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Experience with simulation education at the University of the Third Age at JFM CU in Martin

Prevention awareness: the way towards a healthy lifestyle

Analysis of bachelor study programs of nursing at universities of Eastern Slovakia: a pilot study

A new online software tool for pressure ulcer monitoring as an educational instrument for unified nursing assessment in clinical settings

Knowledge and attitudes of Masaryk University medical students towards electroconvulsive therapy (ECT)

Harnessing real world data from wearables and self-monitoring devices: feasibility, confounders and ethical considerations

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PREFACE

The Mefanet Journal (MJ) starts its fourth volume with one review article on mobile health technology and five original research articles on the topics of active aging, nursing and psychiatry – all employing different means of technology-enhanced learning: medical simulation, electronic courses, curriculum analysis, and data-driven education. The journal has an interdisciplinary scope, binding together research from different disciplines and providing readers around the world with high quality peer-reviewed articles on a wide variety of topics related to applications of computer science within medical education. Its mission is to become the premier vehicle for disseminating information about MEdical FAculties NETwork (www.mefanet.cz), which covers all Czech and Slovak medical faculties as well as schools or faculties of health care sciences.

The first two papers of this issue deal with active aging. Zanovitová et al. address the problem of helping people remain independent and active in higher age with the use of simulation-based training facilities employed by a university of third age, whereas Komenda et al. grasp the healthy aging problem by means of lectures adapted to various target groups differing in age and with a complex e-learning course delivered through a learning management system. Kuriplachová et al. deal with nursing study programs and show the necessity to promote innovative teaching methods, individual work by students, as well as to react to rapid changes in technology and legislation. The authors back up their claims with an evidence derived from statistical data. Pokorná et al. focus on pressure ulcers and suggest unified reporting of data to be ensured by nurses. For that purpose, the authors present a ready-to-use software tool suitable for data gathering and reporting. Educational components of the presented system are discussed in detail. Hoříková and Bartoček report on how education improves medical students' attitudes to and knowledge of electroconvulsive therapy - an area that is seemingly researched infrequently. The review article by Barrick et al. identifies the potential benefits that mHealth technologies can provide and concerns with some of the risks to privacy. The final editorial material by Komenda et al. recalls the most important memories from the last 9th year of the MEFANET conference, which took place in Brno at the end of November 2015. The MEFANET conferences have always been providing a vibrant meeting place for delegates from medical and healthcare faculties, computer scientists as well as medical teachers and students from the Czech Republic, Slovakia and other countries. In 2016, the upcoming 10th year of the MEFANET conference (29–30 November – Brno, Czech Republic) will be focused on technology-enhanced learning and teaching in radiology.

I am sure that the readers will benefit from the information in the presented papers and it is my hope that this issue will stimulate further discussion and additional research. I would like to extend my sincere appreciation to the editorial members and reviewers, without whom this issue would not have been possible. I would like to see the whole fourth volume of MJ as another valuable resource for the MEFANET community and a stimulus for further research into the area of medical education science. Readers are encouraged to submit both comments on these articles as well as their own relevant manuscripts.



July 2016
Daniel Schwarz
Editor-in-chief

EXPERIENCE WITH SIMULATION EDUCATION AT THE UNIVERSITY OF THE THIRD AGE AT JFM CU IN MARTIN

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ABSTRACT — Background: Considering current demographic trends in society, education of seniors has become real needs and a challenge for the field of education and training institutions. Universities of the Third Age (UTA) represent one option for senior education allowing them to study various fields at university level. Within UTA studies, the seniors are interested in studying mainly the issues of health and disease, aging and the social and legal issues. Seniors represent a group of students with specific educational needs. In teaching them it is therefore important to choose teaching methods that take account of developmental changes of the period, contain elements of clearness, and provide the space for communication and activity with the use of previous experiences of seniors. In the framework of elderly education at the UTA at Jessenius Faculty of Medicine in Martin (JFM CU) the simulation methods are also used that bring elements of clarity and attractiveness into the teaching and serve to bridge theoretical education and practical training.

Objective: The aim of the study was to determine the UTA senior students' views on the use of simulation models and simulations in education and to find out what is their satisfaction with the training in the Simulation Center at JFM CU in Martin.

Methods: Questionnaire of own construction was used to gather empirical data. The study involved 30 senior students of the third year of studies in the program "Elderly Care", out of which 25 were women and 5 men. The average age of respondents was 67.3 years (SD 5.6).

Results: Within education and training in Simulation Center, the seniors most positively evaluated preparedness, presentation and interpretation of the lecturer (4.96) and the way in which information were administered (4.76). They had the opportunity of hands-on work with the simulation models and practical training of their skills and such experience was evaluated as excellent (4.70). Seniors also acclaimed the opportunity of active discussion with the lecturers and with each other that was also rated to be excellent (4.70). Results of the study proved overall evaluation of teaching and training in the Simulation Center was highly positive (4.80).

Conclusions: Using appropriate educational strategies within senior education at UTA at JFM CU in Martin contributes to formation of the proper attitude to the health of the elderly and healthy aging.

INTRODUCTION

The current demographic trends point to the numerous representation of seniors in the population, and in respect of the development the issue of the active aging concept has become the focus. Active aging is often associated with lifelong learning as well as the education of seniors [1]. Seniors become a specific target group in education with specific educational needs. From a pedagogical perspective, education of

seniors is the process focusing on intentional, i.e. deliberate education in old age and also emphasizing the educational modes of action on the senior population. Educational activities for seniors contribute to their sense of dignity, satisfaction and fulfilment of social needs, the integration of individuals into society, and the easier coping with new tasks and activities. They help to maintain and improve the mental health thus head towards a higher quality of life [2,3].

One of the options by which modern society aims to address the issue of senior education is the establishment of the Universities of the Third Age (UTA). UTA contribute to offsetting deficits in educational background of the elderly, thereby a raise of their social importance and prestige in society will be achieved. These universities belong to the more challenging forms of study that allow seniors to study at university level in various fields [4]. Senior education has gradually become a "standard" service of traditional universities and colleges for the society. There is a growing interest in this type of educational activities of seniors as a consequence of increasing proportion of people of retirement age [5]. Organizational form of UTA is based on the maternal university, using its structure and facilities, and particularly the potential of university lecturers and teachers. Topics suitable for senior education should be based primarily on the needs and interests of seniors themselves. As it has turned out the seniors consistently have the greatest interest in the issues of health and disease, aging and the social and legal issues [5,6].

As a part of the UTA at Jessenius Faculty of Medicine in Martin (JFM CU) education is provided within two study programs – "General Medicine" and "Elderly Care". The aim of these study programs is to get to know ourselves better and deeper in terms of health, to raise awareness about elderly health care, to improve health literacy of the seniors and mastering the critical health situations by the elderly with potential provision of a non-professional assistance after a health problem is recognized.

In teaching them it is therefore important to choose teaching methods that take account of developmental changes of the period, contain elements of clearness, and provide the space for communication and activity with the use of previous experiences of seniors. In teaching the elderly it is important to choose appropriate teaching methods reflecting the specific features of the audience – the seniors, thus benefit from the correct didactic methods with respect to the developmental changes that are brought around by physiological

aging [7,8]. In the education of seniors it is also appropriate to use teaching methods that contain elements of clearness, motivate them and provide the space for communication and activity with the use of previous experiences of seniors [9]. In the framework of elderly education at the UTA at JFM CU in Martin the simulation methods are also used that bring elements of clarity and attractiveness into the teaching and serve to bridge theoretical education and practical training. In medical education, simulation is a teaching method by which a clinical experience is established through interactive activities in a safe environment that is conducive to learning without fear of personal failure or injuring the patient [10,11]. Simulation is teaching strategies in nurses' education, which is identified as very effective and efficient method [12]. Simulations of various critical health situations and practical training of appropriate techniques to solve health problems help the seniors in development of critical thinking, making the decisions, and self-confidence and to improve health literacy. Using appropriate educational strategies within senior education at the UTA at JFM CU in Martin contributes to formation of the proper attitude to the health of the elderly and healthy aging.

Several high sophisticated mid-fidelity and high-fidelity models and different specialized models and simulators for training the medical and healthcare skills and procedures are available for the purposes of practical training of students [13,14]. Within practical education and training at the Simulation Center the seniors of UTA at JFM CU in Martin had opportunity to use the models for application of subcutaneous and intramuscular injections, model for taking venous blood samples (Figure 1), cardiopulmonary auscultation simulator Harvey (Figure 2) and simulators of adult and a child to practice basic and advanced first aid.

The study aimed to determine the UTA senior students' views on the use of simulation models and simulations in education and to find out what is their satisfaction with the training in the Simulation Center at JFM CU in Martin.



FIGURE 1. A model for taking blood venous sample



FIGURE 2. Cardiopulmonary auscultation simulator Harvey

METHODS

The survey was conducted lecturers from UTA in collaboration with the professional staff of the Simulation Center, who wanted to get feedback on ongoing learning UTA at JFM CU in Martin in the study program "Elderly Care". It was a quantitative cross-sectional study.

Questionnaire of own construction was used to gather empirical data among students of the UTA after completion of the course in the winter semester. The questionnaires contained 10 items in total, the content of which was oriented on pedagogical skills of the lecturer, technical and didactic support for the teaching (teaching aids), scheduling of the teaching and respondents' subjective assessment of knowledge and skills acquired on a given topic of practical training during a course. As for demographic data, the age, gender, level of education, and social status of the UTA students were assessed. For each item, respondents marked one of the options with which they identified most closely. Responses for each item were made on a 5-point Likert type scale (5 - excellently; 4 - very well; 3 - well; 2 - satisfactory, 1 - unsatisfactory). Filling out the questionnaire took about 15 minutes.

Sampling of the respondents was intentional. The inclusion criteria were willingness to cooperate (filling out the questionnaire), and respondent had to participate in practical training within the UTA.

For evaluation of empirical data we used program Microsoft Excel 2010. Descriptive statistics was used for evaluation of empirical data - absolute numbers (n), the relative numbers (%), mean (M), and standard deviation (SD) were calculated.

RESULTS

The sample consisted of the UTA senior students from the 3rd year of the study program "Elderly Care". The average age of respondents was 67.3 years ($SD = 5.6$). In a sample of 30 respondents there were 25 women and 5 men. Sixteen respondents had

completed secondary education and 14 respondents were university graduates. Of the total sample, two were of working age.

Table 1 presents the results of evaluation of lecturers' teaching skills, the course and material and didactic arrangement of education at the Simulation Center at JFM CU in Martin.

The seniors very positively evaluated preparedness, presentation and interpretation of the lecturer (4.96) and the way in which new information were administered (4.76). Respondents indicated that simulators and simulation models were clearly and easy visible for them (4.66) and lecturer was heard excellently (4.70). Seniors had the opportunity of hands-on work with the simulation models and practical training of their skills and this experience was evaluated as excellent (4.70) by them. They actively discussed with the lecturers and with each other that was also rated to be excellent (4.70). Results of the study proved overall evaluation of teaching and training in the Simulation Center was highly positive (4.80).

All respondents accepted and acclaimed the time when simulation training was conducted at the Simulation Center as well as its duration (120 min.). Two respondents would welcome even longer training.

Respondents expressed requests for the opportunity to attend lectures and practical training courses together with the students of full time studies (nursing, medicine). Only three respondents reported they are not interested in such an offer from the faculty.

DISCUSSION

Within the classes held in the Simulation Center, the seniors very positively evaluated preparedness, presentation and interpretation of the lecturer and the way in which new information were administered. Lecturers involved in the education of seniors have to be fully aware of the specifics of education of this age group and implement them into the educational process. In that case lecturer cannot act only as an informant or an expert who conveys information, but should act more

TABLE 1. Evaluation of lecturers' teaching skills, the course and arrangement of education

| Evaluated items | M* | SD |
|---|------|------|
| Pedagogical skills, preparedness, presentation and interpretation of the lecturer | 4.96 | 0.18 |
| Route of administration of new information on a given topic | 4.76 | 0.50 |
| Lecture / explanation I've heard | 4.70 | 0.53 |
| Lecturers and simulation models I've seen | 4.66 | 0.54 |
| The possibility of practical training on the simulation model | 4.70 | 0.65 |
| An opportunity to discuss presented topic / issue | 4.70 | 0.53 |
| Subjective assessment of knowledge and skills acquired during the course | 4.60 | 0.62 |
| Overall evaluation of education in the Simulation Center | 4.80 | 0.48 |

SD - standard deviation, M - mean, * 5-point Likert type scale used: 5 - excellently; 4 - very well; 3 - well; 2 - satisfactory, 1 - unsatisfactory

like a facilitator who supports and facilitates learning of the students [15]. Lecturer must be fully competent in the clinical situations and for them is very important to study literature oriented on simulation teaching [13]. In teaching the seniors lecturer must take into account the specific needs and requirements of the age group, often related to physical, psychological and social changes brought by senior age. For example, visual and aural problems are common among senior students, which may pose a barrier to the education of seniors. Prior the classes, lecturers had prepared the room in the Simulation Center in terms of material and didactic aids and ensured senior students could be close enough to the simulation models and the lectures. Namely, the chairs were placed in a semicircle, the space around the simulation models was arranged to be large enough for seniors to move around freely and safely, appropriate and adequate lighting was ensured and fall risk factors were eliminated (e.g. cords and cables on the floor). The lecturers had been provided with the microphone during presentation of the topic / issue.

Seniors had the opportunity of hands-on work with the simulation models and practical training of their skills during their lessons in the Simulation Center. Such experience was evaluated as excellent by them. From a didactic point of view, discussion included to the presentation of each topic / issue in addition to lectures and practical skills training. In the discussion seniors used previous experience and knowledge, and tried to think critically about situations simulated and to evaluate them.

In educating seniors, simulation methods are suitable as they cover not only the transfer of theoretical knowledge and information, clarification of concepts and theories, but in particular they can also motivate the students, mobilize and activate them, respect their individuality and specific learning styles and enhance critical thinking skills [15]. Our experience of the use of simulation methods in the group of the UTA senior students at JFM CU in Martin is highly positive, as evidenced by positive evaluation of lecturers' teaching skills, the course and material and didactic arrangement of education at the Simulation Center. Results of the study proved overall evaluation of teaching and training in the Simulation Center was highly positive and respondents positively evaluated lecturers' teaching skills, the course and material and didactic arrangement of education.

Within evaluation of education the seniors should express themselves also on the issue of intergenerational learning. Respondents would welcome such an opportunity and have expressed their interest in the possibility to attend some lectures with students of full-time studies (4.30 – rather yes). Respondents agreed students of full-time studies can participate in selected lectures of the UTA studies together with them (3.87 – rather yes). Intergenerational learning is

defined as the reciprocal learning relationships and interactions between young people and seniors [16]. In the framework of senior education at the UTA held at JFM CU in Martin the possibility of such a form of learning can be considered including simulation education. In the process of teaching the students of study programs general medicine and nursing the UTA senior students can act directly as a source of information to create case reports or clinical case studies and scenarios describing certain specific situations in the lives of seniors. At the same time in the case of their interest and willingness they can be a "model" to describe and demonstrate individual perception of any particular specific (e.g. health related) situation in their life and also the way to cope with it after the discharge from institutional care. The process of such an interaction of nursing students and senior citizens is established in the education at the University of Salford in the UK, where there is a group of seniors, their significant others and primary caregivers to cooperate with, the so-called Service Users and Carers Group. Within such an interaction the seniors' needs to be accepted and appreciated as well as the need of self-realization are saturated. On the part of nursing students it supports their attitude to elderly generation in terms of intergenerational tolerance and solidarity and their learning with the use of alternative, experiential teaching methods, with the possibility of confrontation of theoretical knowledge with real practice, the situation or real experience of seniors [17].

LIMITATION OF THE STUDY

Our research study has several limitations as are number of study sample and inclusion criteria, thus our findings cannot be generalized. Due to the special topic which is solved, we suppose that report similar like it has not been published in Slovak Republic.

CONCLUSION

At present, the seniors have the option to generate new information quite easily through the availability of information and communication technologies, but the problem may arise in relation to their ability to understand that information, sort them and critically reflect them, therefore not consider them automatically as obvious and true. The process of effective education of the elderly should therefore be active with the use of activating educational methods, since learning of seniors is based on their own experience reflected and experience of others shared [15].

Using appropriate educational strategies within senior education at UTA at JFM CU in Martin contributes to formation of the proper attitude to the health of the elderly and healthy aging.

Mária Zanovitová

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CONFLICT OF INTEREST

At the beginning of the questionnaire, the respondents were informed about the study aim. Anonymity and voluntary nature of study participation were respected. Authors of the report are not aware of any conflict of interest. The authors declare the study has no conflict of interest.

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PREVENTION AWARENESS: THE WAY TOWARDS A HEALTHY LIFESTYLE

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ABSTRACT — Background: Until recently, the notion of ageing was associated with older age, and only a few years ago new findings have come to light, shifting the start of ageing back to the age of late adulthood, and then gradually to younger age categories. At the same time, the possibility of prevention of main factors influencing the overall condition and independence of older people has been shown.

Objective/Purpose: The aim of the work is to ascertain the level of knowledge of various age groups of the population and possibilities for the prevention of older-age pathologies, to map certain lifestyle aspects of the current young generation, to provide groups of individuals from different age categories with information associated with this matter, to support the effectiveness of remembering through personal experience.

Material and methods: A diverse group of listeners (pupils, adolescents, adults, younger senior citizens) was familiarised with the subject through age-adapted lectures. Moreover, in order to address the diverse needs of the target population, we decided to use two primary distance learning dissemination channels, which have been accepted into mainstream education.

Results: A total of 1,463 probands from different age categories participated in the project. The results showed a low awareness of the necessity of lifelong prevention of atherosclerosis and osteoporosis, low levels of physical activity and short time spent outdoors among the project participants. Electronic support of the project outcomes was published in the form of a comprehensive e-learning course, and a web portal describing the prevention of older-age pathologies is available.

Conclusion: The education effectiveness was proved by the increase of correct answers immediately after the education, and after 2–3 months as well. The results confirmed our previous assumption of a low level of awareness among the population of the necessity of lifelong prevention of atherosclerosis and osteoporosis. Nevertheless, effectiveness of the education event was confirmed by an increase in the number of correct answers in tests performed immediately after the education.

