient has not bradycardia; therefore, there is no indication for drug administration unless the agent causing the syndrome is confirmed. Therefore, I will give supportive medical care to minimize the effects of the exposure
   d. I put on gloves and mask and give bolus of 1–3 mg of atropine; 5 min later, I check whether there is

improvement of the muscarinic signs and symptoms. If no improvement, I give double the original dose of atropine

e. He is depressed and probably drunk. I advise to take some rest and come for a new visit in few days.

6. The Incident Command System (ICS) is a standardized structural design for incident management that is applied by different domains and agencies such as healthcare and law enforcement. It is true that:
   a. should be established when a situation occurs where available resources may be insufficient to meet medical and health care needs
   b. the system is a tool that helps in coordinating all efforts in managing an incident because it follows one standard.
   c. should be maintained until routine operations can be re-established
   d. a), b) and c)
   e. None of the foregoing

7. In prehospital incident management, the team on the site will perform the reconnaissance, downsizing and initial reporting to the EMS control center. Information gathering and reporting shoud be carried out according to the acronym M.E.T.H.A.N.E. Only one among the following informations is not included in the initial report.
   a. confirmation of mass casualty incident
   b. emergency services present and required
   c. hazards present on the spot
   d. access to the scene
   e. **need for activation of extraordinary measures**

8. According to the S.T.A.R.T triage system, a patient with a respiratory rate of 25 br/min and radial pulse present that follows simple commands, should be categorized as:
   a. Green Code (Minor)
   b. Yellow Code (Delayed)
   c. Red code (Immediate)
   d. Black code (Expectant or Deceased)
   e. Only carotid pulse is valid in the S.T.A.R.T triage system

9. One among the following is not a common element in Complex Humanitarian Emergencies.
   a. conflict
   b. civilian population at risk
   c. necessity of intervention
   d. duration of at least 2 years
   e. c) and d)

10. Regarding the Crude Mortality Rate (CMR, n° deaths/10.000 people/day), it is true that:
    a. defines the mortality rate for the selected population regardless of the death cause
    b. an increase is considered the best trigger to define a complex humanitarian emergency
    c. any complex humanitarian emergency will result in an increase in CMR, regardless of its nature
    d. can be used to monitor interventions
    e. All the foregoing

11. Which of the following assertions best defines the concept of Initial Rapid Assessment (IRA)?
    a. It is a rapid assessment (3-5 days) aimed at collecting priority information to decide whether an intervention is needed or not. It includes data on: demographics, mortality and morbidity, nutritional status of the population, water, food, hygiene and sanitation and shelter.

b. It is an assessment aimed at collecting all the information regarding a given population: demographics, mortality and morbidity, nutritional status of the population, water, food, hygiene and sanitation and shelter. As it is very comprehensive it may last several weeks.
c. It is a rapid assessment (3-5 days) aimed at collecting priority information to decide whether an intervention is needed or not. It includes data on: demographics, mortality and morbidity only of under-5 population, nutritional status of the population, water, food, hygiene and sanitation and shelter.
d. It is a rapid assessment based on pre-existing data to decide whether an intervention is needed or not
e. It is a rapid assessment (3-5 days) aimed at collecting data to calculate the crude mortality rate and so decide whether an intervention is needed or not.

12. Measles is still a leading cause of mortality and morbidity for children in Complex emergencies, especially, in refugee camps. Regarding the vaccination against measles is true that:
    a. the main goal of measles vaccination campaigns is to reach a 100% coverage
    b. the target group for a measles vaccination campaign is every children from 6-9 months to 12-15 years regardless of their immunization status
    c. the target group for a measles vaccination campaign is every children from 6-9 months to 12-15 years regardless of their immunization status but only if they have never had the disease.
    d. regardless of age, all those children that have never had the disease should be vaccinated.
    e. a) and b)

13. The provision of save drinking water should always be dealt with the highest priority as water scarcity may be both a public health and a security issue. Regarding water-hygiene and sanitation programs, it is true that:
    a. 15-20 l/p/d allows personal hygiene and clothes washing, and should be therefore considered as the minimum target
    b. as a general rule, water quantity should have priority over quality
    c. transported water tanks or bladders should be considered as a last resort
    d. a) and b)
    e. a), b) and c)

14. Which among the following <u>is not used</u> to assess malnutrition in food and nutrition programs?
    a. Body-Mass Index (BMI)
    b. abdominal circumference
    c. Mid-upper arm circumference (MUAC)
    d. Weight-For-Height (WFH)
    e. bilateral pitting edema

15. As member of the expatriate staff of an international non profit organization you should be aware that in case of incident (e.g killing someone after hitting him with your car) you :
    a. do not have diplomatic protection
    b. may be subject to local laws and civil and/or criminal court
    c. may receive a harder treatment because of your condition of expatriate
    f. a) b) and c)
    d. none of the foregoing

16. You are on your way back to your compound and suddenly run into an improvised check point. Your driver says that this check point was not there before and he has no laissez passer. The best move will be:
    a. turn the car around and go away

b. reduce speed and be prepared to stop if required

c. bribe your way out of danger

d. give immediately your ID card and explain the situation

e. be friendly and polite but never say the truth about the mandate of your organization

17. Mines are normally used to deny access to aroute or postion but can be also placed randomly. Which among the following statements is correct?
    a. speaking to locals may be a good strategy to collect information on mined areas
    b. white coloured areas are usually cleared from mines
    c. when starting a journey, allow time for local traffic to travel the roads before you set off
    d. never drive over anything on the road
    e. all the foregoing are correct

