DEVELOPMENT OF CLINICAL CASE REPORTS DATABASE TO IMPROVE PREPARATION OF MEDICAL STUDENTS FOR BEDSIDE TEACHING AND CLINICAL PRACTICE

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ABSTRACT

Clinical case reports play an invaluable role in education of medical students, especially in their preparation for bedside teaching. In general, it is because of the real background based on true stories and integration of professionals' experiences involved in strategies used to solve particular clinical case. In addition, the real clinical case reports are often the core and essential part of another teaching methods including problem-based learning, virtual patients etc. The inconsistency in such education materials offered to our students forced us to initiate activities leading to the development of clinical case reports database and to the motivation of our academic clinicians to participate on it and to utilize it in the education process.

INTRODUCTION

Medical education involves various teaching methods and strategies showing students clinical stories and examples based on real patients' health related problems. Even if the evidence-based medicine is considered to be one of the most relevant methods revealing background of systematic research and scientific clinical outputs, individual case reports have still a great potential to increase students' medical knowledge.

Clinical case reports, as the sources of evidence located at the bottom parts of the evidence-based medicine hierarchy [1], represent the rich source of practical knowledge and experiences applicable in any medicine oriented pedagogical process. In general, the clinical case reports are offered as documentation of clinical observations that describe common and rare cases; characteristics of known and unknown diseases; novelty and/or new ideas in medicine; variations in diseases and their combinations; positive and negative effects of interventions; side effects of drugs usage as well as the ways the professionals use to solve particular clinical case, respecting their best recent knowledge.

Because of the absence of general reporting guidelines designed for case reports, the clinicians and teachers report their clinical cases to the students in various heterogeneous forms. These forms can be either electronic or paper based. However, there are efforts to generate guidelines for clinical case reports in specific clinical domains. One of the positive developments in this area is an initiative of international group of experts that developed Case Reports guidelines (CARE guidelines) [2,3]. With the aim to reduce bias, to increase transparency and to provide first outputs of clinically working methods, these guidelines are useful mostly for publication of high-quality clinical cases in scientific journals.

Several medical journals already stopped to publish case reports as for the low citation index and thus negative effect on journal's impact factor [4]. Contemporary studies pointed out the case reports based on guidelines, whether modified or derived from CARE guidelines, have their usefulness and are not rarely cited. Thus, the well-written clinical case reports are again popularly published either in new medical journals or in special supplements, volumes or websites of many prestigious publishers.

Aiming at higher educational level, the reporting of modern clinical cases tends to take the form of narratives to reveal problem solution [5]. However, CARE guidelines can be used to develop framework of clinical case reports for education purpose as well [6]. On the other hand, one have to be aware of broad variety of general and specific objectives in individual clinical disciplines that cannot result in a single case report framework applicable to all clinical cases and domains. Therefore, various protocols and architectures of clinical case reports were published across different clinical disciplines [7, 8] or in biomedical applications [9,10]. Focused on specifics related to particular area such guidelines reflected more or less CARE guidelines [11].

In contrast to the above-mentioned publishing phenomena, and because of the educational background of our work, we had opposite role, where the main task was to design not specific, but rather generalized case report framework to suit as many disciplines as possible while keeping authors a reasonable space for integration of their specifics that vary from case to case. Thus, our primary effort and objective was to specify a common interdisciplinary acceptable framework and to offer it to the authors together with possibilities to modify its elements according to the characteristics of their particular clinical case and to share it through web-based tools as well.

MATERIALS AND METHODS

To develop a clinical case reports database, which will serve medical students as additional source of clinically relevant study materials and which should help them in better preparation for their later real clinical practice, we solved both the methodological and the technological problems. The methodological problem aimed to find a framework of case reports that best fits to the most of the clinical disciplines. To solve the technological problem, we searched for the best way to create, share and maintain the database of clinical case reports that should be available to students anytime and anywhere.