INTRODUCTION

Until recently the notion of ageing was associated with older age, and only a few years ago new findings have come to light, shifting the start of ageing back to the age of late adulthood and then gradually to younger age categories. The fact that certain processes of tissue wear and damage develop from the adolescent and younger adult age is insufficiently well known to and accepted by the general public. The most significant long-term risk factors currently involve high blood pressure, high levels of fats and sugar in the blood, damage to and wear of joint cartilage, incorrect remodelling of bone tissue, loss of function

of muscles of the limbs and pelvic floor, and damage to nerve cells. Preventive measures usually involve certain restrictions and necessary activities different from the currently prevailing lifestyle, which typically involves surplus energy intake and low levels of activity. Increasing the awareness of these issues among different target groups, particularly the adolescents, and enhancing their motivation to adhere to principles of healthy lifestyle in the long term, proves to be a challenge. With the proper use of modern information and communication technologies for educational purposes, we are able to effectively disseminate these findings to the general public.

POSSIBILITIES OF PREVENTION

Metabolic syndrome

Avoiding metabolic syndrome, or the Kaplan's "deadly quartet", means avoiding its individual components, i.e. high blood pressure, high level of sugar in the blood stream, diabetes and obesity. In general terms, increased insulin resistance – i.e. the limited ability of cells to use insulin – is considered to be the basic pathogenic mechanism of the metabolic syndrome. Polygenic inheritance is presumed to be a possible cause; in the general population, however, insulin resistance is undoubtedly of secondary origin, most often caused by an excessive intake and a low output of energy, inappropriate composition of diet, stress, smoking, and certain medicines. The inability to utilise insulin leads to specific changes in the metabolism of lipids, i.e. higher peaks of serum lipid levels after food, retention of water and sodium, reduced ability to synthesise nitric oxide (NO), and activation of the sympathetic nervous system. The described process leads to an accumulated damage to the vascular epithelium and to the acceleration of atherosclerotic processes. It is nowadays known that the clinical correlate – i.e. visible atherosclerotic changes – can be already apparent in the second decade of life. Atherosclerosis affects an alarmingly large proportion of the population, and is the cause of 50% of deaths [1–4].

Osteoporosis and sarcopenia

Osteoporosis affects at least one third of men and a half of women in older age. Two thirds of women can expect the development of osteoporosis after an artificially induced menopause. Osteoporosis represents a serious medical problem resulting in a possible loss of independence after suffering an osteoporotic fracture, and it can also impact the person's social life. As regards prevention, the most important term is the so-called peak bone mass, which is generated in every individual up to the age of 30, and everyone then draws on this stockpile until the end of their life. The lower the generated reserve, the earlier osteoporosis develops. For the formation of bone mass, the level of activity and the intake of protein, calcium and vitamin D are decisive. In this area too, the current lifestyle of the population is very harmful: low levels of activity and less time spent outdoors results in a low exposure to sunlight, which is necessary for the conversion of provitamin D into active vitamin D in the skin. Under normal circumstances, this natural activation represents 80–90% of the body's vitamin D supply. In recent years, there have been repeated warnings of very low levels of vitamin D in all age categories in the countries of the temperate zone [5]. As regards the risk

of development of osteoporosis, individuals with lactose intolerance or with lactose malabsorption represent a very high-risk group due to their low intake of calcium and vitamin D. Incidence of these dysfunctions in the population has not yet been mapped precisely: not every patient with lactose resorption dysfunction has clinical symptoms, and not every patient with clinical symptoms of intolerance has an absorption dysfunction [6–10].

Incontinence

Currently, the most effective known method for the prevention of incontinence is an active maintenance of the muscle tone of the pelvic floor, preferably through a regular, targeted exercise starting after childbirth, and then from the fourth decade of life. But women very rarely stick to the exercises – not only before the first clinical problems arise, but even after they appear. However, data providing an estimate of incontinence in women above the age of 45 indicate that incontinence affects one in five of them, and that there is a significant upward trend [11,12].

Dementia

In the decades to come, the anticipated dementia epidemic will translate into a constant increase in the incidence of all forms of dementia, in particular Alzheimer's dementia (AD), and the numbers may even triple by 2050. At present, pharmacological intervention only improves clinical symptomatology, and only if started in the earliest stage of dementia development. Prevention of possible risk factors of Alzheimer's dementia is therefore essential. Maximum possible physical activity and exercise, unless contraindicated, plays a fundamental role in the prevention of dementia. Intellectual activity and maintenance of social contacts as long as possible plays a similar role in the prevention of cognitive dysfunctions. A healthy lifestyle can influence the development of AD symptoms and slow them down, or even avert the process of progressive mental deterioration [13–17].

Depression

There is an increasing incidence of depression with increasing age: it is estimated that 15% of older people living in their homes and 30% of older people living in institutions suffer from depression. Results of our previous study performed in 2005–2012 among the Czech population of older people living in their homes confirmed that 18.5% of monitored older people suffered from depression. A negative inventory of life events – the most striking being retirement and the loss of social contacts, along with an increasing number of chronic illnesses and declining independence – has a significant impact on the incidence of depression in

older age. The seasonal nature of difficulties is also significant. Maintaining physical activity, targeted and timely finding of activities replacing employment activities, and last but not least, spending time outdoors (with regard to vitamin D supply), has a preventive effect [18–21].

Broad education considering composition of target population

The aim of our study was to ascertain the level of knowledge of various age groups of the population and possibilities for the prevention of older-age pathologies, to map out certain lifestyle aspects of the current young generation, to provide groups of individuals from different age categories with information associated with this matter, to support the effectiveness of remembering through personal experience, and to ascertain the level of remembering immediately after providing the information and later. Another aim in the case of the group of adolescents and younger adults was to help to develop a positive, humanistic approach of the younger generation to older people. In order to address the diverse needs and interests of the target population, we decided to use two primary distance learning dissemination channels, which have been accepted into the mainstream education: (i) a comprehensive e-learning course focused on the domain of geriatrics; (ii) a web-based portal covering selected topics of prevention in terms of ageing.

METHODS

The way in which the subject matter is presented should correspond to age of the audience. In the introduction of any education event, key terms must be defined. In this case, key terms involved peak bone age, bone architecture, bone construction, vitamin D, lifestyle, nutrition, ageing, the processes associated with ageing, etc. The explanation of the subject matter should be diverse and adapted to the individual. An active educational event should be supported by a factor constituting the conditions for permanent retention of the knowledge gained, for example a meaningful understanding, complemented with a practical illustration, active discussion or personal experience. We simulated the ankle stiffness by reinforced elbow and knee tapes, the hyperkyphosis of thoracic spine by vest with plastic construction and chest compressing belts, the muscle weakness by bracelets with weight. For simulation of sensoric deficits we used glasses with a restriction of the visual field and blurring and ear pads. We used cotton gloves to allow the experience of limited skin perception and its influence to take medications correctly – for example. Effectiveness of the learning process should be verified on an ongoing basis, preferably in the form of self-evaluation through a feedback questionnaire.

Pedagogical fundamentals of educational events

A group of 20–30 listeners was familiarised with the subject matter through age-adapted lectures. In total, more than 50 face-to-face sessions were organized across groups from different age categories in the South Moravian region. The lectures have been supported by the official project website together with e-learning course, which provide complete background including distance learning agenda describing the prevention of older-age pathologies. In case of pupils and adolescents, the lecture emphasized particularly osteoporosis and atherosclerosis; in case of adults and younger senior citizens, the lecture provided basic information about metabolic syndrome, dementia, depression, incontinence, and possibilities of prevention. Before the start of each lecture, the audience answered the following questionnaire associated with the given matter. Moreover, the practical part of educational activities (i.e. the experience) was realized via models of old age, which we developed as authors in cooperation with an external company, under the contractual arrangement provided by the Technology Transfer Office (TTO) of the Masaryk University.

1. What is osteoporosis?

- softening of the bones
- **thinning of the bones and increased brittleness of bones**
- increased bone density

2. From what age is it possible to influence the development of osteoporosis most effectively?

- **from 10–20 years of age**
- from 30–40 years of age
- from 50–60 years of age
- from 60–70 years of age

3. What function does calcium have in the human body?

- contraction of muscle fibre
- building of bones
- coagulability of blood
- **all of the above**

4. Which food is the richest in calcium?

- milk
- hard cheese
- **poppy seed**
- legumes

5. What is atherosclerosis?

- a disease causing cerebral stroke
- a disease causing heart attack
- a disease resulting in amputation of the leg
- a disease damaging the arterial epithelium
- **all of the above**

6. When does atherosclerosis start?

- from the age of 10
- from the age of 30
- from the age of 50
- from the age of 70

7. Smoking and atherosclerosis

- smoking accelerates atherosclerosis
- smoking slows down atherosclerosis
- smoking has no impact on the development of atherosclerosis

At the end of the lecture, the audience was invited to answer the same questions. Subsequently, the participants underwent training in the form of a competition/game using simulation models of ageing syndromes – hearing and sight dysfunctions, stiffening of the joints, curvature of the spine, reduction in hand sensitivity and dexterity. All participants were asked how much time they spend outdoors; levels of smoking were ascertained among students and adults. At the end of the lecture, students of the Faculty of Education were asked if they felt that they themselves had been influenced by the facts given in the lecture, and whether they would include the given matter in their future teaching. After two to three months, pupils of primary and secondary schools were asked to fill in questionnaires ascertaining the extent to which they had retained their knowledge, as well as changes in their attitude and behaviour since the time when the seminar was held. The results of testing were processed using the common methods of descriptive statistics and also using the McNemar's test and Fisher's exact test.

Theoretical fundamentals of e-learning strategy

The implementation of educational materials introducing the prevention requires an understanding of the impact of information and communication technology on the target population and on current teaching and learning practices in order to identify critical success factors that have to be addressed in an e-learning strategy [22]. The e-learning domain emphasises the role of the technology in providing content (information), delivery (access) and electronic services. We paid attention to educational issues such as the appropriate form of online instructional design and the creation of online learning communities. Based on that, we have implemented a modular online course in the local learning management system of the Masaryk University, meeting requirements and needs of the target audience. The course structure includes a plurality of structural elements and one or more relations that indicate dependence between individual structural elements. It defines a basic learning objective and serves the educational content with multimedia

files including a self-assessment agenda. The audience can freely visit the course of geriatrics without any access restrictions. In addition to e-learning, we designed and implemented a web-based portal, which combines a modern web design with static and interactive elements and provides a clear and crucial information about the prevention of main factors influencing the overall condition and independence of older people.

RESULTS

Educational events

A total of 1,463 participants followed the lecture (see Figure 1): the largest group (1,259 respondents) consisted of pupils of the final year of primary schools (PS) and pupils of secondary schools (SS), ranging from 12 to 18 years of age. Another group consisted of 69 students of the Faculty of Education (U), ranging from 20 to 26 years of age; the adult (employee) group included 78 respondents ranging from 27 to 55 years of age; and finally, the older age group consisted of 57 respondents ranging from 64 to 83 years of age. The representation of men and women in the individual categories varied, but over the entire set, the ratio was 41% men to 59% women. The evaluation of answers to the introductory test questions is shown in the Supplementary Table 1.

As expected, listening to the lecture had the greatest impact on the correctness of questions about the start of the first manifestations of atherosclerosis and the start of prevention of osteoporosis: the number of correct answers to these two questions increased by dozens of percent in all groups. The definition of osteoporosis did not represent a problem before the lecture in any group, apart from 16% of participants in the youngest age category. In contrast, less than a half of all participants in all age categories managed to choose the correct manifestations of atherosclerosis before the lecture; after the lecture, the number of correct answers had increased to a satisfying range of 57–86%. In order to verify the effect of the lecture and the comprehensibility of test questions in the youngest age category, i.e. in the group of pupils of primary and secondary schools, there was an evaluation of the type of change of question; the results are also shown in the Supplementary Table 1.

The short-term and long-term effectiveness of the lecture was evaluated through specific questions directed to individual age categories. Immediately after the lecture, students of the Faculty of Education were asked whether they felt they had been influenced by the provided information, whether they would change certain aspects of their lifestyle and whether they would include the newly acquired information in the teaching for their future pupils. Table 1 shows the distribution of answers.

TABLE 1. Evaluation of feedback provided by students of the Faculty of Education

| Question | | Yes | No |
|---|--|-------------|------------|
| Did the lecture make you think about your own habits? N = 171 | | 155 (90.6%) | 16 (9.4%) |
| If the lecture made you think about your own habits, do you intend to change any of them? N = 155 | | 126 (80.3%) | 31 (19.7%) |
| Do you think that you will include a similar topic in the teaching of your future pupils? N = 147 | | 141 (95.9%) | 6 (4.1%) |

TABLE 2. Number and percentage representation of correct answers before and after the lecture (according to groups)

| Question | Lecture (N = 1463) | PS/SS ^{*.1} | P ² | U ¹ | P ² | Employees | P ² | Seniors | P ² | Groups P ³ |
|---|-----------------------|----------------------|----------------|----------------|----------------|---------------|----------------|---------------|----------------|--------------------------|
| What is osteoporosis? | before | 870 (74,9%) | <0,001 | 66 (97,1%) | 0,500 | 70 (90,9%) | 0,070 | 55 (96,5%) | 1,000 | <0,001 |
| | after | 976 (88,7%) | | 68 (100,0%) | | 75 (98,7%) | | 54 (96,4%) | | |
| From what age is it possible to influence the development of osteoporosis most effectively? | before | 337 (29,3%) | <0,001 | 40 (58,8%) | 0,007 | 31 (40,8%) | <0,001 | 34 (61,8%) | 0,001 | 0,002 |
| | after | 680 (62,4%) | | 53 (77,9%) | | 62 (80,5%) | | 50 (89,3%) | | |
| What function does calcium have in the human body? | before | 77 (6,6%) | <0,001 | 14 (20,6%) | 0,219 | 6 (7,9%) | <0,001 | 4 (7,3%) | 0,022 | <0,001 |
| | after | 373 (35,6%) | | 18 (26,5%) | | 25 (32,9%) | | 13 (24,1%) | | |
| Which food has most calcium? | before | 97 (8,2%) | <0,001 | 25 (36,8%) | <0,001 | 29 (38,2%) | <0,001 | 7 (12,7%) | <0,001 | <0,001 |
| | after | 987 (86,8%) | | 65 (94,2%) | | 71 (93,4%) | | 48 (85,7%) | | |
| What is arteriosclerosis? | before | 189 (16,5%) | <0,001 | 28 (41,2%) | <0,001 | 27 (38,0%) | <0,001 | 27 (47,4%) | 0,146 | <0,001 |
| | after | 621 (57,5%) | | 53 (79,1%) | | 64 (86,5%) | | 31 (56,4%) | | |
| When does arteriosclerosis start? | before | 151 (13,0%) | <0,001 | 16 (23,5%) | <0,001 | 8 (11,6%) | <0,001 | 11 (19,3%) | <0,001 | 0,108 |
| | after | 881 (79,9%) | | 62 (89,9%) | | 50 (67,6%) | | 43 (76,8%) | | |
| Smoking and arteriosclerosis | before | 940 (82,1%) | <0,001 | 69 (100,0%) | <0,001 | 65 (94,2%) | 0,250 | 51 (92,7%) | 0,250 | 0,010 |
| | after | 952 (92,9%) | | 66 (100,0%) | | 73 (98,6%) | | 55 (98,2%) | | |

^{*} Primary schools / secondary schools¹ Total count and percentage representation² McNemar test³ Fischer exact test**TABLE 3.** Feedback of influencing presented by the pupils of primary and secondary schools 2 to 3 months after listening to the lecture

| Answer | Number of selection ¹ (N = 295) |
|---|--|
| The experience of simulating old age has helped me understand the process of ageing and older people in general | 134 (45.4%) |
| I do at least 40 minutes of physical activity each day (recommendation of 10,000 steps each day = 7 km) | 105 (35.6%) |
| I try to have a balanced energy intake - I do not overeat | 91 (30.8%) |
| I pay attention to sun exposure in order to get enough vitamin D (at least 2 hours per week) | 40 (13.6%) |
| Trying to make a change is pointless because "there is no cure for age", as wise people say | 28 (9.5%) |
| I was not interested by the activities because these are for old people and have nothing to do with me | 18 (6.1%) |

¹ Total count and percentage representation, multiple choice form

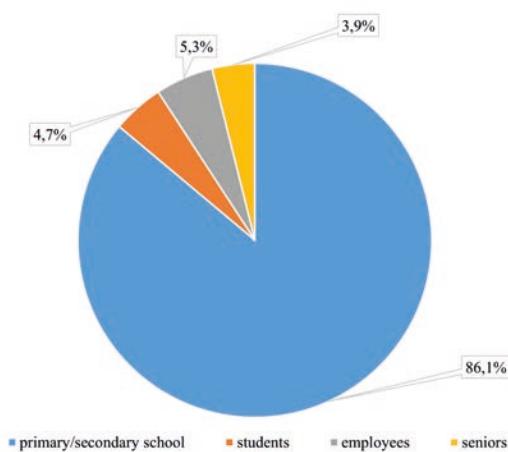


FIGURE 1. The distribution of target audience

Two to three months after the lecture, one quarter of the participants of the youngest age category ($N = 299$) were called on to answer the same questions as they were given before the lecture and immediately after, in order to ascertain the long-term effect of the educational event. Table 2 shows principal results of the study. Figure 2 shows the distribution of number of correct answers. Unfortunately, we are not able to link data from questionnaires before lectures and after 2 to 3 months, so the results are not shown for the same group of participants (n value is different).

In addition, this group of pupils from primary and secondary school filled in questionnaires ascertaining the level of their experienced influence in the area of lifestyle, intergenerational coexistence, and the overall view of the issue of ageing 2 to 3 months after listening to the lecture. Table 3 shows the distribution of answers.

E-learning

A sophisticated e-learning course on geriatrics [23] was developed within the presented project, in order to meet the target of making the information available for the largest target group possible. Publishing this reviewed e-learning course on the educational portal MEFANET [24] guaranteed that the project would make an impact far beyond the Masaryk University. The MEFANET platform makes it possible for students and teachers across all medical faculties in the Czech Republic and Slovakia to share educational materials easily and clearly, based on the horizontal accessibility and without any limitations. Apart from students, individuals from the general public can take the course at any time; the only limitation is the absence of tutor during their study. The course itself provides comprehensive information on selected chapters from geriatrics, based on an appropriately chosen combination of static educational texts, continuous testing, and multimedia elements. Figure 3 shows the interactive synopsis of one part of the course, which deals with the issue of sarcopenia, i.e. the loss of muscle tissue.