18. In a negotiation approach you should:
    a. be genuine and empathetic and try to put yourself in the other person's position
    b. be authoritarian and make clear since the very beginning that you have the situation under control
    c. not engage into a conversation but go straight to what you want/need
    d. allow the other person to believe that you are impatient so that the situation may solve at the soonest
    e. resort to bribing only as a last resort

19. The best definition of *security incident* is:
    a. An event that constitutes a danger to the physical or mental integrity of staff members and that may affect the organisation's operations
    b. An avent that has three adverse consequences, physical harm, mental harm and operational impact
    c. An avent that constitutes a danger to the organisation's reputation but that if it involves physical harm and/or mental harm then it is called safety incident.
    d. only c)
    e. a) and b)

20. Which are common reactions related to *trauma*:
    a. nightmares, sadness, great sense of humor
    b. social withdrawal, denial, motivation to work.
    c. **disturbed relationships, lack of concentration, anxiety**
    d. hyperarousal, disturbed sleep, nice appetite and good sense of humor
    e. b) and c)

21. Regarding conditions related to *stress:*
    a. it is a process that doesn't happen often and when it does, everyone has the same reactions
    b. benzodiazepines need to be offered to adults and teenagers as a first step
    c. It is the synonym for weakness and vulnerability once people get confused and their coping mechanisms are always affected.
    d. benzodiazepines shouldn't be offered to adults, teenagers and children who don't meet the criteria for mental disorder.
    e. its treatment should be handled only by mental health professionals.

22. The principles of humanitarian action are:
    a. neutrality, impartiality, independence, humility
    b. neutrality, impartiality, independence, humanity
    c. neutrality, equality, independence, humanity

d. neutrality, equality, implication, humanity
e. neutrality, indifference, implication, humility

23. Diarrhoeal disease is one of the most frequent health issues after a disaster, especially, when water sanitation is compromised and food and water get contaminated. Which of the following action/s is/are fundamental to decrease mortality?
    a. administration of empirical antibiotic therapy (flouroquinolones)
    b. provide immunization against Rotavirus in children <5 years of age
    c. re-hydration and administration of Oral Rehydration Solution (ORS) plus Vitamin A and Zinc supplementation
    d. instruct mothers to feed and nurse the children and to recognize the main signs of severe dehydration
    e. C + D

24. It is not a basic principle of successful communication:
    a. being transparent
    b. creating an emotional connection with your audience
    c. building a partnership with the media
    d. paying attention to your body language because it accounts for 75%
    e. all the foregoing are basic principles of successful communication

25. All the following are basic rules of international humanitarian law **except:**
    a. The parties to a conflict must at all times distinguish between the civilian population and combatants in order to spare the civilian population
    b. Neither the parties to the conflict nor members of their armed forces have an unlimited right to choose methods and means of warfare
    c. It is forbidden to kill or wound an adversary who surrenders or who can no longer take part in the fighting.
    d. The red cross or red crescent or red crystal on a white background is the distinctive sign indicating that such persons and objects must be respected
    e. Captured civilians who find themselves under the authority of the adverse party combatants are entitled to respect for their lives, their dignity, their personal rights. acts of violence or reprisal. Captured combatants are neither entitled to exchange news with their families and not receive aid.

Post-test_knowledge_ PART 2_emergency medicine

1. Transfusion is an essential component of the management of life-threatening conditions such as decompensated anaemia or major haemorrhage. However, In low-resource settings blood availability may be restricted. Regarding blood transfusion in LRE, it is true that:
    a. in the field, separate blood components are rarely available and, when necessary, blood transfusions are usually carried out using whole blood.
    b. in LRE, once collected, whole blood is usually separated into two or more components, which are then administered according to the clinical needs
    c. screening for HIV 1 and 2, hepatitis B, hepatitis C and syphilis is mandatory, even in an emergency.
    d. ABO, Rh D grouping and compatibility testing are NOT mandatory
    e. a) and c)

2. Regarding rheumatic disease, which of the following statements is true?

a. is a consequence of upper respiratory tract by Klebsiella Pneumoniae
b. the disease typically develops in one year after a severe single throat infection
c. erythema marginatum is common but uncharacteristic
d. multiple painful joints solve shortly after the acute phase.
e. pancarditis may be a dreadful complication

3. Burns are commonly found in patients involved in armed conflict or victims of domestic accidents. It is false that:

a. gentle scrubbing to remove the loose necrotic tissue is recommended
b. a thin layer of silver sulfadiazine cream will decrease the chance of infection
c. burns greater than 15% in an adults require hospitalization
d. as burns are initially sterile, tetanus prophylaxis is not necessary
e. it is recommended to change the dressing daily (twice daily if possible)

4. Meningitis is one of the most common diseases in developing countries, especially, throughout the so-called "African meningitis belt". Regarding this disease, which of the following statements is true

a. the incidence is especially high during the dry season
b. in babies, classic meningitis symptoms of fever, headache, and neck stiffness may be absent
c. treatment consists on Ceftriaxone (2g/die single dose in adults and 100/mg/kg/day single dose in children)
d. a) and b)
e. a), b) and c) are true

5. Regarding malaria, is true that:

a. severe malaria is generally caused by *P. Ovale*
b. in severe malaria, endovenous quinine dihydrochloride is the treatment of choice
c. if the patient presents with alterated state of consciousness or coma we should think on a different vector-borne disease
d. blood transfusion is contraindicated
e. a) and b)