To find the best consensus across various clinical disciplines we studied the forms of case reports presented to our students at individual clinical departments. Not surprisingly, the clinical teachers used a broad scale of options, starting by reading the examination notes in paper-based health records, through PowerPoint presentations and ending with study of the records and laboratory test results stored in clinicians' information systems. However, no one offered comprehensive structured report prepared in compliance with CARE guidelines or similar ones. In addition, no of the reports was available outside of the university network. The discussions followed afterwards and the committee consisting of vice-deans and guarantors reviewed and annotated importance and usefulness of individual sections in these forms of case reports. The conclusion was to use a generalized structure of education aimed case reports as it was already presented in [12] and as it is described in Table 1.

Considering the possibilities of modern technologies and the fact that our teachers presented clinical cases to our students in various heterogeneous forms, including paper based and oral presentations, we decided to concentrate their work in this area to the one unified and online available place. Thanks to the MEFANET network that already brought several interdisciplinary useful educational tools [13,14], we found the solution of this problem in tools used within this network. In addition, we

wanted to maintain the nature of traditional case reports and not to transform them into the simulation or standalone learning management systems, for example, as it was in [15]. Because of the great potential of MEFANET portal platform, we decided to use our local instance of this portal to host repository of our clinical case reports developed for various clinical disciplines. The advantages for teachers include the possibility to use generalized structure of case reports, minimal requirements on their technical skills and many others. On the other hand, the students can find everything in one system and they can study individual clinical cases, together with other types of study materials, wherever and whenever they need. Furthermore, using this way and depending on author's decision, the individual case reports can be shared via MEFANET Central Gate to all students studying at all medical faculties in Czech Republic and Slovakia.

RESULTS

To ensure widest possible impact of our work, to start our project efficiently, to find the best consensus for all disciplines, to address the widest community of clinical teachers and finally to reach continuously growing number of clinical case reports, the management of the faculty organized a meeting with academic clinicians and teachers in September 2017. More than 60 clinicians took part in this meeting and they were informed about ideas and aims of that educational activity. Case Report framework was presented to the participants and consequently it was revised together with opened discussion to prove it is acceptable for academics teaching medical students of our faculty. This also led to elimination of potential confusions and incompleteness of some parts or descriptions. Then, the participants were informed about the Portal of multimedia support in the education of clinical and health care disciplines at Faculty of Medicine at Pavol Jozef Safarik University in Kosice as well as about the ways used to publish clinical case reports on this Portal. The sections of approved case report structure together with sections related to the unique portal presentation are shown in Table 1.

Table 1. Main sections of education-based clinical case reports recommended to be used at faculty's portal

Section number	Section	Description
1	Title	Topic of interest related to the patient, disease, symptoms, interventions etc.
2	Author(s) details	Author(s) name(s) and affiliation to department(s) of medical faculty
3	Medical discipline (s)	Assigned medical discipline(s) related to the problem to be solved
4	Annotation image	Image associated to the problem of presented case report
5	Annotation	Brief introduction to the problem and/or short summary of the case report background
6	Patient's history (anamnesis)	Medical, social and family history, abuses, current health problems and symptoms etc.
7	Laboratory tests	Clinical findings, results of relevant physical examinations, special laboratory tests etc.
8	Imaging methods	Imaging diagnostic methods where applicable, images from modalities used, description of findings and obtained results
9	Diagnosis	Main diagnosis specified according to ICD-10 and resulting from clinical findings and tests, used also to search for similar case reports published at faculty's portal
10	Differential diagnosis	Diagnostic reasoning with all considered diagnoses in patient assessment process
11	Therapy	Therapeutic interventions performed, important dates, treatment administration, prognostic details etc.
12	Discussion and comments	Results of the case, assessment of the results achieved, recent patient's status, strengths of the case, risks and limitations if any, recommendations of relevant literature
13	Keywords	Key elements of the case, used also to search for similar case reports published at faculty's portal
14	Courses	List of associated courses taught at the faculty coursed, used also to search for another education materials and articles related to the course(s) published at faculty's portal