A web portal developed by the Department of Internal Medicine, Geriatrics and Practical Medicine (DIMGPL) [25] is available for individuals from general public who look for information on preventive measures (see Figure 4). Several dedicated chapters to key areas of prevention and healthy ageing are available for the public. Apart from texts, the portal also involves a set of educational presentations, which are available in the regimen of interactive viewing directly in the web browser, including the option of downloading or printing the material. Last but not least, the portal also involves photo galleries from educational events in individual schools.

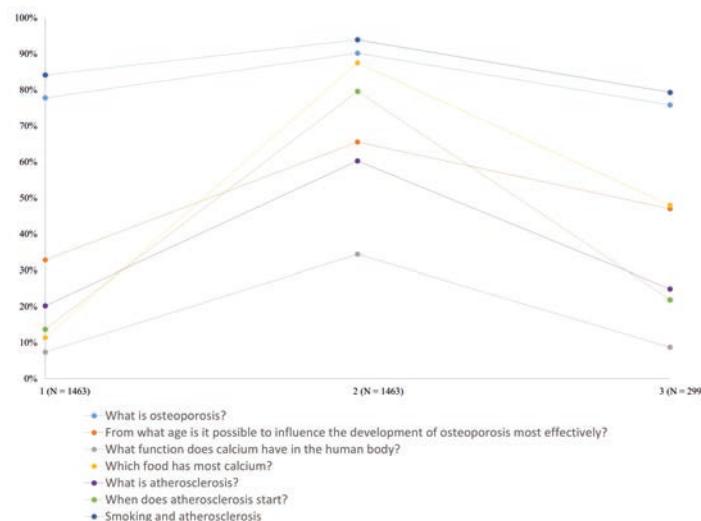


FIGURE 2. Representation of correct answers before lecture (1), immediately after lecture (2) and after 2 to 3 months (3)

The monitoring tool Google Analytics was integrated at the time of portal launch in order to evaluate the number of visits. This tool makes it possible to monitor the behaviour of users. It is a free service offered by Google that generates detailed statistics about the visits to a website; this user-friendly application is provided with the guarantee of Google technology. Due to the fact that monitoring was integrated on the portal, measurements of up-to-date statistics, reports and analyses based on the traffic and visitor's behavior are available. Figure 5 demonstrates the latest summary, where audience behavior is reported.

DISCUSSION

Even before listening to the lecture, participants of the educational event knew the definition of atherosclerosis and osteoporosis quite well, but they were unaware of the existence of the practically lifelong influencing of the start and rate of development of both of these diseases of ageing. The start of prevention of osteoporosis and the start of manifestations of atherosclerosis were the two questions where the performance of the education event resulted in the greatest increase in the number of correct answers; in the case of the youngest group, they were also the best results during the test taken 2 to 3 months later.

A question arises as to the appropriateness of topic for the selected age group of the youngest age category. For individuals around the age of 15, the matter of osteoporosis, affecting most frequently the generation of their grandmothers and most probably great grandmothers, obviously appears totally irrelevant and uninteresting. As a result, great emphasis was placed on a detailed explanation of the term peak bone mass, and on influencing of its formation in a sufficient quality, with reference to lifestyle of the current generation of adolescents and from the aspect of the level of activity and remaining outdoors. In an attempt to make this information more interesting and longer retained in the pupils' memory, the educational event was supported by a model simulating the gradual curving of the spine. In addition to the higher number of correct answers, the success of influencing was expressed by the fact that in their feedback after 2 to 3 months; one third of adolescents stated that they tried to stay outdoors for at least 40 minutes and adhere to the recommended level of activity.

From the aspect of influencing the attitudes of the group of students of the Faculty of Education, it was surprising that they expressed a good level of knowledge even before the educational event; they admitted that they thought about their lifestyle, that they would almost certainly include this topic in the teaching of their future pupils, but a far smaller percentage were planning to change their own lifestyle (although still four out of five). We can confirm the following good

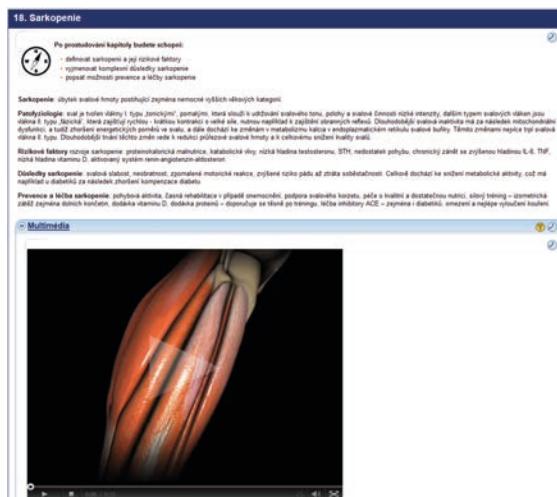


FIGURE 3. Geriatrics course interactive syllabus



FIGURE 4. Homepage of the project portal (www.starneme-uspesne.cz)



FIGURE 5. Google Analytics overview (from 1 July 2014 to 22 March 2016)

results of the education accompanied with experience: almost half participants of the youngest age group reported a better understanding to older people 2–3 months after the educational event; almost one third of the same group attempted to increase their activity level; and the same proportion realised that it was necessary to keep their energy intake under control. In the youngest age category, the percentage of those who did not understand or did not want to understand the purpose of the education event did not exceed 10%.

CONCLUSIONS

In the above-mentioned dissemination of the basic project objectives as regards the prevention of osteoporosis, sarcopenia or atherosclerosis, we used well-established methods based on educational seminars, accompanied by a public availability of supporting materials on the internet. On top of that, we developed an elaborated e-learning course, which guides the user through the basic issues related to the ageing process. We have used and progressively modified two prototypes models of old age in practice, now available for purchase. The quality of processing of the simulation sets is confirmed by the number of uses by the probands, which exceeded 1,500 cycles in a total of eight sets, without any signs of significant wear, and still functioning properly.

We can conclude our work with the following statements: (i) we confirmed the assumption of a low level of awareness among the population of the necessity of lifelong prevention of atherosclerosis and osteoporosis; (ii) the effectiveness of the educational event was confirmed by an increase in the number of correct answers in tests just after the educational event had finished; (iii) the retention of important information, albeit to a lesser extent, was confirmed by testing 2 to 3 months later; (iv) the positive influence on attitudes and behaviour due to the educational event with experience was evident in the group of pupils from primary and secondary schools, and in the group of students of the Faculty of Education.

Martin Komenda

SUPPLEMENTARY MATERIAL

SUPPLEMENTARY TABLE 1. Statistics of correct answers (type of change) before and after lecture in the group of pupils of primary and secondary schools

| Question | Incorrect before and correct after the lecture ¹ | Correct before and correct after the lecture ¹ | Incorrect before and incorrect after the lecture ¹ | Correct before and incorrect after the lecture ¹ |
|---|---|---|---|---|
| What is osteoporosis? | 211 (16,8%) | 924 (73,7%) | 69 (5,5%) | 49 (3,9%) |
| From what age is it possible to influence the development of osteoporosis most effectively? | 463 (37,6%) | 342 (27,8%) | 365 (29,7%) | 61 (5,0%) |
| What function does calcium have in the human body? | 330 (27,3%) | 73 (6,0%) | 786 (65,1%) | 19 (1,6%) |
| Which food has most calcium? | 1010 (77,2%) | 135 (10,3%) | 159 (12,1%) | 5 (0,4%) |
| What is arteriosclerosis? | 518 (42,3%) | 220 (18,0%) | 450 (36,8%) | 36 (2,9%) |
| When does arteriosclerosis start? | 845 (66,9%) | 156 (12,4%) | 246 (19,5%) | 16 (1,3%) |
| Smoking and arteriosclerosis | 133 (11,3%) | 970 (82,3%) | 50 (4,2%) | 25 (2,1%) |

¹ Total count and percentage representation (N = 1463)

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ANALYSIS OF BACHELOR STUDY PROGRAMS OF NURSING AT UNIVERSITIES OF EASTERN SLOVAKIA: A PILOT STUDY

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ABSTRACT — Background: The profile of the nursing studies in Slovakia is harmonized with the criteria of European Directives, enhanced by the adoption of the Declaration of Munich and implemented into the curriculum of educational institutions that provide this training. **Objective:** The main objective of the pilot study was to determine satisfaction of graduates with accredited programs of nursing (prior to the accreditation and after accreditation) at two state universities in the eastern region of Slovakia.

Methods: The monitored group consisted of total 132 respondents (nursing graduates) who completed the 1st degree of nursing study at University of Presov in Presov or University of P.J. Safarik in Košice in the timeframe 2007–2011. The study was realized during calendar years 2012–2013. One year of nursing clinical practice of graduates was required for this study. Data was collected through a modified questionnaire of feedback used at the University of Presov, Faculty of Health Care within the improvement of curricula program and the whole educational program.

Results: Statistically significant differences were observed in area of optional courses of nursing study program ($p < 0.05$). Compulsory optional courses of nursing program at both universities were more interesting and important for clinical practice of graduates after accreditation than before accreditation.

Conclusions: The nursing study program meets the educational requirements of European Union. However, study program needs courses, which would be more interesting and effective for clinical practice.

INTRODUCTION

Nursing education in the Slovak Republic (SR) went through several stages during its 25 year transition process. In the historical context, the education of nurses was carried out as a four-year study ended with leaving exam, two year as external post-graduate study and three-year study as a qualified general nurse at medical vocational school [1]. Currently, the university nursing education in Slovakia is implemented as: university nursing education of the 1st degree and 2nd degree in full-time study and university education of the 2nd degree in part-time study [2]. The study program of nursing at universities in Slovakia is fully compatible with the Directives of the European Commission (EC) and European Strategy of the World Health Organization for education of regulated professions. Important document relating to the nursing education is the European Directive 2013/55/EU amending Directive 2005/36/EC on the recognition of professional qualifications and

the Decree of the Government of the Slovak Republic No. 296/2010 Coll. on professional qualification for performance of health service occupation, the method of further education of health professionals, system of specialized fields and system of certified working activities that have minimum job requirements to perform occupation as a nurse [3,4]. Nursing students are trained for the profession: a registered nurse. They obtain professional competence to provide nursing care to individuals, families, and communities focused on prevention, health maintenance, health promotion, treatment, rehabilitation and help through the method of the nursing process [5]. Graduates can work as registered nurses in the clinical healthcare facilities: hospitals, home care agencies, long-term care facilities, in the community health care facilities, management of nursing care, education institutions and area of nursing research [6]. Act of the National Council of the Slovak Republic No. 363 of July 3, 2007, amending Act No. 131/2002 Coll. on higher education stipulates (§57 Clause 7) admission conditions for nursing

study program. One of the conditions for admission to the university of the 2nd degree is one year of clinical practice in health service after completion of the 1st degree at university [7]. Also, one year of clinical practice of graduates in nursing was required for this study.

OBJECTIVE

The aim of the pilot study was to determine satisfaction of graduates of two state universities in the eastern region of Slovakia focusing on nursing. The field of research was accredited programs in nursing prior to the accreditation and after accreditation (year 2008). Satisfaction of graduates, who are completing nursing program have been evaluated according to the length of their clinical practice in healthcare facilities in Slovakia, which was at minimum one year.

METHODS

Design

The pilot study had a character of cross-sectional descriptive study.

Sample

The monitored group consisted of total 132 respondents (nursing graduates) aged 23–35 (median age of respondents was 25 years, the variance was 3.24 years). Criteria for survey selection was completed full-time university education (1st degree) in the timeframe of 2007–2011 in one of these universities in the region of eastern Slovakia: Department of Nursing, Faculty of Health Care of University of Presov in Presov (FHC PU) or Department of Nursing Care, Faculty of Medicine of University of Pavol Jozef Safarik in Kosice (FM UPJS).

Data collection

The study was carried out in healthcare facilities in the region of eastern Slovakia during 38 weeks of the calendar years 2012–2013 (July to April). In order to identify requirements to improve the nursing study program, was for this purpose minimum one year of clinical practice in health care in Slovakia.

Data was collected through a modified questionnaire of feedback used in the FHC PU in Presov within the improvement of curricula program and the whole educational program.

The questionnaire contained 22 items covering the following areas of the investigation:

1. acquired education of the respondents in the nursing study program
2. clinical practice of the profession
3. curriculum of the study program
4. educational system in nursing.

Data analysis

In order to statistically process our data, SPSS 15.0 software was used. To statistically compare the monitored groups, we used parametric Pearson's correlation coefficient (r), multifactorial analysis ANOVA and Chi-square test, for comparison of several study groups Kruskal-Wallis H test. The statistically determined results were evaluated at a level of relevancy 5%. Through Likert scale (score 1–5) the objective was to get the most relevant data for the study. Response rate of questionnaire was 82.50%. The main results are outlined below.

RESULTS

Total 132 respondents (96.97% women and 3.03% men) of this study completed the 1st degree of full-time university education in nursing in academic years 2007/2008, 2008/2009, 2009/2010, 2010/2011 (see Table 1).

We analyzed opinions of respondents on the nursing study program by means of a Kruskal-Wallis H test. Two groups of nursing graduates (1st and 2nd group) completed their studies prior to the accreditation in the timeframe of 2007–2009 and other two groups (3rd and 4th group) completed their studies after accreditation in the timeframe of 2009–2011. The accreditation of nursing study programs was conducted at both universities in year 2008. Statistically significant differences were observed in area of optional courses of nursing study program ($p < 0.05$). We observed a higher level of perspective of the study program in 4th group of the academic year 2010/2011 (see Table 2). The 4th group of respondents had the highest score in items: *study of nursing study program allowed me (as a student) to select the optional courses which broadened my sphere of interests (M = 3.75)* and *courses of nursing study program were predominantly interesting for me (M = 2.68)*.

In 1st and 2nd group was expressed a lowest level of perspective of the nursing study program. The lowest rated in this groups were in items: *study of nursing study program allowed me to select the compulsory optional courses which are currently important for my clinical practice (M = 2.00)*, *courses of nursing study program were predominantly interesting for me (M = 2.34)* and *structure of the courses of nursing study program was logical for me (M = 2.37)*.

Pursuant to Act of the Ministry of Health of the Slovak Republic No. 455/2012 Coll. which amends and supplements Act No. 131/2002 Coll. on universities, study program of nursing is a set of subjects consisting of educational activities represented especially by lectures, seminars, practicals, laboratory practice, practical training, continuous clinical practice, summer clinical practice, project thesis, internship, final thesis, state exam, and their combinations [8]. Each course of

TABLE 1. Analysis of monitored nursing graduates (n = 132) from the perspective of the completed the 1st degree of full-time university education in nursing

| Order of groups | Completed academic years of monitored nursing graduates | FHC PU in Presov | | FM UPJS in Kosice | |
|-----------------|---|------------------|-------|-------------------|-------|
| | | n | % | n | % |
| 1. | Academic year 2007/2008 | 14 | 15.00 | 14 | 37.00 |
| 2. | Academic year 2008/2009 | 20 | 21.00 | 10 | 26.00 |
| 3. | Academic year 2009/2010 | 20 | 21.00 | 12 | 31.50 |
| 4. | Academic year 2010/2011 | 40 | 42.50 | 2 | 5.00 |

n = number of respondents

TABLE 2. Statistical evaluation of contribution to the study program from the perspective of nursing graduates for each academic year through Kruskal-Wallis H test

| Items | Order of groups | M | SD | Chi-square test | p |
|---|-----------------|-------------|------|-----------------|----------------|
| Courses of nursing study program were predominantly interesting for me (as a student). | 1. | 2.50 | 0.85 | 0.093 | 0.9544 |
| | 2. | 2.34 | 0.86 | | |
| | 3. | 2.65 | 0.78 | | |
| | 4. | 2.68 | 0.92 | | |
| Study of nursing study program was demanding for me. | 1. | 2.73 | 1.15 | 1.311 | 0.4937 |
| | 2. | 2.59 | 0.98 | | |
| | 3. | 2.45 | 1.02 | | |
| | 4. | 2.39 | 0.79 | | |
| Structure of the courses of nursing study program was logical for me. | 1. | 2.44 | 0.73 | 1.025 | 0.6019 |
| | 2. | 2.37 | 0.99 | | |
| | 3. | 2.50 | 0.69 | | |
| | 4. | 2.47 | 0.79 | | |
| Study of nursing study program allowed me to select the compulsory optional courses which are currently important for my clinical practice. | 1. | 2.00 | 0.92 | 1.470 | 0.4126 |
| | 2. | 2.54 | 1.03 | | |
| | 3. | 2.72 | 1.02 | | |
| | 4. | 2.59 | 0.94 | | |
| Study of nursing study program allowed me to select the optional courses which broadened my sphere of interests. | 1. | 2.70 | 1.06 | 6.945 | 0.0487* |
| | 2. | 3.03 | 1.02 | | |
| | 3. | 3.59 | 1.01 | | |
| | 4. | 3.75 | 0.98 | | |

* p < 0.05; ** p < 0.01; *** p < 0.001

M = mean, SD = standard deviation, p = level of statistical significance

1. = academic year 2007/2008, 2. = academic year 2008/2009, 3. = academic year 2009/2010, 4. = academic year 2010/2011

Score: 1 – lowest level of satisfaction, 5 – higher level of satisfaction

the study program reflects the job market's needs. In the EU countries, study program of nursing is based on competence of nurses who are regulated by the legislation of the country and also by the current European Directives. According this European Directives 2005/36/EC and 2013/55/EU, the minimum requirements for the content of nursing education in Slovakia are divided into 2 sections: theoretical disciplines (nursing disciplines, basic medicine disciplines and social science disciplines) and practical disciplines. Courses of the nursing program are divided into: compulsory (comprise 75–80% of study program), compulsory optional (comprise 15–20% of study program), and optional (comprise 5% of study program) [9]. The

entire extent of study is minimally 4 600 contact and non-contact hours, where half of it is practical education and a minimum of one third is theoretical education. A condition to be met for student's advancement to the next year is acquirement of prescribed number of credits in the individual years = 60 ECTS credits (European Credit Transfer System). Each course of the nursing study program is evaluated by certain number of credits expressing student's workload [10].