Post-test_knowledge_ PART 2_anaesthesia

1. Transfusion is an essential component of the management of life-threatening conditions such as decompensated anaemia or major haemorrhage. However, In low-resource settings blood availability may be restricted. Regarding blood transfusion in LRE, it is true that:
   a. In the field, separate blood components are rarely available and, when necessary, blood transfusions are usually carried out using whole blood.
   b. In LRE, once collected, whole blood is usually separated into two or more components, which are then administered according to the clinical needs
   c. Screening for HIV 1 and 2, hepatitis B, hepatitis C and syphilis is mandatory, even in an emergency.
   d. ABO, Rh D grouping and compatibility testing are NOT mandatory
   e. a) and c)

2. In resource constrained areas, Ketamine is considered one of the most useful anaesthetic agents. Which among the following statements regarding this drug is true?

a. after rapid IV injection a self-limited transient apnea may occur
b. is often considered the best choice in the highly unstable haemorragic/hypovolemic patient

c. the IV induction dose is 1 - 2 mg/kg with a maintenance IV dose of 0.5 -1 mg/kg (bolus, every 10-20 min or depending on clinical signs) or 1-3 mg/kg/h (continuous infusion).
d. the IV broncodilatation dose 0.5 - 1 mg/kg
e. all the foregoing

3. Regarding anaesthesia with inhalation agents in LRE:

a. Since there are not specialized devices to measure anesthetic gas levels being inspired and expired, you must rely on clinical signs of general anaesthesia.
b. For Halothane, induction dose is usually within the range of 0.5% to 3% and maintenance varies from 0.5 to 1.5%.
c. For Halothane, induction dose is usually within the range of 3% to 5% and maintenance varies from 2 to 3%.
d. a) and b)
e. a) and c)

4. Regarding the General Anaesthesia Without Intubation (GA-)

a. It is especially recommended in head down position
b. it is recommended as a completely safe method even in the presence of a full stomach
c. it is usually performed with Ketamine as the sole method of anaesthesia and it is widely used without any safeguards of the airway
d. it is reccomended for long interventions
e. this technique is suitable as a universal method of giving anaesthesia for any major surgery, and it is specially reccomended when difficult intubation is anticipated

5. Which among the following is NOT TRUE regarding obstetric emergencies in LRS?

a. anaesthetists operating in humanitarian aid projects handle several and severe complications related to pregnancy
b. preserving the life of the mother might be the goal in spite of the baby's survival
c. the main cause of postpartum haemorrhage is eclampsia.
d. drugs administered to prevent postpartum haemorrhage are: Oxytocin, methylergometrine and misoprostol
e. all the foregoing is false
f.

Post-test_knowledge_ PART 2_ pediatrics

1. Which among the following statements regarding pneumonia in LRE is false?

a. is the number one killer of children younger than 5 years
b. in children aged 2 months to 5 years bacterial infections are the most common cause
c. the diagnosis of pneumonia requires always laboratory tests
d. in children older than 2 months, first-line treatment of simple pneumonia consists on Amoxicillin 30 mg/kg/dose 3x day
e. tuberculosis should be considered if the child has a long history of symptoms and a persistent low-grade fever

2. Which among the following is not a sign of shock?

a. cold hands and feet
b. fast pulse
c. capillary refill < 2 seconds

d. weak or absent pulse
e. c) and d)

3. Regarding septic shock it is true that:

   a. the antibiotic of choice will most likely be ceftriaxone, especially if the sepsis is of unknown origin.
   b. a presumptive diagnosis of sepsis in LRS settings should never be made based only on the clinical presentation of fever or hypothermia in a severely ill/prostrate child
   c. if the patient is RDT malaria positive, even if a severe bacterial infection is suspected, you should treat first only for malaria e see how the patient responds
   d. fluid management during septic shock includes the administration of 10-mL/kg bolus of RL or NaCl 0.9% only when the liver is NOT enlarged
   e. calcium gluconate should never be administered

4. In order to achieve early identification of children with severe acute malnutrition in the community, trained community health workers and community members should measure the mid-upper arm circumference of infants and children who are 6–59 months of age and examine them for bilateral pitting oedema. Regarding this assertion it is true that:

   a. infants and children who are 6–59 months of age and have a mid-upper arm circumference <150 mm should be immediately referred for full assessment at a treatment centre for the management of severe acute malnutrition but only if a certain degree of bilateral oedema coexist

   b. infants and children who are 6–59 months of age and have a mid-upper arm circumference <175 mm should be immediately referred for full assessment at a treatment centre for the management of severe acute malnutrition.

   c. infants and children who are 6–59 months of age and have a mid-upper arm circumference <150 mm should be immediately referred for full assessment at a treatment centre for the management of severe acute malnutrition except when a bilateral oedema coexist

   d. anthropometric indices are validated only in infants aged >5 years and therefore, malnutrition in younger children should be assessed only with the presence of bilateral oedema.

   e. infants and children who are 6–59 months of age and have a mid-upper arm circumference <115 mm, or who have any degree of bilateral oedema should be immediately referred for full assessment at a treatment centre for the management of severe acute malnutrition

5. In a newborn that is floppy, hypotonic and hyporeactive after birth, all the following actions are correct except:

   a. treating hypothermia
   b. checking glucose. If blood glucose cannot be checked, start presumptive treatment for hypoglycaemia.
   c. in the event of seizures, administering a loading dose of phenobarbital only if hypoglycaemia has been excluded
   d. giving glucose and phenobarbital simultaneously to prevent seizures
   e. all the foregoing are correct

[Appendix 5]

Attitudes questionnaire

CANDIDATE NUMBER _____

I believe that training in **Disaster Medicine** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training in **Incident Management System** is of foremost importance for humanitarian workers.

