JOANNA GOTLIB[1], DARIUSZ BIAŁOSZEWSKI[2],
ANNA MOSIOŁEK[3], FILIP DĄBROWSKI[4]

Opinie studentów i nauczycieli akademickich kierunków medycznych na temat kształcenia przez Internet

Opinions of medical students and academic teachers on online learning

Streszczenie

Wstęp. Kształcenie przez Internet wprowadzane jest w coraz większej liczbie uczelni kształcących specjalistów ochrony zdrowia.

Cel. Celem pracy była analiza opinii studentów i pracowników naukowo-dydaktycznych na temat wprowadzenia kształcenia przez Internet.

Materiał i metody. Dobrowolne, anonimowe badania ankietowe przeprowadzono wśród 1528 studentów oraz 128 nauczycieli akademickich w Warszawskim Uniwersytecie Medycznym.

Wyniki. Podczas nauki z komputera korzysta 53% studentów, a 74% przed przystąpieniem do nauki w systemie e-learningu nie potrzebuje szkolenia. Internet wykorzystuje w celach dydaktycznych 55% wykładowców, a 65% przekazuje studentom materiały z zajęć. W zajęciach przez Internet chciałoby wziąć udział 58% studentów, a 54% nauczycieli byłaby zainteresowana przeprowadzeniem takich zajęć (p=NS).

Wnioski. Obecnie zdecydowana większość studentów korzysta z Internetu podczas nauki, zatem są oni od strony technicznej przygotowani do stosowania w dydaktyce metod kształcenia na odległość. Należy podnosić kompetencje studentów platform e-lerningowych tak, aby niedostatek umiejętności studentów w tym zakresie nie utrudniał prowadzenia zajęć dydaktycznych. W uczelniach o profilu medycznym wprowadzanie nowych metod kształcenia przez Internet należy rozpoczynać od zajęć z zakresu przedmiotów ogólnouniwersyteckich realizowanych w trybie wykładów i seminariów.

Słowa kluczowe: kształcenie na odległość, blended-learning, uczelnia medyczna, nowoczesne metody kształcenia.

Abstract

Introduction. Online learning has been introduced at an increasing number of university-level schools training future health-care specialists.

Aim. The present study aimed to analyse the opinions of students and teachers on the introduction of e-learning at their University.

Material and methods. The voluntary, anonymous survey involved 1528 students and 128 academic teachers from Medical University of Warsaw.

Results. According to our findings 53% of the students use the computer while studying and 74% do not need additional training. Moreover, 55% of the teachers use the Internet for educational purposes and 65% provide students with class materials via the Internet. Fifty eight percent of the students and 54% of the teachers would like to participate in e-learning (p=NS).

Conclusions. A vast majority of students currently have access to the Internet for studying, so, they already have the technical preparation for distance learning. It is necessary to improve students' computer skills and their ability to use e-learning platforms to avoid a situation when insufficient skills would impede teaching and affect their perception of this modern form of education. The introduction of e-learning at medical universities should begin with general academic courses conducted in the form of lectures and seminars.

Keywords: distance learning, blended-learning, medical university, modern teaching methods.

[1]Division of Teaching and Outcomes of Education, Faculty of Health Science, Warsaw Medical University
[2]Division of Rehabilitation, Department of Physiotherapy, 2nd Medical Faculty, Warsaw Medical University
[3]2nd Medical Faculty, degree programme: physiotherapy, Warsaw Medical University
[4]2nd Medical Faculty, degree programme: medicine, Warsaw Medical University

INTRODUCTION

With the dynamic development of Information and Communication Technology and the Internet in the recent years, distance learning, such as e-learning or blended learning are being used increasingly frequently in the training of health-care specialists [1-7].

There are still numerous reservations concerning introduction of e-learning at medical universities, where the specifics of training requires interpersonal contacts with patients and the importance of the Student-Teacher-Master relationship may not be overestimated. On the other hand, the dynamic development of medical science necessitates constant updates of the knowledge imparted to students, which is a prerequisite for ensuring high quality of education at university-level schools. E-learning offers an opportunity for providing up-to-date knowledge without incurring additional high expenses; hence, online education is being introduced at an increasing number of university-level schools training future health-care specialists [1-7].

Distance learning offers a possibility of conducting independent e-learning courses, supplementing traditional education, monitoring teaching quality on an ongoing basis and continuously updating the knowledge imparted to students. A prerequisite for the effective use of the Internet for learning and teaching is the possession of very good computer and Internet skills by both students and teachers [1-7].

AIM

The objective of this study was to analyse the opinions of students and teachers from the Medical University of Warsaw (MUW) on the possibility of introducing online learning at their university.

MATERIAL AND METHODS

The study involved a total of 1528 MUW students (Group S), including 1228 women and 275 men. The average age in the group was 29.7 years (min. 19, max. 52, SD: 3.73). The group comprised 671 students of unified MA degree programs, 643 persons attending first-cycle programs and 199 attending second-cycle programs; 863 full-time students and 632 extramural students.