The findings of the study aimed at analyzing the bachelor nursing study program by us observed universities of eastern region of Slovakia shows that the recommended study plan for academic year 2010/2011 was based on accreditation (year 2008), included in

TABLE 3. Correlations in terms of length of clinical practice of nursing graduates

| Items | r |
|--|-----------|
| Graduates of the 1st degree of university study have sufficient theoretical knowledge for their application in clinical practice. | 0.039577 |
| During university study of the 1st degree students can to acquire the knowledge and practical skills in foreing countries. | 0.050491 |
| Graduates of the 1st degree of university study have sufficient practical skills for their use in clinical practice. | 0.001344 |
| Hourly allocation of practical training is sufficient. | -0.055384 |
| There is a close link between theoretical and practical training of nurses. | -0.091612 |
| Possibility to study on the 2nd or the 3rd degree of the nursing study program. | -0.054312 |
| Possibility to study at other universities/faculties with identical content of the nursing study program due to interruption of the study. | 0.030118 |
| Recognition of the ECTS credits within the framework of the EU countries. | 0.042653 |
| Recognition of the competences within the framework of the EU countries. | 0.052655 |

r = Pearson's correlation coefficient

the study program of the 1st up to 3rd year on FHC PU in Presov in optional courses of predominantly preventive focus, for example Prevention of Drug Addiction, Psychohygiene of Health Service Personnel, Basic of Dietetics, but also courses focused on Basics of Administration in Health Care, for example Modern Imaging Procedures in Medicine etc. [9]. For graduates of FM UPJS in Kosice have in the same academic year been recommended these optional courses: Alternative Nursing Procedures, Nursing Communication in Foreign Language, Philosophical Anthropology and Physical Education [11].

According to recommended study plan for academic years 2007/2008 and 2008/2009 of the 1st degree of university education at the FHC PU in Presov were recommended to select the optional courses mainly of preventive orientation, for example: Basic of Health Dietetics, Prevention of Drug Addiction, Psychohygiene of Health Service Personnel, Prevention in Oncology, Health Education in Community, Basic of Nursing Rehabilitation and Physiotherapy, and other courses: Sexual Health Education and Family Planning, Palliative and Hospice Care, Pain Management, Multicultural Nursing and Communication with Persons with Disabilities [12]. For graduates of FM UPJS in Kosice have in the same academic year been recommended these optional courses: Physical Education, Philosophical Anthropology, Alternative Nursing Procedures, Nursing Communication in Foreign Language and course Human Needs in Nursing, omitted from the compulsory courses [13]. Requirements for state exam in the 1st degree of university education of nursing at both universities are following: bachelor thesis defence; practical state exam from clinical practice in nursing (clinical nursing in internal medicine, in surgery, in paediatrics); and nursing state exam. In this pilot study, our attention was focused on the hourly duration of courses which are courses to the final state exam: Nursing and Nursing Process, Nursing

Procedures, Communication in Nursing, Nursing Research, Nursing Management, Practical Training in Internal Nursing, Practical Training in Pediatric Nursing and Practical Training in Surgical Nursing. Hourly duration of Nursing Procedures at FM UPJS in Kosice was 8 hours per week, equally spreaded over winter and summer semester in the 1st year of nursing study. However, the content and scope of the course corresponds to the set of 9 hours per week at FHC PU in Presov taught only in winter semester in the 1st year of the particular study program. At the both universities, the practical training of students started in the summer semester of the 1st year of nursing study.

Competences of nurses are very significant tools because reflects the roles of a nurse and professional preparation for performance of this occupation. The field of competences for nurses (and midwives) is regulated by Decree of the Ministry of Health of the Slovak Republic No. 364/2005 Coll., which determines the scope of nursing practice provided by nurses independently and in conjunction with a doctor and the scope of midwifery practice provided by midwives independently and in conjunction with a doctor (as amended by No. 470/2006 Coll.) [5]. These activities can be realized only by a nurse or a midwife who is registered in the Slovak Chamber of Nurse and Midwives [14,15]. In our study we observed correlations from the perspective of the length of clinical practice in case of the graduates (see Table 3) and the significant relationship between the variables evaluated in the group has not been expressed. Variables was related to the recognition of ECTS credits, degrees of study programs, competences, and other advatages of the study program of nursing.

Table 4 shows the statistical evaluation of preferred innovative methods of educational process from the graduates' point of view.

Statistically significant differences were observed in one of the items, where respondents of FHC PU in

TABLE 4. Statistical evaluation of preferred innovative methods of educational process from the nursing graduates' point of view

| Items | FHC PU in Presov | | FM UPJS in Kosice | | p |
|---|---------------------|------|----------------------|------|---------------|
| | M | SD | M | SD | |
| In educational process I preferred more innovative teaching methods (e-learning, brainstorming etc.). | 2.30 | 1.06 | 2.45 | 1.02 | 0.491 |
| In educational process I preferred more traditional teaching methods (lecture, construction etc.). | 3.15 | 1.03 | 3.58 | 0.94 | 0.029* |

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

M = mean, SD = standard deviation, p = level of statistical significance

Score: 1 – lowest level of satisfaction, 5 – highest level of satisfaction

Presov were more inclined to the traditional methods of teaching. The effectiveness of the learning process and good academic performance can be achieved by creating an optimal psychosocial climate for all participating parties, i.e. teachers and learners.

Due to didactic-methodological level of teacher, efficiency can be increased, that would allow them to apply didactic principles, as well as continuous teacher preparation for lesson or administrative relationship with students. Given that, each student is unique and demands of the course require different teaching methods, it intrigued us, which of the methods are most preferred by the graduates. The following teaching methods for the theoretical subjects were the most frequently preferred from part of graduates: lectures (45.25%), presentations (34.45%), that are traditional teaching methods; for the applied courses: brainstorming (33.03%) and instructions (42.81%), that are innovative teaching methods.

However, respondents mentioned that during teaching positive was application of practical examples, casuistry, from part of teachers by means of which they referred to connection of theory and clinical practice. The graduates of FHC PU in Presov expressed higher satisfaction with the teachers creating space for discussion, critical and independent thinking of students in the course of teaching process.

DISCUSSION

Today, researchers are dealing with functionality of university system of nursing training in Slovakia and other EU countries according to the Bologna directives [16], graduate profile, curriculum and learning outcomes. The main objective of EU standards is to synchronize education, professional qualifications and competency of nurses in order to ensure continuity and compactness of learning objectives with clinical practice. The aim of the pilot study was to determinate satisfaction of graduates with accredited programs of nursing at two state universities in the eastern region of Slovakia.

The results of this study showed higher satisfaction with accredited study programs after accreditation (year 2008) at both universities of the Slovak Republic.

The perspective of study program has proven in the following items: *nursing study program allowed me (as a student) to select the optional courses which broadened my sphere of interests (M = 3.75)* and *courses of nursing study program were predominantly interesting for me (M = 2.68)*. However, the lowest level of satisfaction of respondent was recorded prior to the accreditation of nursing study program, particularly in this item: *nursing study program allowed me to select the compulsory optional courses which are currently important for my clinical practice (M = 2.00)*.

The structure of the 1st degree nursing study program (bachelor degree) in Slovakia is designed in the way that students can gain basic knowledge throughout the study, as well as skills and understanding of discipline based on the integrated theory and teaching practice. Presentation of analytical, creative and critical thinking [17,18] and the ability to solve problems should be applied in the clinical practice, students were able to independently synthesize information for qualified decisions, depending on the findings of researches and practice. The literature indicates that the content of the university nursing program has the stronger focus on theoretical aspects and it may have different impact on clinical skills [19]. Other authors argue that the curriculum is focusing on theoretical and practical skills and requirements [16]. Even though, yearly accreditation affected changes in the curriculum of study programs, students in this study preferred more traditional learning methods such as lectures, constructions etc., because first year students were accustomed to lecture. It may be difficult to engage in self-directed learning during their first year [20,21]. More interest in traditional methods of teaching was recorded at FM UPJS in Kosice. With advancing grade or level of education, students may expect to gradually become better at self-directed learning, and may take more responsibility for their education in a self-directed manner [20].

Statistically significant differences in educational system were not recorded in graduates' views. Graduates confirmed the satisfaction with the training program and recognition of ECTS credits in EU countries. They also positively expressed a probability to continue into 2nd and 3rd degree of their study. Many EU

countries offering education only on the diploma level, demonstrating that the differences between countries are at points rather significant [22]. The reforms of education in EU have given need for harmonising nursing education. However, there are differences in nursing education system in Europe. Future challenges in nursing education are considered cross-cultural collaboration, clinical learning environment, role of patients and teacher education [23].

Results of this pilot study provide evidence to support new curriculum of nursing study program. It is essential to focus on the transformation of the new curriculum with attention on promoting innovative teaching methods and to promote individual work of students – teachers as tutors in educational process. Furthermore, it is necessary to include optional compulsory courses in the study program that would be interesting and rewarding for students' clinical practice. With an increase of patients in hospitals [24] and with the rapid changes in technology, legislation and environments, the next generation of nurses will need to adapt nursing practice [25].

The main objective of the EU standards is to synchronize education, professional capacity and nurses'

competences into clinical practice. University nursing education is to train qualified nurses that will carry out role of a nurse in clinical practice. Evaluation of curriculum, educational process and the entire university system of education are an important and integral parts of the professional teaching activities of educational institutions [26].

CONCLUSION

In relation to the European Directive 2013/55/EU and new accreditation (2014), FHC PU in Presov plans to increase the hourly duration for practical training and to strengthen nursing courses at the expense of medical courses. FHC PU in Presov further intents to increase the hourly duration for Nursing Procedures and divide this course into two academic semesters of one year and specify conditions for completion of courses in relation to student's workload: contact and non-contact hours for theoretical and practical education.

Gabriela Kuriplachová

CONFLICT OF INTEREST STATEMENT

Neither author has any financial or personal relationship with people or organisations that could inappropriately influence their work.

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A NEW ONLINE SOFTWARE TOOL FOR PRESSURE ULCER MONITORING AS AN EDUCATIONAL INSTRUMENT FOR UNIFIED NURSING ASSESSMENT IN CLINICAL SETTINGS

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ABSTRACT — Data collection and evaluation of that data is crucial for effective quality management and naturally also for prevention and treatment of pressure ulcers. Data collected in a uniform manner by nurses in clinical practice could be used for further analyses. Data about pressure ulcers are collected to differing degrees of quality based on the local policy of the given health care facility and in relation to the nurse's actual level of knowledge concerning pressure ulcer identification and use of objective scales (i.e. categorization of pressure ulcers). Therefore, we have developed software suitable for data collection which includes some educational tools to promote unified reporting of data by nurses. A description of this software and some educational and learning components of the tool is presented herein. The planned process of clinical application of the newly developed software is also briefly mentioned. The discussion is focused on the usability of the online reporting tool and possible further development of the tool.

INTRODUCTION

The possibility of analysing the occurrence of pressure ulcers (PU) in patients is an important issue, but in neither the Czech Republic nor internationally is there any uniform methodology for collecting the necessary data that would sufficiently help monitor patients with PU. Most of the PU assessment methods are based on the local know-how of the individual departments or managers and healthcare providers, or they are performed within isolated local prospective and retrospective studies. In most studies the evidence-based classification of PU prepared by the Pressure Ulcer Advisory Panel (EPUAP) is not followed. Thus, sharing of data and comparison of incidence or prevalence data nationwide and even internationally is impossible. In clinical settings without any systematic, ongoing and validated pressure ulcer (PU) registration system, estimating the incidence and prevalence of pressure ulcers will mostly prove an academic and time-consuming exercise, one leading to imprecise estimations [1]. Nonetheless, information on PU occurrence is considered an indicator of healthcare quality and is important for assessing the costs of

providing healthcare connected to the occurrence of PU and their consequences (prolonged hospitalization, increased costs of treatment, influence on the patient's quality of life etc.) [2–4]. In the Czech Republic, there is no database specifically designated for providing unambiguous data on the prevalence and incidence of PU. Furthermore, until now there has not been any uniform platform for data collection concerning PU at the national level. The aim of the presented project ("The register of decubitus ulcers – integration strategy for monitoring and preventive interventions on the national level") is to establish a standardized methodology and define it uniformly for PU reporting, as well as to prepare a useful electronic tool for monitoring of PU which is to be piloted in three university hospitals in the Czech Republic. The authors are aware that the real incidence of pressure ulcers is underestimated in the administrative data (i.e. in the local registry of adverse events or incident reporting or in the National Registry of Hospitalized Patients – NRHOSP). So, these project activities aim to stress the importance of collecting PU prevalence and incidence data as an effective measure of healthcare and patient outcomes and to identify facility trends for quality and

safety evaluation. As project leaders understand that prevalence rates are commonly cited to suggest the development of relevant and innovative care, pressure ulcer incident data is likely to be a better indicator of an organization's performance in pressure ulcer prevention and damage minimization [1]. Hospital-acquired pressure ulcers (HAPUs) remain a serious iatrogenic problem threatening patient safety and there is need to recognize whether the wound was formatted before admission to the hospital or during the hospitalization. The relationship between patients and direct care staff who have an impact on HAPUs is, however, imprecise, conceptually problematic and operationally difficult [5]. The data must be collected in a uniform manner to capture the scale of wound care. The conventional approach is to record details of ulcer care such as treatment strategies, dressings, antibiotics, analgesics, investigations, hospital admissions and surgical interventions at each patient contact over the period from the first presentation to wound healing [6].

All important details could be monitored, stored for a long time and also retrieved easily only through a well-planned electronic monitoring system which is user-friendly, allows extraction of important data concerning delivery of care and will not increase the burden on healthcare givers (especially nurses). Another aspect which must be taken into account is the lack of training for a unified assessment of PU (not all hospitals in the Czech Republic use the suggested evidence-based EPUAP classification). Another factor is the insufficient use of objectifying scales for assessing the overall condition of the patient by nurses in the clinical setting.

METHODS

The article presents a newly prepared electronic software tool (database) for monitoring PU incidence in the clinical setting. The possible benefits and risk of the collected data and uniform evaluation of the patients with PU is discussed. Particularly the elements and components enabling education of nurses concerning the uniform evaluation of PU and patients' overall status are highlighted. The presented software electronic tool is intended to be useful for objective recording of patient characteristics and uniform PU classification. This tool should not increase the workload and burden on nurses, but rather to enable nurses to gain further experience and expertise, as well as to monitor the influence of preventive clinical processes of care on HAPU incidence and prevalence.

General description of data collection system

Data on PU will be stored in a database system which was originally based on a modified version of the TrialADB system [7–9]. This online system has undergone

changes in layout and structure, which has made data entry even more convenient, while security measures have been maintained at the same level as in previous versions. Data security within the registry is of key importance, and special attention has been paid to this issue.

The system has been designed as a robust basis for collection of a large amount of data in clinical trials and/or clinical registries, and it is fully customizable to the structure of the project. The online application is accessible to users via their web browsers. The security of individual records within the registry is guaranteed via anonymized data collection. Each patient's identity is replaced with a number (ID) which does not allow any backward identification of that person. The unequivocal identification of the patient is known only to the attending physician or to an authorized health care professional.

The main advantages of this system involve centralized administration, uniform appearance of forms for data collection in all registries and easy development of new, extending functions. The basic characteristics of the system are:

- The system is very user-friendly: all data are entered via web forms which are analogous to paper collection (classical CRF). Thus, nurses could use it even as a bedside evaluation.
- The data can be entered into the registry from any computer connected to the internet and equipped with a standard web browser (it must support encrypted communication over a 128-bit SSL protocol).
- No additional software needs to be installed on the client's computer.
- Only authorized persons have access to the registry, using their login and password.

Data in the registry are de-identified, i.e. the patients' records are kept under codes (ID) which exclude any chance that the person might be identified. In this way, the system meets all valid rules on the protection of personal data.

All data transfer is encrypted in order to prevent any potential abuse during the transfer. Data can be exported for authorized users as a local database for further processing. Users can print the filled forms or save them in a local computer in MS Excel format.

The system of user rights is one of key functions in the administration of user accounts. Apart from this, automatic logout is done after a predefined period of user inactivity (i.e. when the nurse has to leave the nursing room and go to the patient's room or to another patient). This function is aimed to prevent misuse of an unoccupied computer if the user forgets to log out.

An encryption protocol is used for data transfer between the user and the central database to prevent tapping of the communication between the client and server (for example, interception of the user login and

password). For this reason, any communication between the client and server is realized via the secure protocol HTTPS, using SSL (Secure Socket Layer) encryption.

In order to provide maximum data security, other security measures have been taken by the provider (Institute of Biostatistics and Analyses – IBA), involving mainly the security of the provider's network and the server itself. These measures include firewalls (separating both database and application servers from the internet), regular monitoring of the system, monitoring changes in configuration, physical protection of the server room, etc.

Additional measures have been taken to prevent potential data loss or damage in the case of unexpected events, which are not directly related to information technology. These measures involve a fire-stop system, air-conditioned server rooms, etc.

Both system configuration and the data stored within it are subject to regular backup. Therefore, even in the case of a system breakdown, the entire system including the data can be promptly restored.

Description of some specific components enabling nurse education in the PU data collection system

As mentioned above, the software tool contains some components and applications to help nurses use appropriate evaluation processes and improve the accuracy of monitoring of patients with PU. The information about the patients is divided into two main sections. The first section covers information about the overall status of the patients (using objective tests, i.e. the Activity of Daily Living Test, Glasgow Coma Scale, and Body Mass Index which are commonly used in the majority of Czech healthcare facilities). This part is identified as anamnesis of the patients and it is the first part of patient registration. Data collected there could be used from the common internal hospital record of the patient in cases where this tool is implemented in the internal hospital electronic system (IHEC). The following variables are recorded: date of birth, gender, age, healthcare department where the patient is hospitalized, date when the information was recorded (date of evaluation of the patient), code of diagnosis according to the ICD-10, mobility and self-sufficiency, ability to collaborate, psychological status, height and weight for the possibility of evaluating nutritional status (Body Mass Index – BMI). The system can also record any possible long-term complication of patient status which could be compounding factors for formation of HAPU. What is of great importance is that all information which has to be reported is selectable (as tick boxes or multiple-choice items) and nurses do not have to remember any scales or classifications (i.e. for BMI, nurses could report information about height and weight and BMI is automatically

calculated, or they could directly choose the BMI according to verified data from patient documentation).