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training in **Communication** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training in **Resource Management** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training in **Public health and Basics of Infectious Diseases** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training in **Safety and Security** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training in **Ethics and International Humanitarian Law** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training how to improve **Situational Awareness** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training on **Mental Health** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training on **Leadership** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

I believe that training on **how to adapt my specific skills to operate in underserved environments** is of foremost importance for humanitarian workers

STRONGLY AGREE - AGREE - DON'T KNOW - DISAGREE - STRONGLY DISAGREE

[Appendix 6]

Situation Report

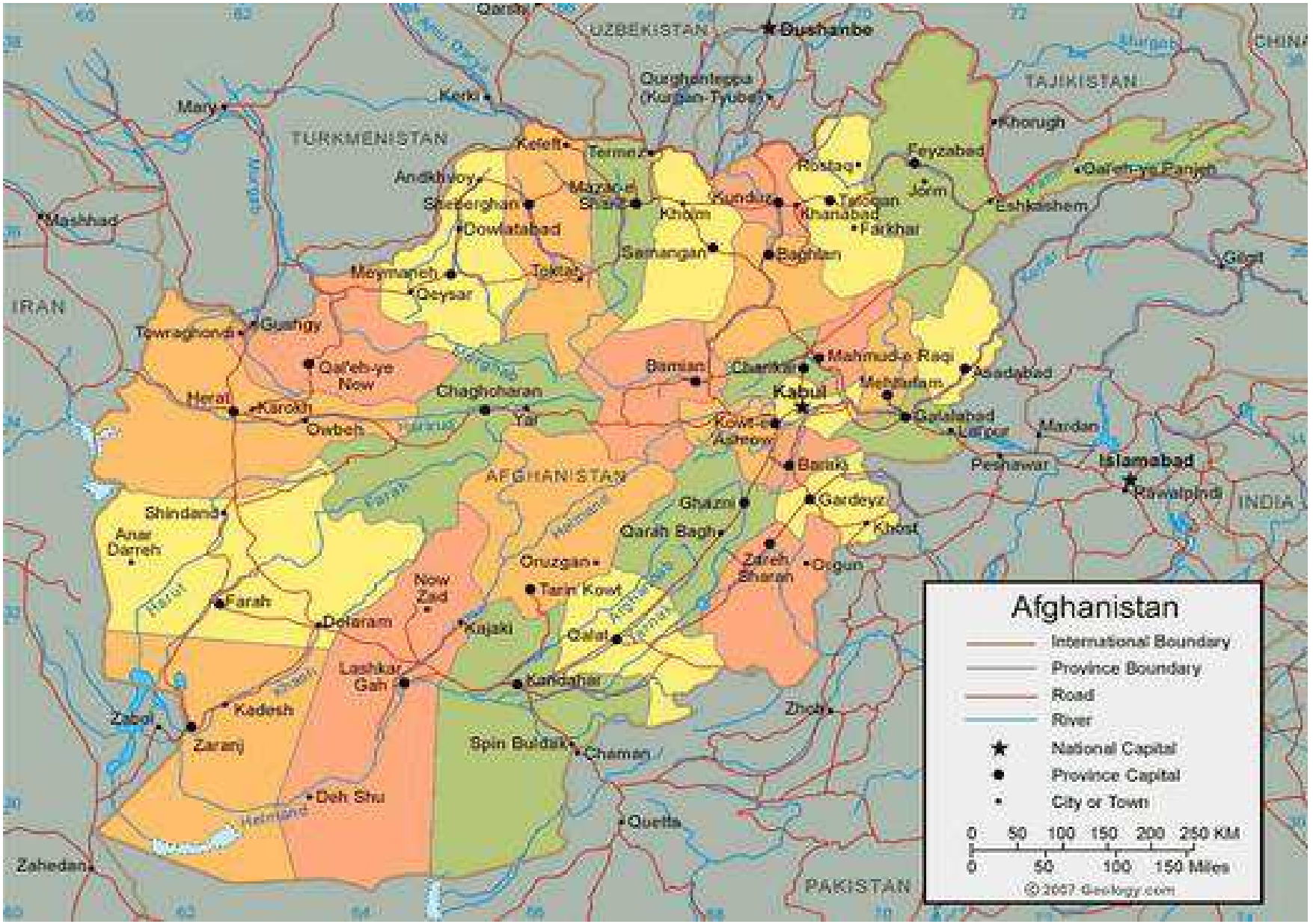
Context: Asymmetric conflict
Country: Afghanistan
City: Khost
Nearest Health facility: Ghazni Governmental Hospital, 150 km (4 h drive): see map.
Religion: Muslims
Language: Pashtun
Project type: Maternity Hospital
Project language: English
Security situation: confinement for expatriate staff; it is not possible to go outside the hospital.
Facilities available:

- 1 Shock room (real)
- 1 Delivery room (virtual)
- 1 In-Patient Department (IPD, virtual)
- Laboratory (virtual)
- Blood Bank (virtual)
- 1 unequipped ambulance (virtual)
- Interrupted electricity supply during the day. Generator during the night.
- Cold and hot running water; taps in every corridor of the hospital (virtual).

Staff available:

- 1 gynecologist (on-call)
- 1rst Anaest-ER doctor (you, on-call)
- 2nd Anaesthesist (on-call)
- 1 midwife: in shock room (present)
- 10 Health staff working in delivery room, IPD, lab…. Additional information regarding training or medical background is not available.

Today you're the doctor on duty; it is Friday (holy day in muslim countries) and you are having lunch with the rest of your colleagues in the expat compound..