The idea of our initiative was accepted quite positively and most of the participants agreed to participate on first round of case reports development that was opened from 1 October 2017 to 31 December 2017. The first case reports were sent to the redaction within few days after the meeting took place and once the post-meeting discussions were finished. As we expected, the majority of the case reports was prepared in internal medicine, surgery and dental medicine too. The academic clinicians generated several tenths of cases within this three--month period. Sixty-three of them were finished, rearranged to fit the portal's framework and layout and shared to the students by 31 December 2017.

Figure 1 shows the cumulative progress in numbers of clinical case reports shared at the Portal of multimedia support in the education of clinical and health care disciplines at Faculty of Medicine at Pavol Jozef Safarik University in Kosice during fourth quarter of 2017.

Figure 2 shows an example of clinical case reports published at the Portal of multimedia support in the education of clinical and health care disciplines at Faculty of Medicine at Pavol Jozef Safarik University in Kosice.

The activity to create clinical case reports database at our faculty continues and the authors create new and improve their existing cease reports in 2018 too. There were totally 76 case reports finished and published at the Portal by the end of the March 2018. All the case reports are published according to the portal's rules. To ensure the highest quality, guarantors of particular clinical disciplines review the content of all case reports.

Then, each reviewed case report is labelled by the review logo to allow students recognizing reviewed and unreviewed clinical case reports. The reviewed case reports are automatically sent to the Central Gate of MEFANET portals, thus the students of all medical faculties in Czech Republic and Slovakia can find them in one place and use them in their studies no matter which faculty they are from.

Another added value of our work, as we suppose, is that we expect increased motivation to create case reports for education also in academic clinicians from another medical faculties involved in MEFANET. The motivation can be increased not only because of our pilot round of development, but maybe also because of the first positive students'

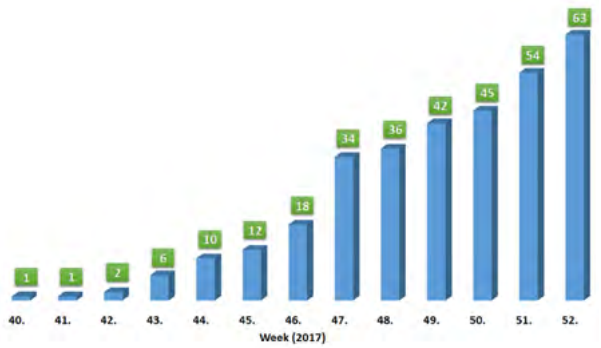

Figure 1. Cumulative number of case reports shared at faculty's portal during first round of the project

Figure 2. Example of a clinical case report published at faculty's portal

Figure 3. Total amount of clinical case reports published at portals of individual medical faculties involved in MEFANET by 31 December 2017

feedbacks we noticed after publishing our pilot case reports. The technological requirements already exist as all the faculties already runs their own portals together with functional exports of reviewed materials to the MEFANET Central Gate. Doing so, the contemporary negative, but very challenging situation in sharing of educational case reports (see Figure 3) can be changed and the students will be able to use the database of hundreds if not thousands of clinical case reports in one place.
Conclusions

Our primary goal was to initiate development of clinical case reports database covering various clinical branches that will be offered to medical students with the aim to support clinical education process. Even if the scientific impact of clinical reports is considered as very low, we suggest the critical thinking of medical students can be improved thanks to the combination of high-quality clinical case reports, other traditional and electronic education methods used at the faculty and clinical bedside teaching. Except of others, the benefits for medical students included access to the valuable clinical experiences. Prior to the clinical practice, the students are able to study how the theory interacts with practical skills in particular patient's problems. Studying common as well as rare clinical cases helps students to improve critical thinking and thus to minimize later clinical failures and/or mistakes in their real clinical decisions.
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