The second part of registration is focused directly on description of the pressure ulcer. The following variables are recorded concerning PU:

- Identification data (workplace where PU was detected and, if different, workplace where PU was formatted).
- Important dates and the time sequence (initial date of hospitalization and number of days from the beginning of hospitalization until detection of an individual pressure ulcer during the hospital stay).
- Connection or linkage with the performance of an operation (surgery).
- Risk evaluation (Norton score) at the beginning of the care and before discharge or transfer (or death) of the patient.
- Preventive strategies (before and after the identification of PU).
- Treatment strategies (immediately after the identification of PU and finally a summary of treatment strategies at the end of care).
- Detailed information about PU which should be reported during the entrance examination when the PU is identified and for the final examination at the end of care (description: size of PU, category, local complication and periwound skin, localization of PU – only for the initial assessment).

In what follows we will present only the components which are the most useful for nurse education and learning.

Risk assessment

The PU risk assessment tool is a system for recording factors about the patient that would increase their risk of developing a PU. These factors are then scored. It is essential that risk assessment be conducted as early (ideally within 8 hours after admission) and as accurately as possible. Assessment of the risk of PU is done on the basis of the Norton scale as this is the most commonly used scale Czech healthcare facilities. Even with the standard use of the Norton scale, there is no single scoring system used in all Czech hospitals and therefore the learning tool for nurses was implemented in the developed online collecting system. Nurses can directly specify data about patient status (i.e. age, mobility, incontinence, or psychological status) and the Norton scale score is automatically calculated. In situations when nurses cannot identify all the data, but they have verified data from previous patient records, they can directly report the Norton score (see Figure 1). In both above mentioned cases, they can make use of help in the form of readable tables (see Figure 2).

Classification of pressure ulcers

The precise and accurate classification of PU is essential for selection of appropriate preventive and therapeutic strategies. However, there is still a lack of consistency in the evaluation of stage/category of PU in clinical settings. Therefore, a further and very important tool for nurses, which corresponds to the newest evidence-based recommendations of EPUAP, has been prepared (see Figure 3). In connection with the identification of the stage/category of PU, also differential diagnostics of incontinence associated dermatitis (IAD) or other lesions (i.e. friction lesion of skin tears) are problematic. The helping and learning tool for differential diagnostics is presented in Figure 4.

Localization of pressure ulcers

Although it may be considered that the location of a PU and its correct identification is underestimated and downplayed in relation to care planning, it is an essential part of effective evaluation and quality management as well as making the appropriate choice of preventive and therapeutic strategies. The last educational tool that we would like to present should help nurses to record the right area and localization of PU (see Figure 5). The most frequent confusion in the location of the PU was identified from retrospectively analyzed patient records in the gluteal region and sacrum. So, nurses could use a picture with a numerical designation of the location and simply record it accurately.

Ethical considerations

The purpose and procedure of this project, voluntary participation, guaranteed anonymity, and the possibility of withdrawing at any time were explained to the subjects (nurses and nursing managers involved in development of the software tool). Ethical permission for the project activities from the hospitals involved was obtained.

DISCUSSION

Nurses, midwives and other non-medical health workers form the bulk of the clinical health workforce and play a central role in all health service delivery systems. There is a potential to improve healthcare quality if nurses and other healthcare staff routinely use the best available evidence in their clinical practice. Since many of the factors perceived by health workers as barriers to the implementation of evidence-based practice (EBP) are found at the organizational level, it is crucial to devise and assess the effectiveness of organizational infrastructures designed to promote EBP among nurses [10]. One very good tool for improvement of the organizational structure and

FIGURE 1. Automatic calculation of Norton scores according to specified data

FIGURE 2. Manually entered data – entering account details (helping table)

FIGURE 3. Classification of PU (helping figures)

for supporting EBP is simplification of the recording of patient data in a unified fashion. The use of objectifying tests and scales in a uniform manner should help ensure a better understanding and transfer of information in a multidisciplinary team. A number of nurses working today in clinical practice have studied the issue of PU in an “old-fashioned” manner and they do not know exactly how to obtain new information or how to implement the knowledge obtained in lifelong learning. We must also emphasize that the process of knowledge translation is slow, i.e. the

translation of research findings into practice [11,12], and it is common problem also in the case of pressure ulcers. Because of this, there is a pressing need for simplified learning strategies that will not serve as barriers for nurses and could increase their knowledge in a non-threatening form for an objective assessment of patients. Pressure ulcers are considered avoidable incidents, but sometimes they occur even if the care is perfect and nurses need to have the evidence in the form of simple and quick records concerning the care rendered. All PU should be investigated to identify the circumstances surrounding PU development using root cause analysis techniques (RCA). This approach seeks to understand the underlying causes and could bring a comprehensive view (i.e. environmental context) of how the incident happened. Therefore, an exact record of data is essential. The authors of the newly developed online reporting system for PU are aware that healthcare professionals have used differing grading systems to describe the severity of PU in the Czech Republic. A global guideline has been developed by the European Pressure Ulcer Panel (EPUAP), National Pressure Ulcer Panel (NPUAP) and Pan Pacific

Pressure Injury Alliance (PPIA) [13] and these guidelines are implemented in the online reporting tool presented here. Accurate evaluation of PU is important because the cost of care increases with the severity of PU as the time of healing is longer and the incidence of complication is higher in more severe cases [14,15]. As we know that wound assessment should be comprehensive, systematic and evidence-based, we have followed the recommended framework "Triangle for Wound Assessment" which aims to simplify the evaluation process for all healthcare workers [16]. A systematic approach in assessment and reporting data should help to overcome the barriers to healing as proven by national registries in Sweden [17] and help promote continuity of care. The nature of nursing tasks and interventions has led to a high demand for software that supports long-term bulk data collection, storage and evaluation, as this is a way to save time which is needed for patient care, especially when lack of staff is a big challenge. The benefits of reporting systems have been summarized also by recent work, where special attention has been paid to the five key challenges that explain why incident reporting has not reached its potential: poor processing of incident reports (triaging, analysis, recommendations), inadequate engagement of professionals (especially physicians), insufficient subsequent visible action, inadequate funding and institutional support of incident-reporting systems and inadequate usage of evolving health information technology [18]. Therefore, from the authors' point of view the human resources (nurses and other healthcare workers' opinions) and their behaviour and attitudes are important components for the functioning and effectiveness of the online reporting system. Another systematic review has proven that still little is known about the effectiveness of the incident-reporting systems. Some evidence of single-loop learning



FIGURE 4. Differential classification of PU and IAD (helping table)

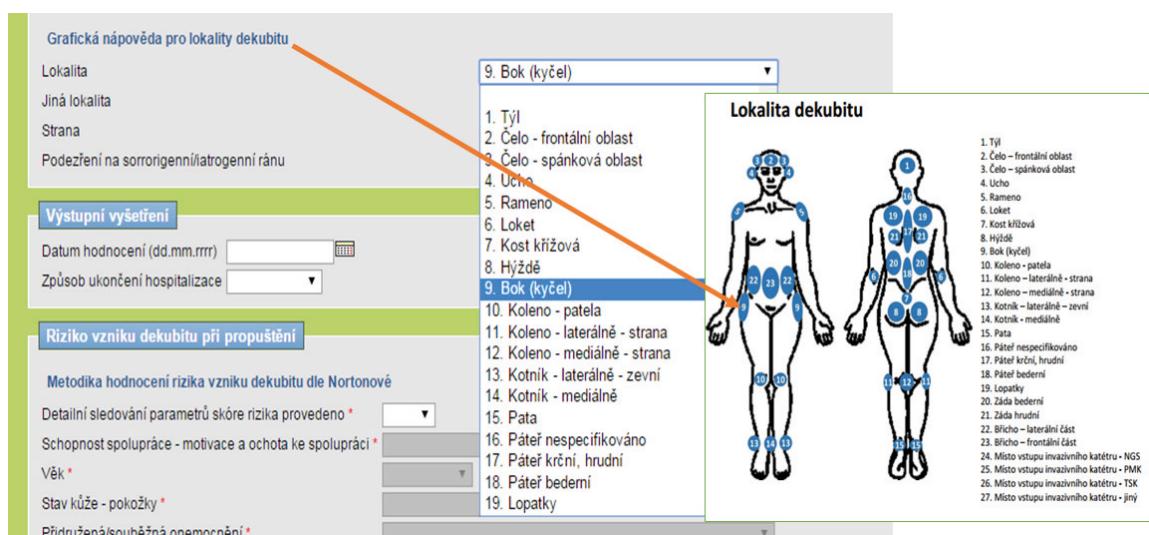


FIGURE 5. Localization of pressure ulcers (helping picture)

has been found and there was insubstantial evidence for enabling double-loop learning, that is, a cultural change or a change in mindset [19]. Thus, the authors of this new online reporting tool are aware that it is important to know about the view of users concerning electronic reporting systems. We cannot predict that the system will have a positive effect by changing staff attitudes and knowledge. Nevertheless, the way in which the system is introduced and the training to support its introduction could contribute to a cultural change. Another aspect that must be taken into account is the computer literacy of nursing staff. Some nurses are reluctant users of Information and Communications Technologies (ICT). This factor needs to be managed sensitively, because the experience of the benefits of using ICT and electronic patient records influence their acceptability [20,21] and the implementation processes. For the above mentioned reasons, the long-term implementation plan (at least 6 months) was carefully prepared to implement online monitoring tools. This period will include seminars and workshops, as well as feedback mechanisms (an anonymous questionnaire survey and interviews) to evaluate the satisfaction of target users with the implemented online monitoring tool. There is always one scheduled group seminar for the entire clinic planned, during which the system and methodology of collecting and reporting data will be presented. Two workshops will be subsequently organised for each unit and department where the participants will try assessment of pressure ulcers and their record under the scientific supervision of an expert guarantor from each hospital (project team member). We need to know the nurses' views on the system in terms of usability (the system cannot be too slow or too fast, reporting cannot be time-consuming, etc.). For the future development of this tool on the local level in each hospital, it is desirable to evaluate the influence of computerization on staff mobility (as this is a commonly-presented problem [22]) and the possibility of sharing data among the various hospital and inpatient settings that are involved. As this tool has been prepared as an educational one, we expect that the finally evaluated dataset will be implemented in the internal electronic

hospital reporting system and there is also the possibility of modifying it for tablet users.

CONCLUSION

We have developed a software tool which will be primarily used for testing and validation in three university hospitals in the Czech Republic (Military University Hospital Prague, University Hospital in Pilsen and General University Hospital in Prague). At least one project team member is working (mostly at the managerial level) in all of the above-mentioned hospitals and is organizing or leading the education of nurses in usage of the electronic tool and in using objective scales or scoring tests to monitor overall patient status and also the local status of pressure ulcers (face to face workshops and seminars, feedback activities). Notwithstanding, the electronic tool on its own supports self-learning and includes several features to help nurses in situations where it is difficult to decide how to report collected data or classify the patient or pressure ulcer.

STRENGTH AND LIMITATION

Data protection and authentication are crucial in clinical software and collection of patient data in a healthcare setting. For this electronic software tool (prepared primarily as an educational tool), nurses are required to use a username and password. The authors of the developed software tool expect that for the clinical implementation, it would be more suitable to implement collection of data into the internal hospital informational/electronic system (IHEC) to ensure better accessibility of data and also for the possibility of using data which already exists about individual patients according to Czech legislation. This should decrease the burden on nurses and allow them to spend more time with patients as the final version of collection tool (dataset) will be implemented as a part of the real information system used in each hospital.

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CONFLICT OF INTEREST STATEMENT

The authors state that there is no conflict of interest.

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KNOWLEDGE AND ATTITUDES OF MASARYK UNIVERSITY MEDICAL STUDENTS TOWARDS ELECTROCONVULSIVE THERAPY (ECT)

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ABSTRACT — Background: Electroconvulsive therapy (ECT) is an efficient therapeutic procedure used in contemporary psychiatric practice. It is also considered one of the most controversial and stigmatized treatments in medicine. Studies evaluating the knowledge and attitudes of medical students towards ECT have been conducted in many countries. According to available data (Medline database), no such research has been performed in the Czech Republic.

Objectives: The aims were to evaluate knowledge about and attitudes towards ECT of medical students, to assess the effectiveness of theoretical and practical lessons about ECT at the Department of Psychiatry, and to improve education and awareness about ECT.

Methods: We conducted a prospective observation of medical student knowledge and attitudes concerning ECT and how they change after a two-week psychiatry rotation. These were evaluated using a questionnaire which was completed at the beginning and at the end of the rotation.

Results: In total, 148 students in the 5th year of general medicine were enrolled in the survey. Prior to the psychiatry rotation the majority of students drew their information about ECT from movies and television. Finding indicated a relatively low baseline level of knowledge about ECT before the lessons and a significant increase after two weeks of lessons; students with any previous personal experience with psychiatry had significantly higher scores in the knowledge test at the beginning of the rotation. Personal experience with ECT during the psychiatry lessons after the rotation had no effect on knowledge scores after the rotation. The baseline attitudes of students towards ECT were not overall negative. Positive change was observable, but less pronounced than expected. We did not observe a pronounced effect of ECT demonstration on student knowledge or attitudes.

Conclusions: The depiction of ECT in the mass media is mostly negative and continues to influence student attitudes towards this therapy. We can speculate that the most important factors in improving student knowledge about and attitudes towards ECT are gaining more information about the procedure via theoretical lessons and having direct contact with psychiatry.

INTRODUCTION

Electroconvulsive therapy (ECT) is an efficient therapeutic procedure used in contemporary psychiatric practice. It is also one of the most controversial and most stigmatized treatments in medicine. It was first used in 1938 by Italian neuro-psychiatrists Ugo Cerletti and Lucio Bini in the treatment of schizophrenia [1]. ECT is a medical procedure in which a brief electrical stimulus is used to induce an artificial epileptiform seizure under controlled conditions [2]. This treatment modality has undergone many changes and improvements over the years. In developed countries, ECT is administered under a short general anesthesia.

Muscle relaxants are important for preventing tongue bites, fractures, and other injuries sometimes observed in spontaneous epileptic seizures. ECT should be conducted under strict observation of patient state; breathing, oxygenation, blood pressure, ECG, heart rate, and EEG are usually monitored [3,4]. The efficacy of the procedure was proven in clinical practice, clinical studies, and meta-analyses; ECT is most efficient in the treatment of mood disorders and, to a lesser extent, some other disorders [5].

According to current treatment guidelines, ECT can be used as the first choice in the treatment of major depressive disorders with or without psychotic symptoms, acute manic episodes, catatonic conditions, and

neuroleptic malignant syndrome. In these cases, ECT can be considered if rapid therapeutic response is needed, if there is information about the patient's previous good response to ECT or insufficient positive therapeutic response to other treatment options during a previous episode. It is essential to assess the seriousness of the disorder and the potential risks associated with therapy. It is possible to use ECT as a second choice in poor therapeutic response especially to psychopharmacological treatment, intolerance of other forms of treatment, and presence of suicidality [6]. According to current literature, there are no absolute contraindications to the use of ECT. However, there are many relative contraindications, including diseases of the cardiovascular, respiratory, and central nervous systems. It is very important to carefully consider the potential risks and benefits of both ECT and alternative treatments for a patient [2, 4]. ECT is associated mostly with the common adverse effects of general anesthesia, such as nausea, vomiting, headache, muscle aches, and, rarely, cardiopulmonary complications or prolonged seizures [3,4]. The mortality rate is, however, low – 0.06–0.8%, mostly caused by cardiac complications [3]. The most disturbing adverse effect is memory impairment, which is usually transient [2,7].

Knowledge and attitudes concerning ECT

Although ECT is an efficient and safe therapeutic procedure, part of the general public and some professionals consider ECT to be controversial, dangerous, or even unethical.

Reasons for the stigmatization are various. They are usually associated with outdated ideas of psychiatry, with ignorance, inaccurate information, and prejudice, and with terrifying depictions of ECT in movies and other media, as well as with misunderstandings of this procedure; for example, some people understand ECT as a form of punishment of a patient. Those reasons lead to concern about the overuse or misuse of this procedure. Fear of using electricity in a head area and causing an epileptic paroxysm could be another important factor [7]. However, therapeutic procedures employing electricity are used in other medical fields without similar stigmatization; such procedures include electrocardioversion or electrotherapy in physiotherapy.

Studies evaluating attitudes of medical students towards ECT, their knowledge, and the effect of different teaching methods have been conducted in many countries. A review of the literature, references, and the findings of these studies is provided further in the text. The reviewed studies were conducted between 1992 and 2016, and contain data obtained from the United Kingdom, United States of America, Australia, India, Greece, Hungary, Turkey, Egypt, and Iraq.

The wide range of years reflects the relative scarcity of data as well as the fact that ECT is an old therapeutic procedure that has been used for more than 70 years [1]. According to available data (Medline database), no similar research has been performed in the Czech Republic.

Studies show that the levels of knowledge about ECT are diverse. Direct associations were found between good knowledge about ECT and more positive attitudes to this therapeutic procedure [8]. Insufficient or incorrect information, commonly obtained from the media or outdated and inaccurate depictions of ECT in movies, usually leads to negative attitudes [9–11].

The role of theoretical lessons and practical demonstrations of ECT procedures in influencing student knowledge and attitudes is unclear. A positive impact was described on the attitudes of students who observed an ECT session or saw an educational video about ECT compared with a group of students who did not experience one of these two teaching methods [12]. Another study came to a similar conclusion, i.e. students who participated in theoretical lectures as well as in direct observation of the procedure had more positive attitudes towards ECT than a group of students who only attended theoretical lectures [13]. Solomon et al. evaluated the effectiveness of theoretical and practical lectures followed by interaction with a patient and his family on medical student knowledge and attitudes towards ECT. Each of these approaches led to improved knowledge about and attitudes towards ECT. The authors suggested that exposure to ECT and interaction with patients should be part of lessons to improve student knowledge and attitudes about this safe, effective, and potentially lifesaving treatment procedure [14]. Another study examined whether direct participation and observation could affect medical student perceptions of ECT. At the end of lessons, most students expressed a more positive view of ECT than at the beginning. This change occurred similarly, regardless of whether medical students observed or participated in ECT. This may indicate that both instructional methods are equivalent in improving medical student perceptions of ECT [15].