Afghanistan
International Boundary
Province Boundary
Road
River
National Capital
Province Capital
City or Town
0 50 100 150 200 250 KM
0 50 100 150 Miles
© 2007 Geology.com
AFGHANISTAN
IRAN
PAKISTAN
TURKMENISTAN
UZBEKISTAN
TAJIKISTAN
INDIA
Dushanbe
Kabul
Islamabad
Rawalpindi
Peshawar
Kandahar
Herat
Mashhad
Quetta
Zahedan

CASE INFORMATION

Case title: Uterine atony in in a resource-constrained emergency room

Educational rationale

Worldwide, postpartum haemorrhage remains the leading cause of pregnancy-related mortality and uterine atony the most common indication for peripartum blood transfusion. The low number of birth attendants and the lack of equipment and appropriate training are at the basis of the disproportionately high rate of maternal death in developing countries.

The management of peripartum hemorrhagic shock in resource-constrained settings requires professionals able to adapt their competencies to the context and display good crisis resource management skills. However, it is worth noting that health staff coming for high-income countries rarely receive specific training before deployment which may endanger patients and result in poor performance and professional frustration.

This scenario is based in a real case occurred during a field mission of one of the authors and has been developed in an attempt to enhance participants awareness on the need to receive proper training before deployment and to evaluate their crisis resource management skills in an unfamiliar and under-equipped environment.

Learning objectives

1. Recognize signs and symptoms of massive bleeding
2. Demonstrate ability to visually and clinically estimate the severity of blood-loss in pregnant women
3. Demonstrate ability to manage hemorrhagic shock in pregnant women in a low-resource setting
4. Demonstrate ability to manage drugs and materials usually available in LRS for anaesthesia/sedation induction according with the clinical situation of the patient;
5. Evaluate and discuss the role of uterotonic agents
6. Recognize the need to promptly call for help
7. Mobilize and use technical and human resources efficiently in an unfamiliar environment
8. Demonstrate team leadership
9. Demonstrate ability to communicate effectively and respectfully with the local staff
10. Demonstrate ability to interact effectively and respectfully in a multicultural environment
11. Demonstrate situational awareness
12. Demonstrate problem solving skills

Guided Study Questions

- How can the severity of the blood-loss rapidly be assessed by visual and clinical examination?
- Which are the most commonly available uterotonic agents in developing countries?
- Which are the vital sign monitoring devices usually available in LRS?
- Which are the drugs for anaesthesia/sedation induction usually available in LRS?
- Which are most commonly used strategies to prevent or delay intravascular disseminated coagulation (DIC) in LRS?

Assessment instruments

Ottawa Crisis Resource Management Global Rating Scale.

This exercise is intended to test residents' actions when exposed to a series of critical decision points (Table 1);

Time (min)	Patient status	Participant Key Actions (best performance)	Critical points	Cues for missed actions	Cue giver	Teaching points
0 Baseline	▪ Lying supine with blood-stained sheets and massive ongoing bleeding coming out from the vagina. Also a big puddle of blood on the floor. ▪ Received 40 units of oxytocin IM. ▪ 20 G IV cannula placed and infusion of crystalloid running (slow).	▪ Listen to the report of the nurse ▪ Understand the severity of the bleeding		▪ Enhance participant perception on the amount of blood loss	Nurse	▪ Importance of the initial perception of the severity of the case and its chance of rapid evolvement. ▪ Relevance of the visual estimation of the blood loss
0-5 Initial assessment	▪ Conscious, moaning ▪ **Airway**: Patent, no signs of airway obstruction, Thick and short neck. ▪ **Respiratory**: Lungs clear, RR 30/min, SPO_2 93% (low signal). ▪ **Cardiovascular**: Heart sounds normal, HR 130/min, radial pulse weak. ▪ **Abdomen**: Soft and thick, uterus uncontracted ▪ **Renal**: reduced urine output.	▪ Call for help (second anaesthetist and Gynaecologist). ▪ Alert the lab and ask for stored 0 neg blood units, not available then ask for fresh whole blood from donors. Send the relative to the lab for blood typing. ▪ Administer misoprostol. ▪ A-B-C-D assessment. – Use oxygen concentrator – Estimate the severity of hypotension by checking radial pulse. – Place IV cannula (16-14G) into the tibia o humeus – Go ahead with fluid challenge.	▪ Second anaesthesist busy. ▪ No stored 0 neg blood units. ▪ High pressure oxygen not available. ▪ BP cuff only standard size (undersize for obese patients) ▪ Impracticable peripheral venous access ▪ Intraosseous and central venous sets not available.	▪ Emphasize the call for help. ▪ Emphasize the need to get fresh blood. ▪ Propose the relative as donor. ▪ Propose the administration of misoprostol. ▪ Suggest the administration of O2. ▪ Suggest checking radial pulse. ▪ Suggest intraosseous approach.	Nurse	▪ Importance of calling for help ▪ Anticipate the request of blood. In poor health systems there is a limited availability of stored blood units. ▪ Ask for fresh whole blood from donor and test the relative as potential blood donor (fresh blood from external donors will take at least 30 min). ▪ Use efficiently the uterotonic drugs available. ▪ Building on medical knowledge, radial pulse may be an asset to estimate the severity of the hypotension when BP monitoring is not available. ▪ In case of severe emergencies, in the absence of Intraosseous sets and central venous lines, the intraosseous approach with 16-14G IV cannulas is possible.