The positive impact of any kind of education on medical student attitudes, whether theoretical lessons or practical demonstrations, has been demonstrated in other studies [16–20].

Surveys assessing student knowledge and attitudes regarding ECT repeatedly ascertained that before proper education, many students perceived ECT as a painful, cruel, and barbaric procedure causing brain damage. They thought that it was misused, that it was used to punish violent or uncooperative patients, that it was outmoded, and that it should be banned [21,22]. Many students also believed that the use of ECT should be governed by law [21]. It is clear that it is necessary to improve undergraduate education concerning ECT [9,14,21] because theoretical and practical training in

ECT play an important role in increasing the level of knowledge of ECT and decreasing the prevalence of negative attitudes towards ECT among medical students [23], and therefore among future physicians.

METHODS

Aims and hypotheses of the study

The first aim was to evaluate knowledge about and attitudes towards electroconvulsive therapy among General Medicine undergraduates studying at the Faculty of Medicine of Masaryk University. The second aim was to assess the effectiveness of theoretical and practical lessons about ECT at the Department of Psychiatry. The third aim was to improve education and awareness about ECT and through this improvement to promote the destigmatization of this therapy that has a justified place in contemporary psychiatric practice.

Our hypotheses were as follows:

1. Knowledge of students about ECT will be based on information acquired from mass media more than from specialized literature. They will have limited levels of knowledge about ECT at the beginning of the lessons; their success rate in the knowledge questionnaire will be maximally 50% correct answers. Most of the students will have negative or neutral attitudes towards ECT.
2. Students who have had previous personal contact with psychiatry or whose relatives have been treated by a psychiatrist will have more positive attitudes and better knowledge.
3. At the end of the lessons, most of the students will have a higher level of knowledge about this therapeutic modality and there will be a higher percentage of students with positive attitudes than at the beginning. Students who are present during actual ECT procedure will have better knowledge and more positive attitudes at the end of the lessons.

Design of the study

All of the General Medicine students, studying in Czech, beginning lessons at the Department of Psychiatry of University Hospital Brno and Faculty of Medicine of Masaryk University who were willing to participate in the survey were eligible. The survey was approved by the ethics committee of the Faculty of Medicine of Masaryk University.

At the beginning of the psychiatry lessons, students were informed about the research project, the opportunity to participate, and the conditions of their potential participation. The completion of the questionnaire was absolutely voluntary for students. Students filled in questionnaires with their informed consent. The completion of the questionnaire was also a statement of consent to participate in the study. The

questionnaires were anonymous. Personal student data were not obtained or processed. Students had the opportunity to terminate their participation in the study without giving a reason only in the course of completing the questionnaire; after the questionnaire was completed, termination was no longer possible. Completing or not completing the questionnaires did not influence student assessment during lessons.

The questionnaire was filled at the beginning and at the end of the lessons, that means at the beginning and after the completion of all theoretical and practical lessons. In this way, it was possible to evaluate student knowledge and attitudes that were not influenced by lessons and any changes after finishing the course.

The questionnaire used in the study had three parts. The first part contained questions about basic demographic data, previous experiences with psychiatry, and sources of information about ECT before the lessons. The second part consisted of questions focused on knowledge about ECT (29 questions), and the third part dealt with attitudes (16 questions). Questions in the questionnaire were mainly of closed format and Likert-type questions. Questionnaires contained a combination of questions that had been repeatedly used in the reviewed studies. This approach ensured the comparability of our results with results from previous studies. Two versions of the questionnaire were created. Version A was used at the beginning of the psychiatry course and version B was used at the end of the course. The knowledge and attitude questions were the same in both versions.

STATISTICS

The variables compared across groups of students were the number of correct answers in the knowledge part of the questionnaire and the proportions of favorable answers for each question in the attitude part of the questionnaire. The results obtained before the lessons were compared with those after the lessons. When taking into account just the results from the questionnaire administered before the lessons, two groups of students were contrasted – those with previous experience with psychiatry and those without such experience. Similarly, two groups of students were compared when processing the results of the questionnaires administered after the lessons: students who had the opportunity to be present during ECT administration and students who were not able to observe the procedure.

Distribution of knowledge scores was evaluated by the Shapiro-Wilk test. As the distribution was not normal, Wilcoxon rank-sum test was used for the comparison of the aforementioned group pairs. Differences in attitude proportions were tested using Fisher's exact test. P-values lower than 0.05 were considered statistically significant.

Statistical analysis was conducted using R statistical library.

RESULTS

Demographics, descriptive statistics and sources of information about ECT

Demographics and a basic description of the sample are summarized in Table 1 and Figure 1. In total, 148 students were enrolled in the survey, all students in the 5th year of general medicine. All the enrolled students filled in both the first and second questionnaire. However, some of the students did not fill in all of the questions, which led to some discrepancies in further processing of the data. The sources of information and the numbers of students who did or did not observe ECT during the lessons is depicted in Figure 2. The influence of different sources of information on student attitudes towards ECT is summarized in Figure 3.

Knowledge scores

There were 29 questions in the knowledge part of the questionnaire. The numbers of correct answers among the different groups of students are summarized in Table 2. Before the lessons, the median of correct answers was 15 (interquartile range, IQR = 7). Students with previous personal experience with psychiatry were generally more successful (median = 18, IQR = 6) than students without previous experience with psychiatry (median = 15, IQR = 8). This difference was statistically significant ($p = 0.005$).

After the lessons, the number of correct answers increased (median = 25, IQR = 5). The difference in the number of correct answers before and after the lessons was statistically significant ($p < 0.001$). There was not a statistically significant difference between the success rates of students who were present during an ECT procedure (median = 25, IQR = 6) and those who were not (median = 25, IQR = 4).

Attitudes

The texts of the questions in the attitude part of the questionnaire as well as the percentages of different answers to each question are summarized in Figures 3, 4, and 5. It is important to note that a favorable answer to a question can mean a positive or negative attitude, depending on the question.

The number of students who answered all of the questions in the attitude part of the questionnaire were: 137 (92.57%) before the rotation, 144 (97.3%) after the rotation, 24 (96%) with previous experience with psychiatry, 113 (91.87%) without previous experience with psychiatry, 50 (89.29%) students who observed ECT during the rotation, and 86 (94.51%) students who did not observe ECT.

When comparing student responses to the attitude questions before and after the lessons, there was a statistically significant shift in attitude question 2 (before lessons 86 – 62.77%, after lessons 138 – 95.83%, $p < 0.001$), question 3 (before lessons 30 – 21.90%, after lessons 17 – 11.81%, $p < 0.02$), question 6 (before lessons 33 – 24.09%, after lessons 17 – 11.81%, $p < 0.001$), question 9 (before lessons 22 – 16.06%, after lessons 92 – 63.89%, $p < 0.001$), question 10 (before lessons 80 – 58.39%, after lessons 107 – 74.31%, $p < 0.001$), question 13 (before lessons 122 – 89.05%, after lessons 140 – 97.22%, $p < 0.001$), the C variant of question 15 (before lessons 12 – 8.76%, after lessons 32 – 22.22%, $p = 0.001$) and the C variant of question 16 (before lessons 8 – 5.84%, after lessons 35 – 24.31%, $p = 0.001$).

In responses gathered before the lessons, statistically significant differences were found between students with and without previous experience with psychiatry in question 9 (with previous experience 8 – 33.33%, without previous experience 14 – 12.39%, $p = 0.01$), the C variant of question 15 (with previous experience 5 – 20.83%, without previous experience 7 – 6.19%, $p = 0.03$) and the C variant of question 16 (with previous experience 4 – 16.67%, without previous experience 4 – 3.54%, $p = 0.03$).

In responses after the lessons, there was a statistically significant difference between students who were present during ECT and those who were not present only in question 2 (were present during ECT 56 – 100%, were not present during ECT 81 – 93.10%, $p = 0.04$) and question 3 (were present during ECT 2 – 3.57%, were not present during ECT 14 – 16.09%, $p = 0.02$).

DISCUSSION

We conducted a survey concerning knowledge about and attitudes towards ECT in students of General Medicine. General Medicine is a 6-year study program; students are supposed to complete their psychiatry rotation in the 5th year of their study. A total of 313 Czech-speaking students attended their psychiatry rotation in the 2015–2016 school year. This survey took place in the fall semester, during which 148 students were enrolled.

Sources of information about ECT

Consistently with our hypothesis, before the lessons the majority of students got their information about ECT from movies and television. Most of such students considered the depiction of ECT in the media to be negative and more than one third of the students stated that this depiction had a negative effect on their own attitudes.

Our finding that prior to their psychiatry rotation, medical students got their information about ECT mostly from the mass media is consistent with previous similar studies [9,11,21]. The fact that students

considered the depiction of ECT in films to be negative and felt that this depiction influenced their attitudes in a negative way supports the findings of the interventional study by Walter et al. [10] in which clips from several popular movies had a profound negative effect on student attitudes. The influence of negative depictions of ECT on attitudes can even be covert, as shown in a study by Clothier et al. in which students who considered themselves more knowledgeable about psychiatric illnesses had a more negative bias towards ECT, with the sources of their knowledge being college lessons as well as movies [9]. On the other side, several studies found that improvements in student attitudes are usually accompanied by increases in student knowledge [12,14,16–18,20,24,25]. In other studies, even theoretical lessons about ECT were sufficient to increase both student knowledge and attitudes [16].

It appears that the two most important factors in shaping the attitudes of students about ECT are the amount of knowledge and the depiction of the treatment procedure in sources to which students are exposed. As the knowledge about psychiatry and psychiatry treatment procedures in medical students prior to their psychiatry rotation is rather low, and the depiction of ECT in the mass media is mostly negative, it could be expected that students approach ECT with a priori negative attitudes, as demonstrated by previous studies [9,10,17,21,22].

However, in our sample, the baseline attitudes of students were not generally negative (see below). There are several possible explanations: It is possible that the exposure of students in the Czech Republic to negative depictions of ECT is limited in comparison with other countries. Another explanation is the good theoretical preparation of students in previous years. We can also hypothesize that students tried to complete the survey as they thought psychiatrists would like them to. Because the student knowledge about ECT in our sample was not optimal (see below) and previous results in other countries have shown differences in attitudes towards ECT [26], the most probable explanation appears to be the first one.

From the results of our own and previous studies we can conclude that: (i) students do not use appropriate sources of objective information about ECT before formal psychiatry lessons; (ii) before the psychiatry rotation, student information about ECT comes

predominantly from mass media; and (iii) depictions of ECT in popular media are, in general, negative.

Knowledge

Our findings of a relatively low baseline level of knowledge about ECT in students before the lessons and its significant increase after a two-week rotation at the Department of Psychiatry was in accordance to our hypothesis, as was the fact that students with previous personal experience with psychiatry were significantly more successful in the knowledge test. On the other side, there was no effect of personal experience with ECT during psychiatry lessons on knowledge scores after the two-week rotation at Department of Psychiatry.

Limited knowledge about ECT in students of medicine before the psychiatry lessons was repeatedly demonstrated [9,10,14,17,22,26]. The extent of baseline student knowledge about this topic tends to vary in different countries, with possible reasons for this being cultural differences and differences in educational systems [26]. Our results, of approximately 51% correct answers in the knowledge test before the rotation, is within the range of results from other comparable studies [14,17].

The improved student knowledge after the lessons was consistent with our hypothesis and in accordance with other similar studies [12,14,16,17,18,20,24,25]. In our sample, the overall improvement in the percentage of correct answers was highly significant; it went from approximately 51% to 86% correct answers.

We observed that students with previous personal experience with psychiatry were significantly more successful in the knowledge test before the rotation than students without such experience. It appears that previous personal experience with psychiatry can give students an edge in knowledge over other students even about such specialized types of treatment as ECT. The explanation can be that those students tried to

TABLE 2. Knowledge scores of the students. Median and interquartile range (IQR) is depicted. Note that groups of students with and without experience with psychiatry were assessed before the lessons; groups of students who had or had not seen ECT were assessed after the lessons. Statistically significant results are highlighted: a) p < 0.001, b) p = 0.005

| Student group | Median | IQR |
|---|-----------------|------------------|
| Before the lessons | 15 ^a | 7 ^a |
| After the lessons | 25 ^a | 5 ^a |
| With personal experience with psychiatry | 18 ^b | 6 ^b |
| Without personal experience with psychiatry | 15 ^b | 7,5 ^b |
| Have seen ECT during the lessons | 24,5 | 6 |
| Have not seen ECT during the lessons | 25 | 4 |

TABLE 1. Basic demographics of the sample

| Age | Median | IQR |
|--------------------|-------------|--------------|
| | 23 | 1 |
| Gender | Male | Female |
| | 41 (27.70%) | 107 (72.30%) |
| Place of residence | City | Village |
| | 94 (63.51%) | 54 (36.49%) |

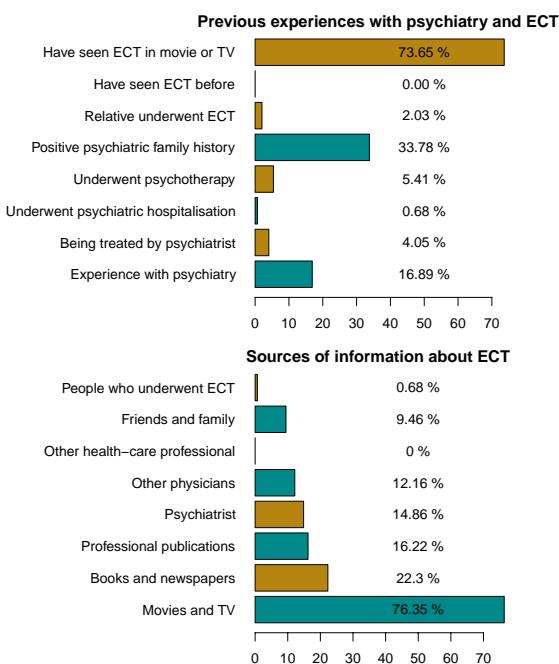


FIGURE 1. Student experiences with psychiatry and ECT and their source of information about ECT before the lessons

get more information about the field of psychiatry beforehand or that previous exposure to problematics of mental disorders and psychiatry allowed them to have a more realistic view over the whole of this medical field.

On the other side, we did not observe any significant difference in student knowledge after the rotation when comparing students who were able to observe an ECT procedure personally and those who were not. This means that theoretical lessons were sufficient for improving student knowledge about ECT. There are several studies with similar results to our own [12,18,19,25], but also several works that have shown an advantage in seeing an ECT procedure over pure theoretical lectures or texts [13,14]. It can be expected that theoretical lessons improve student theoretical knowledge, but it is interesting that several authors observed that witnessing an ECT procedure further enhances that knowledge. One possible explanation is that students might have had more opportunities to ask additional questions and thus were able to get more relevant information. In any case, it appears

that a system of theoretical lessons and the amount of information conveyed by them are the most important factors that influence student knowledge. In some situations, direct demonstrations of ECT procedures can be advantageous; however, it is possible to significantly improve student knowledge even without it.

Attitudes

With the relatively high number of attitude questions with different levels of emotional salience, it is not possible to summarize student attitudes similarly to their knowledge. The questions that can be considered the “ultimate test of attitudes” are questions 15 and 16 – whether the student or the student’s relatives should undergo ECT if needed. Surprisingly, in spite of relatively low knowledge scores, the baseline attitudes of students towards ECT were not overall negative. Because of this, changes of attitudes towards more positive ones were observable, but less pronounced than we expected.

Even before the lessons, the majority of students generally admitted that ECT still had a place among other treatment modalities; they did not consider it an obsolete procedure and they did not think that this procedure was abused. The acceptance of electricity use in medicine was also exceptionally high. Another interesting result was the relatively high number of students who would undergo ECT (question 15) or encourage ECT use in their relatives (question 16) if needed.

As was already mentioned, the lessons did not dramatically change student attitudes. The change was more in the form of a slight shift that possibly reflected greater understanding of this procedure after the rotation. It was apparent that the students began to look at ECT similarly to other therapeutic procedures. There was a decrease in the percentage of students who considered ECT a dangerous procedure that needed to be regulated by a law. As a result, acceptance of this treatment rose and students were more willing to undergo this procedure or persuade their relatives if needed.