5-20 management of severe postpartum hemorrhagic shock	▪ Clinical deterioration ▪ Unstoppable bleeding and uterus uncontracted despite adequate therapy with uterotonics agents. ▪ Manual uterus exploration excludes retained material. ▪ Patient hypothermic. ▪ Indication for laparotomy. ▪ **Airway**: initially patent, vomiting after sedation. ▪ **Respiratory**: SpO2 91% with O2 (low signal). ▪ **Cardiovascular**: Heart sounds normal, HR 150/min, radial pulse absent. ▪ **Abdomen**: Soft and thick, uterus uncontracted. ▪ **Renal**: reduced urine output	▪ Reevaluates the patient and recognizes signs of deterioration (hypothermia and absence of radial pulse). ▪ Choose the correct drugs for sedation/intubation (Diazepam and/or, Ketamine, Suxamethonium) in an unstable patient. ▪ Proceed with intubation when the patient vomits. ▪ Call for extra help even if unqualified; establish efficient communication and manage to get assisted in simple tasks (e.g. covering the patient, getting hot water from the tap, replacing empty infusion bottles, ventilating the patient with ambu bag etc). ▪ Considers coagulopathy prevention with the material and resources available: gloves filled with warm water, draping, iv warm fluids.	▪ Reevaluation of the patient Participant might not be used to Ketamine or Suxamethonium, commonly used in resource constrained settings. . ▪ Vomiting (only if sedation during manual revision of the uterus); need for intubation; need to ventilate the patient. ▪ Lack of qualified personnel to help (nurse and Gyne are scrubbed). ▪ Need to take advantage of additional unprepared human resources. ▪ Absence of blood products, tranexamic acid and recombinant clotting factors.	▪ Ask the participant to reassess the patient's condition (e.g how is the BP?) ▪ Ask the participant to sedate the patient for the procedure (e.g I will need some sedation to do the revision of the uterus) ▪ Suggest the correct drugs to be used in this patient (e.g the previous anaesthesist used Ketamine and it worked well). ▪ Suggest to call for extra help (e.g I will need the nurse to scrub, you have to call for help). ▪ Suggest warming (e.g the patient is so cold and is bleeding a lot!)	Gynaecologist	▪ Use of available resources at their best.. ▪ Communicate efficiently with local staff. ▪ Diazepam, Ketamine and Suxamethonium are widely used in this settings for anesthesia and procedural sedation. ▪ Prevention of coagulopathy. In most low-resource environments, warming through rudimentary methods and fresh whole blood are often the only assets practicable against coagulation disorders.

Therefore, actors would give pre established cues in case that residents failed to recognize key events and/or react accordingly to these events; this will ensure exposure to every critical point in a realistic fashion; for instance, repeating the observation of abnormal vital/clinical signs or suggesting specific actions. According to Kim et al the extent of external support (cues) needed for residents to act determines the final scoring. These cues were defined during the development of the scenario and were discussed for adequacy and realism.

PREPARATION

Monitors required

a. Manual blood pressure monitoring;
b. Pulse oximeter;

Other equipment and drugs required*

- Patient Simulator (we used Gaumard Noelle)
- Equipment
    - 1 Bed
    - 1 Small fridge
    - 1 Drawer wagon
    - 2 small tables
    - 1 OT mobile light
    - 1 IV pole
    - 1 Tray
    - 1 Laryngoscope with blades (1-4)
    - 1 Bougie
    - 1 Ambu bag
    - 1 Foot powered suction
    - 1 Sthetoscope
    - 1 Manual Sphygmomanometer (only standard size)
    - 1 Pulse oximeter
    - 1 Oxygen concentrator
    - 3 Nasal airways
    - Gloves (1 box)
    - 1 Face mask
    - (2 of each) Endotracheal tubes (6,7,8)
    - 6 Standard infusion sets
    - (2 of each) Intravenous (IV) fluids: ringer lactate, normal saline and colloid
    - Sterile and non sterile drapes
    - 20-18-16 G IV cannulas
    - Syringes (5ml, 10 ml)
- Drugs (unlimited amount of)
    - Ketamine
    - Thiopental

- Suxamethonium
- Lidocaine
- Diazepam
- Pethidine
- Morphine
- Misoprostol
- Oxytocin
- Adrenaline
- Atropine
- Bupivacaine
- Hydralazine
- Running hot water

- Others (virtually available):
  - Laboratory
  - Small blood bank (Fresh whole blood takes 30 minutes to be ready)

*for further information on real and virtual resources please see situation report

Supporting Files

- Situation report for participants

Staff required (Figure 1)

- Nurse (Local)
- Gynaecologist (Expatriate)
- Female Relative (Local)
- Midwife (Local)

Simulation script for the nurse

- Wears clothing appropriate to country and dress-code (i.e. niqab for Afghani females).
- Understands English but her speaking is poor. If the participant gives unclear or excessively complex orders she will pretend not to understand,
- Describes the situation and looks very anxious and worried
- Assists the participant with what he/she orders.
- Cue giver during the first 5 minutes of the scenario (Table 1)

Simulation script for the Female Relative

- Wears clothing appropriate to country and dress-code.
- Neither understands nor speaks English.
- She stands by the patient crying and very stressed.

Simulation script for the Gynaecologist.

- He is very bad-tempered and has been long time working in this project.
- The previous ER doctor/anaesthetist had good expertise and they got along very well; he is reluctant to work with young and inexperienced newcomers.
- As soon as he enters the scenario he will want to take the leadership

- Cue giver min 5-min 20*

* the decision to include two cue givers was made to avoid the risk that participants didn't take into consideration the suggestions of the nurse impeding the progression of the scenario.

Simulation script for local midwife:

- Wears clothing appropriate to country and dress-code .
- Neither understands nor speaks English.
- Has poor medical background and will be useful only if the participant manages to be understandable by using signs and clearly showing what he needs (e.g showing her how to ventilate with an ambu bag or how to collect warm water from the taps).

Room/mannequin set up

Human patient simulator is positioned supine on the bed with massive bleeding coming out from the vagina and with a 20G cannula in place with 500 ml normal saline running.

Bed linens blood-stained.

Big blood puddle on the floor.

Local nurse and female relative are present.

Familiarization

As most of our participants have never been previously exposed to a low resource medical environment, a short familiarization with the equipment was considered to be necessary in order to rule out the possibility of a bad performance caused merely by "feeling out of place".

Time Duration

Set-up	15 min
Familiarization	15 min
Preparation	5 min
Simulation	20 min
Debrief	30-45 min

CASE STEM

Today you are the medical officer on-call in a Non-Governamental Organization (NGO) project and receive a call from a local staff member: there is a critically-ill patient in Emergency Room (ER). The person calling is very agitated and hangs up immediately without further explanations. When you reach the ER the nurse present says that the patient was very "sick" and completely blood-stained when she arrived 20 minutes before. The only information that she managed to get from relatives is that she delivered at home approximately 2 hours before. The nurse administered an intramuscular injection of 40 units of oxytocin and called you because the patient is not getting any better. She says that she managed with extreme difficulty to place a 20G IV cannula and started an infusion of 500 ml of normal saline.

Background and briefing information for facilitator or coordinator eyes only

This simulation is designed to evaluate participants' crisis resource management skills during the management of a severe postpartum hemorrhagic shock in a LRE. Also, it aims to enhance participants perception on the challenges posed by underserved health systems and the need to receive further preparation before first deployment.

Before the arrival of the scenario participant the local nurse has already administered the "routine" therapy according to local habits but the patient's condition worsens and the uterus is still uncontracted and actively bleeding. This is the reason to call the medical officer on-call. The participant will enter the scenario at this stage and receive the report from the nurse. After that, he is expected to rapidly assess the basic A-B-C-D and estimate the blood loss. Some difficulties at this step will be: (A) none; (B) give O2 with the oxygen concentrator; (C) the blood pressure cuff is undersized so blood pressure values are not available. He might decide to estimate the severity of the hypotension by checking the radial pulse. Peripheral vein access is impossible due to vasoconstriction. He might decide to place an intra-osseous access using a 14G or 16G cannula into the tibia or humerus and go ahead with the fluid challenge. Next or at the same time he should call expert help: the gynaecologist and secondly the anaesthetist at the soonest (the latter will be busy with another emergency and will not be present in this scenario). Also the participant will have to consider running a basic hemoglobin test and call the lab and ask for stored blood units; in absence of stored blood units, he should ask for whole blood from donors sending the relative to the lab for blood typing and screening, this is a common practice in many resource-constrained environments (according to local practice and policy). He should then optimize the uterotonic therapy with appropriate agents (misoprostol) and consider active warming to prevent coagulopathy. The gynaecologist reports and confirms that the uterus is badly contracted. The gynecologist will then want to perform a bedside ultrasound that does not give evidence of free fluid in the abdomen, consequently he will give indication for a quick manual uterus exploration under sedation in the ER to exclude retained material (the operating theater is busy at the moment with a major trauma). Thus, the nurse and the gyne start to scrub leaving the participant without any assistant. The participant, due to the unavailability of the anesthetist, is expected to manage the procedural sedation of the patient. It is advisable at this that that the participants looks for assistance (e.g calling another member of the local staff).

During the sedation, the patient vomits (if the resident decided to intubate at the previous step this step will be skipped). The participant is expected to do immediate suction, prepare the drugs and proceed with orotracheal intubation in rapid sequence.

The gynaecologist finds several clots in the uterus but no retained placental material, the patient is still bleeding profusely though and general conditions are worsening.

The team should decide to move this patient to the operating theatre for surgical control of the bleeding.

PATIENT DATA, BACKGROUND AND BASELINE STATE

Patient History

An approximately 20 years old obese female presents to the ER with postpartum uterus atony and severe vaginal bleeding. Her medical history is unknown.

Review of Systems

Central nervous system: Conscious, moaning

Cardiovascular: Hypotensive

Pulmonary: Normal

Renal/hepatic: Reduced urine output

Endocrine: Unknown

Coagulation: Unknown

Current Medications and Allergies

Unknown.

Physical Examination

General: Obese

Vital signs: HR 130/min,, SPO_2 93%, afebrile

Airway: Patent, no signs of airway obstruction. Short, thick neck

Lungs: Clear, RR 30/min

Heart: Heart sounds normal, radial pulse weak (absent by the end of the scenario)

Abdomen: Soft and thick abdomen, uterus uncontracted

Laboratory

No data a

[Appendix 7]

SCALA OTTAWA DI VALUTAZIONE GLOBALE DELLA GESTIONE DI RISORSE IN SITUAZIONI DI CRISI ("OTTAWA GRS")

CRITERI DI VALUTAZIONE:

Questa scala di valutazione è volta a verificare le competenze nella gestione delle risorse in situazioni di crisi e nella cura dei pazienti critici. Lo standard di competenza è stato fissato al livello dello specializzando più anziano, cioè del terzo anno con pregressa esperienza in terapia intensiva e nella gestione di crisi, in qualità di medico specializzando. Poiché esiste un requisito base di conoscenze mediche necessarie per gestire efficacemente queste situazioni, anche questo sarà valutato. Tuttavia, il focus della valutazione sarà sulle capacità di gestione della crisi. Le competenze qui descritte comprendono aspetti essenziali della gestione di crisi. Durante le sessioni di scenari simulati, verrà valutata la prestazione in ciascuna area, oltre alla quantità di suggerimenti o indicazioni richiesti durante gli scenari.