Results before the lessons were similar even when analyzing groups of students with and without previous experience with psychiatry separately. Attitudes remained relatively positive in both groups. However, there was apparently a greater acceptance of ECT and willingness to undergo this procedure without

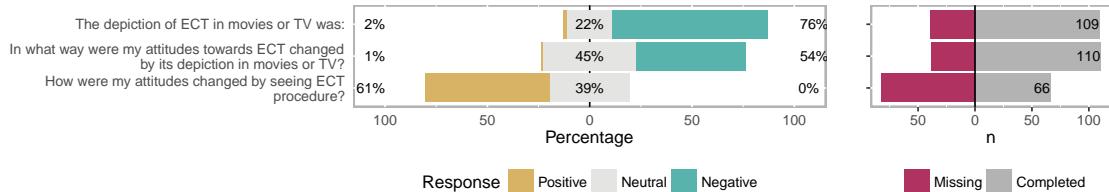


FIGURE 2. Student opinions of how their attitudes towards ECT were influenced by movies and television as well as perceived changes in their attitudes after they observed ECT during the lessons. Percentages of missing answers are depicted in the second bar plot

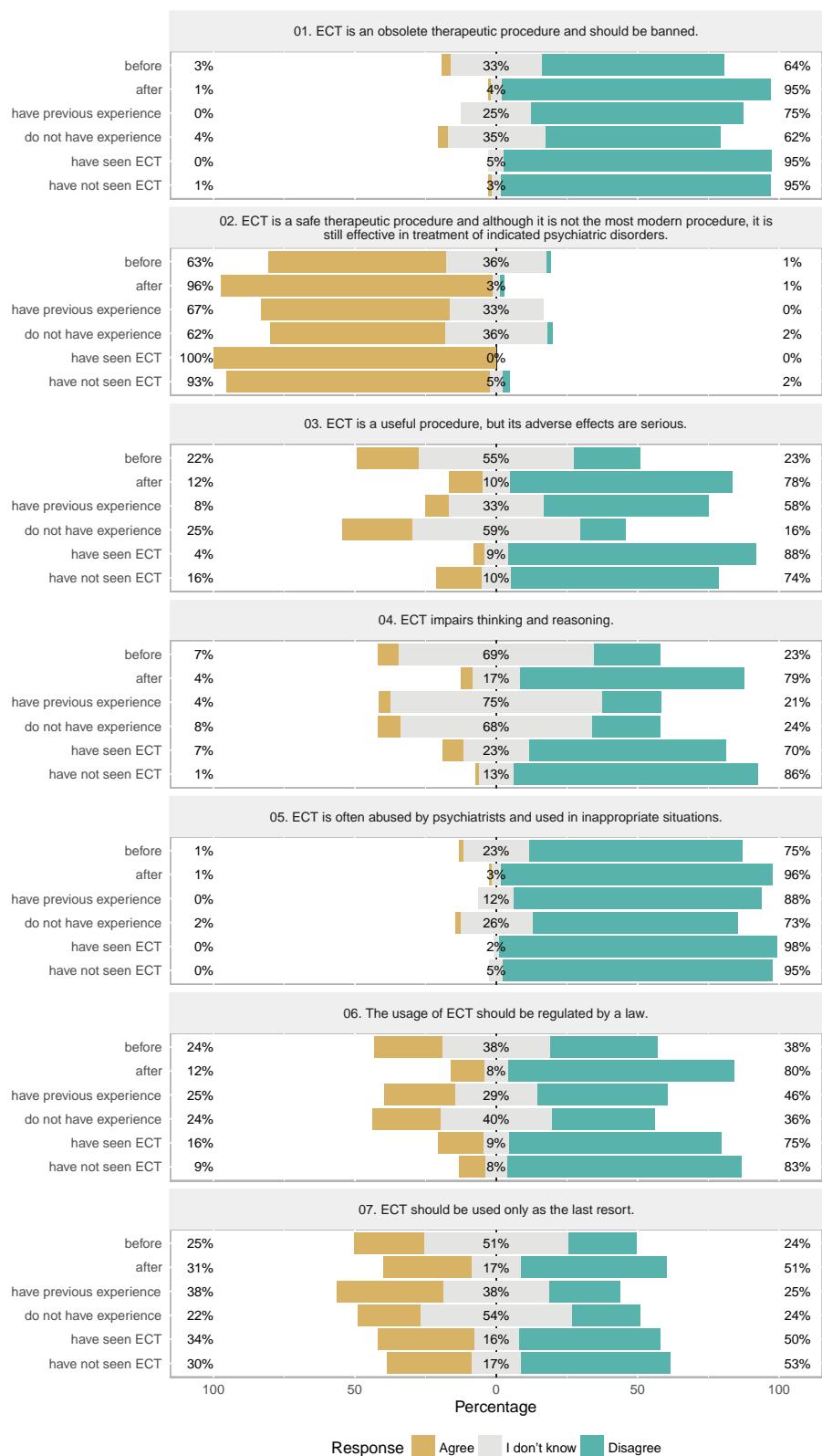


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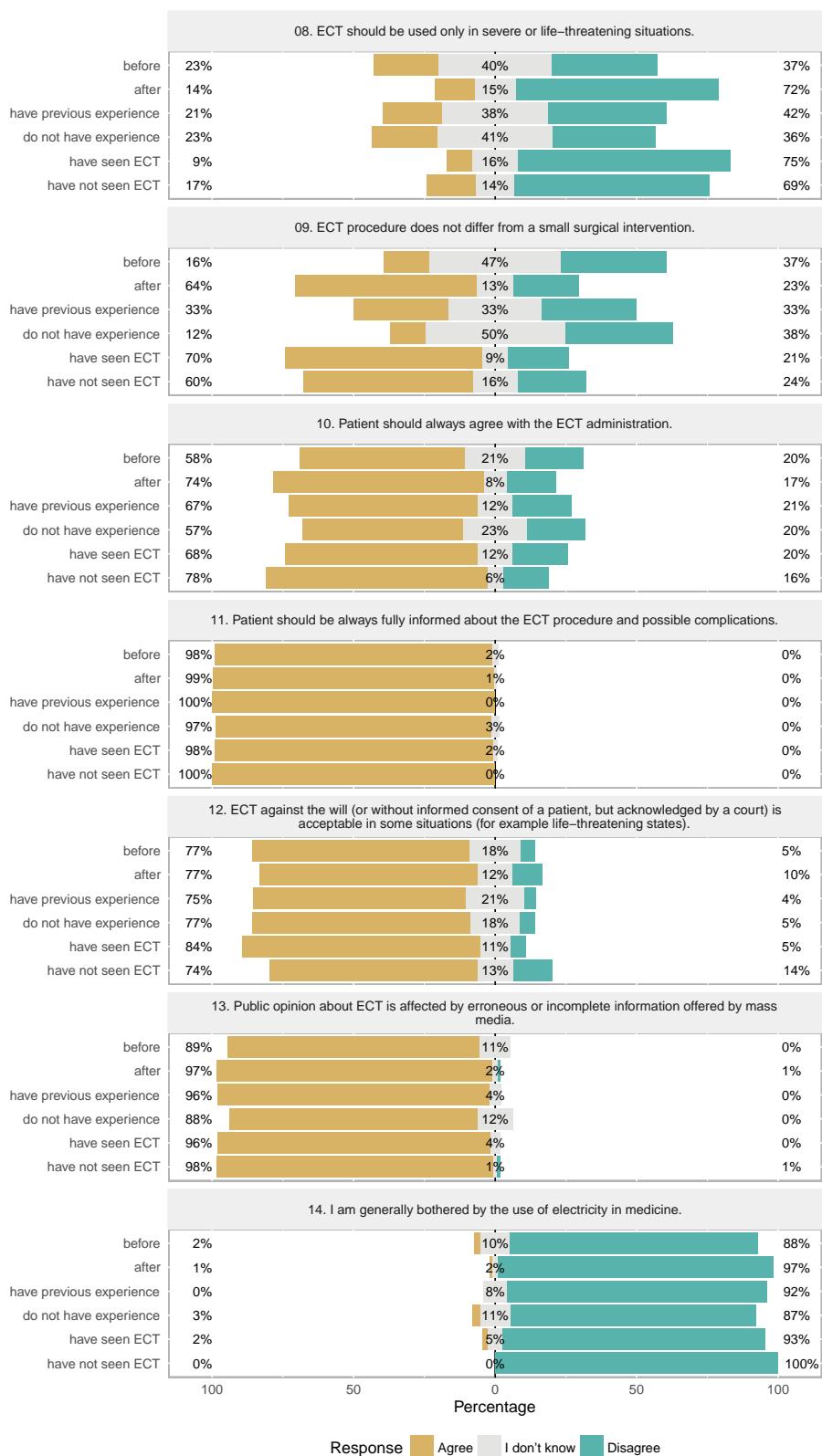


FIGURE 4. Diverging stacked bar plots and summary of the second 7 questions in the attitude part of the questionnaire and student responses

reservation in the group of students with previous experience with psychiatry.

Contrary to our expectations, we did not observe a pronounced effect of ECT demonstration on student attitudes. Students who were present during ECT administration had similar attitudes to students who had no opportunity to see this procedure. Attitudes were similarly positive in both groups. The only difference was that in the group of students who had seen the procedure there were significantly more students with more positive views of ECT efficacy and its adverse effects.

A majority of previous studies found negative attitudes towards ECT in students before psychiatry lessons [9,10,12,14,16,17,21,22]. As stated above, the attitudes in our sample can hardly be described as generally negative; for example, only 2.7% students would reject ECT if ill and the same percentage would be against their relatives undergoing ECT. To compare, in another study, the percentage of students who would dissuade family members or relatives from ECT was 10% [10]. Possible causes for our results differing from the majority of other studies were discussed in the section dealing with sources of information about ECT.

Changes in attitudes after proper education about ECT and psychiatry has been repeatedly observed [10,13,14,16–18,20,24–27]. In this regard, our results do not differ. As already mentioned, there was an observable and significant shift in many attitude questions towards more positive attitudes.

Whether being present during an ECT procedure influences student attitudes more than theoretical information can be a subject of debate. An effect of ECT demonstration was observed by some authors [20,24], but not by others [18,25,27]. Our study belongs to the

second mentioned group. We can speculate that this result stems from relatively positive baseline attitudes and probably from the possibility that students in the Czech Republic are exposed to negative images of ECT less than students in other countries.

It appears that in our sample the most important factor influencing attitudes is the greater knowledge about ECT which students get during lessons. It is probable that changes in attitudes are dependent on how the information about this procedure is conveyed to students. In some situations, proper theoretical lessons appear to be sufficient to improve student attitudes about this topic.

Study limitations

Several factors could have influenced our results.

Although the questionnaire was administered during the lessons, actual control of whether the students completed it independently was limited. We tried to increase this possibility by informing the students that completing the questionnaire was voluntary and anonymous and that it would not influence their final grades for the psychiatry rotation.

There is a possibility that some students answered questions untruthfully. This is probably the case with several students who answered most of the questions 'I don't know'. However, the number of students replying in this way was low.

Another limitation is similar to the previous one and mostly regards the attitude part of the questionnaire. Students might have answered questions not according to their actual convictions but in a way they thought we would like them to. This is a serious limitation which might have influenced the results of the

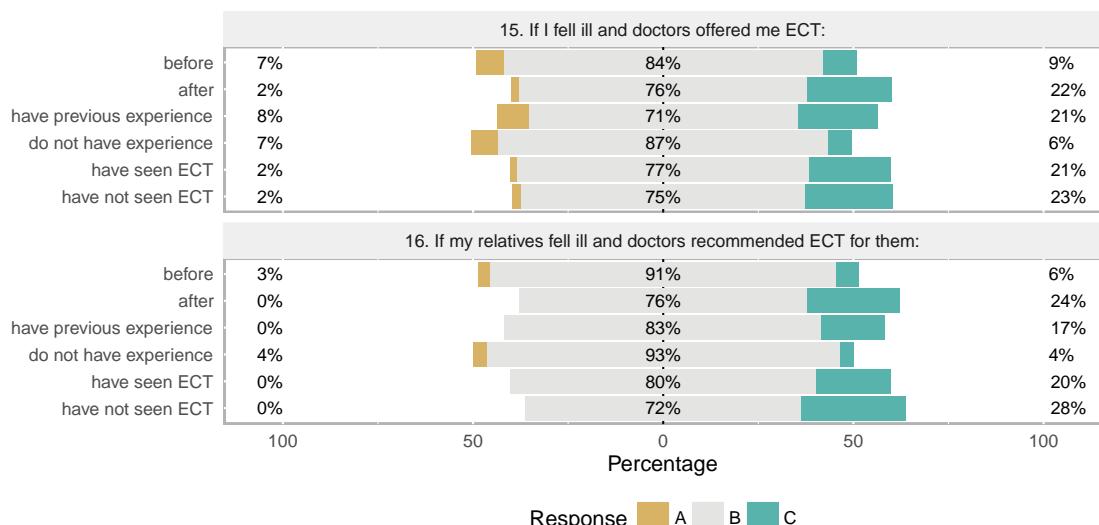


FIGURE 5. Diverging stacked bar plots of the last two questions in the attitude part of the questionnaire and student responses. Responses were formulated as follows: A) "I would strongly oppose it" B) "I would be worried, but I would support the recommendation" C) "I don't have any reservations against ECT, it is a therapeutic procedure not different from other procedures. I would support the recommendation"

attitude part. However, the extent of this limitation remains unknown.

The last limitation is related to the way the attitude questions were worded. It is not possible to objectively measure how strongly these questions reflect student attitudes. Therefore, it is not possible to summarize this part of the questionnaire in the same way as the knowledge part. We tried to solve this by evaluating every question independently, as stated in the section concerning the methodology.

SUMMARY

The depiction of ECT in the mass media is mostly negative and it is also perceived as such by medical students. This negative depiction influences student attitudes towards this treatment procedure. Knowledge of students about ECT prior to their psychiatry rotation is very limited. However, the attitudes of Czech students towards ECT are not generally negative. For example, a majority of students would undergo ECT if needed and even more would agree with ECT for their relatives. A two-week psychiatry rotation positively influences student knowledge and attitudes.

Knowledge is influenced dramatically. The change in attitudes is positive, yet less pronounced. It appears that the attitudes of students towards ECT is the result of knowledge about the topic and how this procedure is depicted in the mass media. After the lessons and after the knowledge of students increases, their attitudes also improve. We can speculate that the most important factors in improving student knowledge about and attitudes towards ECT are gaining more information about the procedure via theoretical lessons and having direct contact with psychiatry.

Two to three months after the lecture, one quarter of the participants of the youngest age category ($N = 299$) were called on to answer the same questions as they were given before the lecture and immediately after, in order to ascertain the long-term effect of the educational event. Table 2 shows principal results of the study. Figure 2 shows the distribution of number of correct answers. Unfortunately, we are not able to link data from questionnaires before lectures and after 2 to 3 months, so the results are not shown for the same group of participants (n value is different).

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HARNESSING REAL WORLD DATA FROM WEARABLES AND SELF-MONITORING DEVICES: FEASIBILITY, CONFOUNDERS AND ETHICAL CONSIDERATIONS

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Abstract — *The increasing usage of smart phones has compelled mobile technology to become a universal part of everyday life. From wearable gadgets to sophisticated implantable medical devices, the advent of mobile technology has completely transformed the healthcare delivery scenario. Self-report measures enabled by mobile technology are increasingly becoming a more time and cost efficient method of assessing real world health outcomes. But, amidst all the optimism, there are concerns also on adopting this technology as regulations and ethical considerations on privacy legislations of end users are unclear. In general, the healthcare industry functions on some stringent regulations and compliances to ensure the safety and protection of patient information. A couple of the most common regulations are Health Insurance Portability Accountability Act (HIPPA) and Health Information Technology for Economic and Clinical Health (HITECH). To harness the true potential of mobile technology to empower stakeholders and provide them a common platform which seamlessly integrates healthcare delivery and research, it is imperative that challenges and drawbacks in the sphere are identified and addressed. In this age of information and technology, no stones should be left unturned to ensure that the human race has access to the best healthcare services without an intrusion into his/her confidentiality. This article is an overview of the role of tracking and self-monitoring devices in data collection for real world evidence/observational studies in context to feasibility, confounders and ethical considerations.*

INTRODUCTION

mHealth is an abbreviation for mobile health (a component of eHealth), a term for the practice of medicine and public health supported by mobile devices [1]. It is the generation, aggregation and dissemination of health information via mobile and wireless devices [2].

The rapid proliferation of mobile platforms and incessantly increasing usage of smart phones has compelled mobile technology to become a ubiquitous part of everyday life. The practical utility, greater flexibility and opportunity for improving human health via mobile devices offers myriad opportunities for diverse industry verticals, especially the healthcare industry. Wireless medical sensors or mobile biosensors are rampantly being utilized by physicians and other medical personnel to accumulate real-time information holding invaluable clues to manage efficiently some of the most devastating human diseases

that are chronic in nature, more so non communicable diseases (NCD). From wearable gadgets to sophisticated implantable medical devices, the information extracted with mobile technology has the potential to revolutionize the manner in which clinical research is conducted and care is delivered [3]. Further, by providing patients with sensors, wearable gadgets and apps, data is captured in an unobtrusive way. This data is real time, objective and e-sourced. The information assimilated via mHealth allows physicians or investigators to work with more complete data sets and they can identify digital biomarkers that set the path for more intricate research. But, the greatest impact in instrumenting and accumulating patient data for clinical studies is the ability to rethink end points resulting in more effective outcomes, particularly for R&D. Hence, it is critical to make early mHealth projects a success to prove the value of data by applying data science techniques to derive actionable insights.

Designed studies often encounter obstacles in generating and collecting multiple data points. The likelihood arises from the desire of capturing direct evidence from patients [4]. Therefore, the utility of self-tracking devices comes into the picture here to generate meaningful insights on real-time basis. Though the research literature in this area is very limited, lessons can be learnt from other areas, which offer battling techniques for data breaches in mHealth [5]. But, there is the frequent drawback of mobile technology developers being unclear on the regulations and ethical considerations on privacy legislations of end users. For example, biosensors and wearable gadgets like fitness monitors, cry translators, diabetes manager, blood pressure monitors, and pain assessors with smart phones, to name a few, are intruding our lives and can raise many ethical issues in this digital era [6–8]. All these wireless access technologies are exposing our body to the outside world easily and like never before. There is no clear certification or clarity of precise functionality of these applications, especially concerning areas like protection of privacy and confidentiality, data security, lack of informed consent/assent of a minor etc. [9]. Many application managers take decisions based on patient feedback which may not be authoritative, reliable and can ignore mental limitations, leading to adverse consequences.

In most jurisdictions worldwide, except the USA, there is no privacy legislation to define the collection, use and disclosure of data, including healthcare data collected through consumer facing apps [10]. The United States of Food and Drug Administration (US FDA) released its long-awaited final guidance on mobile medical apps in September 2013 and reissued it in February 2015. It positions the agency's present ideas on the fast-evolving mobile technology space. The US FDA has made it clear that this guidance applies only to a subset of mobile apps that can transform a mobile platform into a regulatory medical device [11]. On this ground, the US FDA has cleared around 23 notable digital health apps devices in 2014 [12].

The US Department of Veterans Affairs has embarked on a new clinical trial of post-traumatic stress disorder by using PTSD apps. The study is designed to "assess the feasibility of recruiting participants and get a preliminary read on the efficacy of the technology with or without clinicians" [13].

In general, the healthcare industry functions on a few regulations and compliances to ensure the safety and protection of patient information. Regulations for patient privacy and safety with mHealth apps are:

- The Health Insurance Portability Accountability Act (HIPPA);
- Health Information Technology for Economic and Clinical Health (HITECH)

The first act was made a law in 1996, whereas the second one came into being in 2009. Importantly,

HITECH regulations do not replace HIPAA regulations. Rather, "it adds greater fines and penalties for noncompliance" [14].