Saranno valutati i seguenti criteri

CAPACITÀ DI LEADERSHIP
Mantiene la calma e il controllo durante l'emergenza
Prende decisioni in modo rapido e deciso
Mantiene una visione d'insieme della scena

CONSAPEVOLEZZA DELLA SITUAZIONE
Evita errori di fissazione
Riconsidera e rivaluta la situazione costantemente
Anticipa gli eventi probabili

CAPACITÀ DI COMUNICAZIONE
Comunica in modo conciso ed efficace
Usa la comunicazione diretta, verbale e non verbale
Ascolta i suggerimenti del team

RISOLUZIONE DI PROBLEMI
Approccio "problem-solving" organizzato ed efficiente (ABC…)
Veloce nella implementazione
Considera alternative durante l'emergenza

UTILIZZO DELLE RISORSE
Chiede aiuto in modo adeguato
Utilizza le risorse disponibili in modo appropriato
Assegna la corretta priorità ai compiti

Specializzando #: _____ **Data:** _____

Staff: _____ **Ora:** _____

PERFORMANCE GENERALE

1	2	3	4	5	6	7
Novizio; tutte le capacità richiedono significativo miglioramento		Novizio avanzato; molte capacità richiedono un moderato miglioramento		Competente; la maggior parte delle abilità richiedono modesti miglioramenti		Chiaramente superiore; poche, o nessuna abilità richiede un modesto miglioramento

I. CAPACITÀ DI LEADERSHIP

1	2	3	4	5	6	7
Perde la calma ed il controllo per la maggior parte dell' emergenza; incapace di prendere decisioni precise; non riesce a mantenere una visione di insieme		Perde spesso la calma e il controllo durante l'emergenza; ritarda nel prendere decisioni precise (o necessita suggerimenti); raramente mantiene una prospettiva globale		Mantiene calma e controllo per la maggior parte dell'emergenza; prende decisioni precise con lieve ritardo; in generale, mantiene una buona visione d'insieme		Mantiene calma e controllo per l'intera emergenza; prende decisioni precise al momento giusto e senza ritardo; mantiene una costante visione d'insieme

II. RISOLUZIONE DI PROBLEMI

1	2	3	4	5	6	7
Non riesce a stabilire i corretti passaggi abc senza suggerimenti diretti; usa approccio sequenziale nonostante i suggerimenti; non considera alternative durante l'emergenza		Valutazioni abc incomplete o lente; usa soprattutto approccio sequenziale a meno di suggerimenti; scarsa considera-zione delle alternative		Valutazione abc soddisfacentie senza suggerimenti; usa soprattutto approccio di gestione simultaneo con pochi suggerimenti; considera alcune alternative		Procede velocemente con l'abc senza suggerimenti; usa approccio simultaneo; considera le alternative piu probabili in emergenza

III. CONSAPEVOLEZZA DELLA SITUAZIONE

1	2	3	4	5	6	7
Incorre facilmente in errori di fissazione nonostante ripetuti suggerimenti; sbaglia nel rivalutare e riconsiderare la situazione nonostante ripetuti suggerimenti; non riesce ad anticipare eventi probabili		Evita errori di fissazione solo grazie a suggerimenti; raramente riconsidera e rivaluta la situazione senza suggerimenti; raramente anticipa eventi probabili.		Evita errori di fissazione con minimi suggerimenti; rivaluta e riconsidera la situazione frequentemente con minimi suggerimenti; in generale anticipa eventi probabili		Evita errori di fissazione senza suggerimenti; rivaluta e riconsidera la situazione costantemente senza suggerimenti; anticipa costantemente eventi probabili

IV. UTILIZZO DELLE RISORSE

1	2	3	4	5	6	7
Incapace di utilizzare le risorse e l'equipe in modo efficace; non assegna priorità ai compiti o non chiede aiuto quando necessario nonostante i suggerimenti		Capace di utilizzare le risorse con efficacia minima; capace di dare priorita' ai compiti o di chiedere aiuto solo grazie a suggerimenti		Capace di utilizzare le risorse con efficacia moderata; capace di dare priorita' ai compiti o di chiedere aiuto con suggerimenti minimi		Chiaramente capace di utlizzare le risorse al massimo dell'efficacia; imposta chiaramente le priorità e chiede aiuto in modo appropriato senza suggerimenti

V. CAPACITÀ DI COMUNICAZIONE

1	2	3	4	5	6	7
Non comunica con l'equipe; ignora le comunicazioni dell'equipe; non usa mai la comunicazione diretta verbale/non-verbale		Comunica occasionalemente con l'equipe ma in modo poco chiaro e vago. Occasionalmente ascolta ma raramente interagisce con l'equipe, Raramente usa la comunicazione diretta verbale / non-verbale		Comunica con l'equipe in modo chiaro e conciso per la maggior parte del tempo; ascolta i feedback dal personale; in generale usa la comunicazione diretta verbale/non-verbale		Comunica sempre in modo chiaro e conciso , incoraggia il personale a contribuire con spunti e feedback; usa costantemente la comunicazione diretta verbale/non-verbale

[Appendix 8]

MSF END OF MISSION EVALUATION FORM For staff in categories 3 (supervisors and specialists), 4 (coordinators) or 5 (managers) of the function grid	
First name	**Surname**
Position	**Project / Country**
Period under consideration :	

Analysis of strengths and areas where attention is needed	
STRENGTHS	**AREAS WHERE ATTENTION IS NEEDED**

Observations and conclusions	
Comments of Direct Supervisor	
Comments of Technical Referent	
Name of Direct Manager	

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