The mobile healthcare space is a high growth area. It is estimated that around 500 million smartphone users worldwide are expected to use a healthcare app by 2015 [15] and half of more than 3.4 billion smartphone and tablet users likely will have downloaded mobile health applications by 2018 [16]. According to Healthcare Information and Management Systems Society (HIMSS), around 100,000 health, fitness and medical related apps are available in more than 60 app stores as per the latest estimates. It is expected that developed countries are likely to spend nearly 15 percent of their GDPs on healthcare within the next two decades [17]. The signs are indicative of groundbreaking changes in the medical sciences arena.

HIMSS defines four sectors in healthcare that deal with mHealth [17]. But, regulatory guidance is yet to be shaped on the following:

- Consumer-oriented medical apps
- Apps for medical professionals
- Apps for patient engagement
- Clinical care apps

DISCUSSION

Tracking and self-monitoring devices usage is on the rise and it is unquestionably transforming the healthcare industry

The preceding years have demonstrated a gradual shift from orthodox modes and traditional instruments to self-monitoring devices or mobile apps to identify and gather patient data. But, the understanding is still limited on the diverse array of healthcare apps available to consumers, their roles, and the barriers to enhance their recommendation and support from providers, as well as the essential requirements for mobile apps for a passage into the mainstream of healthcare.

New patient technologies help caregivers work more efficiently with real-time information on patients and updates on labs, orders, and other notifications that are crucial to their workflow. Tracking technologies optimize the "flow" of patients in the emergency department (ED), the inpatient setting and increase the number of acute care transfers entering a facility [18].

Self-report measures may be a more time and cost efficient method of assessing psychosis than clinical interviews, as they do not require the presence of a trained assessor. Thus, self-report measures may be the more attractive option for clinical assessment [19].

Self-monitoring devices include those that assist patients to manage diabetes and prevent cardiovascular complications (CVCs). Although recent surveys

indicate that patients are willing to manage their own care, the clarity is missing on the knowledge level of these patients on self-monitoring techniques, their accessibility, and feasibility of their implementation into daily life.

Remote patient monitoring with cell phones, smart phones, and other wireless technologies (internet-based applications) are becoming accessible, especially to self-manage diabetes and adhere to exercise and diet regimens. These data collection tools can be used in a home setting or while traveling, at a minimal cost to the patient and the provider. Also, simple reminder schedules for self-monitoring can be established using such tools, and healthcare providers can oversee the progress via patient monitoring databases.

The impact of usability on self-monitoring device adherence is especially important in certain populations, such as younger patients with T1DM or T2DM, who may need additional encouragement and support to use their devices and regulate their metabolic functions [20].

Aside from recreational uses, global positioning system (GPS) devices are extremely beneficial to a number of social groups. A couple of articles recognized the benefits of GPS in tracking wandering dementia patients – “Technology Applied to Address Difficulties of Alzheimer Patients and Their Partners” [21] and “Location System for Dementia Wandering” [22].

The first article discussed convergence as the devices used in the prototype were made from a combination of GPS and GSM (global system for mobile communications) technologies. The second article “Location System for Dementia Wandering” discussed the combination of GPS and a mobile phone to discover the practical applications of tracking dementia patients. This program is known as “Guide Me” [23]. The devices also maintained the privacy of dementia patients as they did not want to be contacted openly by their caregivers and divulge information that was uncomfortable for them to share openly.

Intel Corporation launched a personal health system known as the “The Intel-GE Health Care Management Suite” post an approval from the Food and Drug Administration [24]. It combines a device used by patients at home with an online interface that permits healthcare professionals to remotely monitor and manage the medical conditions of patients. It generates continuous information about patients’ vital signs and offers educational information, patient reminders, surveys, and video-conferencing capability [25].

Self-monitoring devices are an important component of wellness and engagement. They generate volumes of data that venture beyond the commercial realms of improving profits and reducing overheads, and are used at advanced levels to predict epidemics, cure diseases, improve quality of life and tackle avoidable deaths [26]. The challenge lies in accumulating sensible data out of the snowballing data sets that are

rampantly on the rise and utilizing them accurately. Too much data can be sometimes overwhelming.

The technology sphere is also witnessing remarkable refinements in wearable devices. “While personal devices today are largely if not completely external, the next generation may be ones that are implanted under the skin. Such devices could include artificial retinas, glucose monitors, organ monitors, cancer detectors, and general health monitors” [27]. In this case, technology needs to play a crucial role in enabling and educating the patients to understand, use and accept medical devices. Technology also enable self-monitoring and self-maintenance, allowing patients to lead a quality life without external dependence all the time. There are areas in which patients may be ignorant and educating them in these areas helps counter symptoms earlier than anticipated. There are instances where technology is going beyond traditional paths in patient education. It proved to be an effective tool for them to understand the symptoms, aura and take action earlier.

Drawbacks in data tracking and self-monitoring devices

Self-monitoring devices like SMBG (self-monitoring blood glucose) have consistently been effective to assess glycemic control in resource-rich settings for patients with high risk to develop diabetes-related complications. But, questions are still raised on their performance within resource-constrained settings.

Research necessitates evaluation of Interventions and outcome measures with respect to feasibility, adherence, and satisfaction of diabetes self-management devices and many trials use qualitative surveys or depend solely on the frequency of device uploads to the server to evaluate these. Calculating percentages in self-monitoring devices, evaluating patient or provider compliance with statistically rigorous methods can be difficult. In many cases, patients and providers are mostly contented with self-monitoring technologies, and self-management interventions, possibly due to better inspiration after learning how to use the technologies, and regular feedback [28].

Researchers argue that blood results from glucose meters are not as accurate as those from laboratory methods, although they are far more accurate than the earlier approach of visual color matching. However, there are confounding variables [29].

Operator-related errors are a more significant source of error than instrument-related errors [30]. For example, patient failure to calibrate the glucose meter regularly is a common cause of error. Improper storage of test strips, which exposes them to humidity or excessive temperature, can falsely elevate results. Glucose meters are also less reliable in the lower ranges of glycaemia and may overestimate true glucose values in the high glycemic range [31].

Similarly, a number of problems and limitations were recognized in studies related to patient's data tracking. A feasibility study inferred that the positioning of GPS and tall buildings had an effect on the experiments. Not only that, this experiment was also affected by the problems that arose due to environmental conditions like large snowflakes. There are limitations when using GPS to track dementia wanderers, although some solutions are suggested to overcome these [23].

In a study to determine the feasibility of obtaining written informed consent for participation in the Registry of the Canadian Stroke Network, patients neither gave nor refused to give consent because they were cognitively impaired, and a surrogate decision maker was not available. It was argued that in a publicly funded healthcare system, patients have a social obligation to permit their de-identified healthcare data to be used without their consent so that the healthcare system can be monitored and improved for overall benefit. But, it was also suggested that the decision to grant waivers of informed consent for clinical registries must be made carefully and should be based on the judgment of an independent research ethics board [32]. Ethical guidelines dealing with good moral duties over bad obligations were originally designed to protect individual human research subjects [33]. Developing country context has pushed the extrapolation of these principles to the community level, not only for research but at all levels of life. These include any actions for modifying disease progression, its prevention, curbing the morbidity and psychosocial well-being of an individual in a society.

Privacy is always a concern when using and tracking data via self-monitoring devices. Researchers are also attempting to distinguish the concepts of "privacy" and "security". "Privacy" is the right of an individual to make preferred choices in the collection, use and disclosure of their personal data. "Security" is the safeguard to protect the confidentiality, integrity and availability of data. Attempts are on to develop an appropriate legal scheme to share information amongst healthcare professionals across healthcare organizations globally. Advancement of internet technology in the health sector is showing a declining trend of face-to-face doctor-patient interaction on health related issues. Discussions on social media, online free advices and suggestions on any ailment with the aid of latest gadgets have virtually created a lot of confusion in patient management. As the patient diagnosis, treatment modalities and the entire patient related information are exchanged online, with no clear assurance of safeguarding the privacy and confidentiality, discussion on these ethical issues has become an important issue these days [34-36]. There is a belief that such privacy legislations are found mainly in developed countries [37]. Developed countries are using different steps to address these issues; like mandatory use of privacy settings which can safeguard patient

information online [38]. But such checks have their own disadvantages as there is no assurance that there would not be any breach of privacy or confidentiality with these checks. Digital monitoring and tracking of patient activities using advanced gadgets can breach the trust of professional relationship which outrages the autonomy [39]. In a recent study, researchers at the London School of Economics argued that developing countries are not adequately equipped to prevent patient privacy [40]. Hence, a review was invited on the national law on privacy of health related information. In the survey report of 2006 [41], it is concluded that in most countries there is some form of privacy protection law which governs and guides the collection and dissemination of personal information, but it also states that only a few countries have specific legislation addressing medical privacy.

From the discussions, a few questions arise:

- Are we doing more harm than good?
- Is non-maleficence overriding beneficence?
- Are the individual's privacy and choice protected?
- Is the risk-benefit assessment adequate and appropriate?
- Is the quality of life compromised?
- Is everyone equally benefitted?
- Or a basic question – Is technology required for the concerned situation?

It is important to address these questions before inventions and technology affect our lives in a way that they compromise our healthy tomorrow.

CONCLUSION

Overall the scope for mHealth to revolutionize the way healthcare is delivered is right now at a tipping point. The platform for delivery being almost ubiquitous, data penetration to the remotest corners of the globe, high acceptance of trackers and wearables leading to generation of data and the ability to not just manage, but prevent and manage diseases outside of a hospital setting holds high promise in an industry that is already expensive. However, challenges do exist in terms of reliability of service providers, patient privacy, data security and the accuracy of collected data to be able to make informed inferences and act on them. On the bright side, there are clear regulations shaping up, intra-operability standards are emerging and tools that help mine and understand the large amounts of data are being used more. There is a promise that in the near future there will be a time when personalized healthcare and prevention become a possibility on a mHealth platform combined with other technology innovations like drones. The motto goes "Healthcare is expensive; health is affordable" – it is to be seen how mHealth will help prevent diseases as well as reduce cost of disease management with remote tracking and management in the evolving future.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interests regarding the publication of this paper.

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MEFANET 2015: NEW FORMAT OF A TRADITIONAL CONFERENCE

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ABSTRACT — The ninth year of the MEFANET conference saw several organisational changes, which might have been perceived either as a facelift by some people, or even as a new model by others. What remained, however, was the desire to share one's own experience with modern approaches and technologies in the education of medical and health care disciplines, and to get new information and ideas from others.

Again, the MEFANET conference was held in late November in Hotel International Brno, Czech Republic. In 2015, however, the organisers decided to do things differently. In particular, more attention was paid to practical workshops, which took place in the afternoon of the first conference day. Unconventionally, the invited lectures and plenary sections with contributions of authors from across Czech and Slovak medical faculties took place on the second conference day.

The event started with a quick Wednesday's lunch, attended by participants of the first workshop and by the team of Petr Stourac, MD, PhD, head of the Department of Paediatric Anaesthesiology and Resuscitation, who guaranteed the entire section. The conference programme started with their workshop dedicated to interactive algorithms in the education of emergency medicine, which have been developed for many years now by this team within the AKUTNĚ.CZ® project. Divided into groups and led by expert instructors, workshop participants tried to create plausible clinical scenarios, which might possibly be later used in the education of physicians as well as non-physician health care professionals. After finishing their work, the participants presented both the basic structure of their scenario and "dead ends" in the form of unnecessary examinations or even patient harm, which might be intentionally set up to test the students' knowledge. Workshop guarantors were satisfied both with the variety of topics and with their contents.

The second practically oriented workshop was primarily aimed at participants of the CROESUS projects, in which three universities (Masaryk University, Pavol

Jozef Safarik University in Kosice, and St George's, University of London) are involved. However, other conference participants, who were interested in virtual patients, were very welcome as well. A theoretical introduction was followed by presentations by clinicians of different specialties, who were trained within the CROESUS project in the development of branched virtual patients and in the application of these patients in problem-based learning (PBL) sessions; the presentations involved drafts of virtual cases as well as examples of their implementation based on the OpenLabyrinth platform. Dr Andrea Pokorna from the Faculty of Medicine at Masaryk University then commented on their presentations, providing a valuable feedback for authors. Dr Pokorna emphasised that virtual cases should be interactive and should not contain excessive amount of information in the form of texts, which might actually distract the user's attention from solving the case. In the end, guests from the London team of Prof Terry Poulton also summed up their overall impression of the workshop.

For that matter, Dr Ella Iskrenko-Poulton was one member of this team, and also gave the first invited lecture entitled "Scenario-based learning: what can it provide now for the learner, and how can we use it next?" In her teacher-oriented lecture, Dr Iskrenko-Poulton introduced various forms and uses of interactive and simulative methods of education that fall within the definition of "scenario-based learning". Real clinical scenarios, whether it be in the form of interactive computer simulations, games, virtual worlds or dummies, are undoubtedly an excellent means of



FIGURE 1. AKUTNĚ.CZ® workshop



FIGURE 2. CROESUS workshop

teaching and practising the ability to decide, to cooperate, and to avoid potential mistakes in future clinical practice. Dr Iskrenko-Poulton also mentioned the recently emerged type of electronic courses called the Massive Open Online Courses (MOOC), which led to a heated debate with the audience.

The second invited speaker, Fotios Liarokapis, PhD, from the Faculty of Informatics at Masaryk University, had a more technology-oriented lecture. Dr Liarokapis mentioned not only virtual and augmented reality, but also the communication between the human brain and computer via various interfaces. Additionally, he demonstrated how this technology might be used in interactive applications to simulate a real environment, not only in the education of medicine. During his lecture, he gave the audience a tour of the site of a recent bomb explosion in London (which only happened virtually, of course!) or of the centre of ancient Rome. Many of these applications can nowadays be controlled by EEG waves via a brain-computer interface (BCI), without using any mouse or keyboard; the user can thus fully immerse himself/herself in the "game" and task solving. Dr Liarokapis also presented results of studies demonstrating that as regards control by EEG waves, there were differences between users who were passionate and experienced players of computer games, and beginner players.

Like in the previous years, one section of the MEFANET conference was dedicated to the application of modern technology in the education of a specific branch of medicine: this year, it was neuroscience, which added a new dimension to an already attractive topic. At the beginning of this section, representatives of the Faculty of Medicine in Plzen invited the



FIGURE 3. Attentive audience of the MEFANET 2015 conference

audience to visit a virtual restaurant that aims to help with the treatment of alcohol abuse. After all, it would not go amiss even for moderate drinkers to have occasional training of turning down invitations to get a drink... Other contributions shifted the topic as far as into the area of psychiatry; lectures accompanied with popular video streaming from operating theatres of neurosurgery departments were also involved.

The MEFANET conference also hosted two working meetings related to international projects of the Erasmus+ programme, which is currently the EU flagship in the area of education support. Namely, these were the TAME (Training Against Medical Error) and MEDCIN (Medical Curriculum Innovations) projects, which brought representatives of individual partner universities from Sweden, the United Kingdom, Greece, Kazakhstan, Malaysia and other countries to Brno. Masaryk University represents the MEFANET network in both projects, and has made a continuous effort to deepen mutual cooperation with foreign institutions and to implement globally respected trends, methodology and technology into Czech conditions.

The ninth year of the MEFANET conference brought varied and very inspiring contents again. The new model, combining working meetings with lecture sessions, attracted more than a hundred of participants, who together created a congenial and relaxed atmosphere. The organisers believe that the tenth anniversary conference, which will traditionally be held in Brno in late November (29–30 November 2016), will be at least as successful as the last one.

Martin Komenda



FIGURE 4. Fotios Liarokapis, PhD

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MEFANET JOURNAL PROFILE

Aims and Scope

The journal is intended to present within a single forum all of the developments in the field of medical informatics, medical education, e-learning and thereby promote the synergism among these disciplines. The journal is the premier vehicle for disseminating information about MEdical FAculties NETwork, which covers all Czech and Slovak medical faculties.

The journal enables medical teachers and scientists to share and disseminate evidence demonstrating the actual practice in on-line education in medicine and healthcare sciences by focusing on:

- research in medical educational informatics and learning analytics
- applications of medical informatics into education
- design, usage and results of novel e-learning tools and innovative pedagogical methods in medical teaching and learning
- other interdisciplinary topics related to information and communication technology in medical education

In 2009–2012, MEFANET report was published as one volume per year and was printed in 1000 copies. Since 2013, MEFANET journal has been published biyearly.

Subjects of interest

- E-health and telemedicine
- E-learning
- Information science
- Innovative teaching methods
- Medical educational informatics and learning analytics
- Modeling and simulation
- Multimedia
- Social media pedagogy
- Evidence-based medicine in education

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On-line access

All volumes are available in electronic version at <http://mj.mefanet.cz>

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The Facta Medica Ltd. publishing house, based in Brno, was founded in 2008 by Dr. Boris Skalka, Dr. Eliška Skalková, and Assoc. Prof. Zdeněk Susa. The publishing house was founded with the aim of focusing on the publication of specialized literature from the field of medicine and health care – both periodical and non-periodical, but also medicine-related literature of fact and that of fiction. Since 2009 the publishing house has been represented by B. Skalka and E. Skalková.

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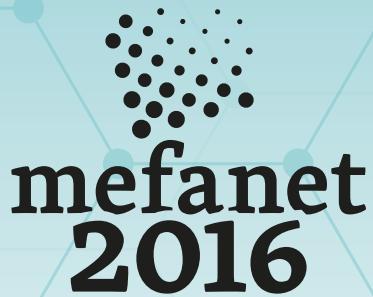


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LANGUAGES

oral, poster: *Czech, Slovak, English*

proceedings: *English*

IMPORTANT DATES

on-line registration: 1 September – 25 November 2016

extended abstract submission deadline: 1 October 2016

on-site registration: 29–30 November 2016

CONFERENCE REGISTRATION FEES

two-day fee for active and passive participants – academics: 900 CZK

one-day (the second day) fee for active and passive participants – academics 400 CZK

PRELIMINARY PROGRAMME

Tuesday 29 November 2016

Lunch

Workshop I

Coffee break

Workshop II

MEFANET Coordinating Council

Reception

Wednesday 30 November 2016

Short communications

Coffee break

Key notes

Lunch

Short Communications

Coffee break

Short Communications

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