The group of MUW employees (Group T) comprised 128 teachers. Women accounted for 54% of the group and men represented 45%. The average age was 40.43 years (min. 25, max. 67, SD: 12.36). The participants had been employed as academic teachers at the MUW for an average of 11 years (min. 1, max. 35, SD: 8.86).

The MUW employees taught all types of classes (lectures, seminars, practical classes, laboratory classes and optional courses) for all degree programs and years of study.

The voluntary and anonymous survey was conducted using two questionnaires prepared by the authors: one for students and one for teachers. To enable comparisons between the study groups, 10 questions were repeated in both questionnaires.

Questionnaires were distributed among students between 4th April and 9th May 2011, during classes. The survey consisted of 14 questions (single- and multiple-choice closed, open, semi-open, rating on a scale from 2 to 5). The survey enrolled students of medicine, medicine and dentistry, pharmacy, physiotherapy, nursery, and midwifery.

The teachers were surveyed from 15th May to 9th June 2011. The online questionnaire was posted on a free external server:

https://spreadsheets.google.com/spreadsheet/viewform?formkey=dFdLb3lRSVhGQkJvck1rYzBfZVFGY3c6MQ and sent by electronic mail to all teachers of MUW. The database with e-mail addresses was made available to the authors by the IT Department of MUW on a single-use basis for the purposes of the present study. The survey consisted of 20 questions (single- and multiple-choice closed, open, and semi-open).

Statistical design

The survey data were compiled in an Excel sheet (Microsoft Office). The statistical analysis was conducted using the Statsoft STATISTICA 9.0 program (licensed to Warsaw Medical University).

Since the data were qualitative and non-parametric and did not follow a normal distribution ($p>0.05$), which would be analysed using the Shapiro-Wilk test, the statistical analysis was conducted using the Mann-Whitney U test. The significance level was accepted at $p<0.05$.

RESULTS

The majority of the MUW students surveyed (53%) always use the computer while studying and a vast majority of the students (74%) do not need additional training in basic computer/ Internet skills before starting e-learning. The detailed results are presented in Table 1.

The students rated their familiarity with all the basic computer applications very high, above 4 (on a scale from 2 to 5), with the lowest score for the ability to use a statistical package. The detailed results are presented in Table 2.

In Group T, 55% of the MUW teachers use Internet for educational purposes or to contact their students every day or several times a week and 65% of them provide students with class materials via the Internet. A majority of the teachers (66%) would be interested in supplementing traditional educational forms, such as lectures, seminars and practical classes, with e-learning. The detailed results are presented in Table 3.

In the opinion of most teachers and students of MUW, the traditional forms of teaching that could be most successfully taught on-line are lectures and seminars. The largest proportion of teachers (67%) and students (48%) believed that the area most suitable for e-learning would be general academic courses. A majority of students (58%) would like to participate in online learning and 54% of teachers would be interested in conducting classes online. The detailed results are presented in Table 4.

TABLE 1. Computer/Internet use for studying by the students of the Medical University of Warsaw.

No.	Question	Responses	Group S*/Response percentages
1.	How often do you use the computer/Internet for studying purposes:	Always	53%
		Several times a week	33%
		Less than once a month/never	1%
2.	Please specify your access to the computer (laptop, netbook, PC)	I have my own computer	81%
		I share a computer with my family	12%
		I use a computer together with friends	2%
		I only use public computer facilities	0.2%
		I do not use a computer	0.2%
3.	Which operational system are you currently using:	Older than Windows XP	17%
		Windows XP	45%
		Windows Vista	19%
		Mac OS	6%
		Linux	2%
4.	How old is the computer you are currently using:	less than 3 years	70%
		Between 3 and 6 years	18%
		Older than 6 years	2%
		I don't know	0.7%
5.	Do you have a fast broad-band Internet connection?	Yes	86%
		No	7%
		I don't know	4%
6.	What factors would most effectively encourage you to participate in e-learning?	Freedom to choose the time of studying	50%
		customised course/pace of studying	40%
		Interactive, personal contact with the teacher	17%
		Financial considerations (commuting costs)	14%
		Possibility of developing my interests	25%
		constant updating of the knowledge conveyed	25%
7.	How often do you use the Internet	I am online almost all the time	21%
		Several times a day	57%
		Every day	11%
		Several times a week	6%
		Once or several times a month	0.2%
		Less frequently than once a month	0.2%
8.	Do you need an additional training in the basic use of the computer/ Internet before starting e-learning?	Definitely yes/yes	9%
		I don't know	16%
		Definitely not/no	74%

* Group S – the students participating in the study

TABLE 2. MUW students' self-assessment of their computer literacy.

Computer application	I do not use this kind of application	Average rating of one's skill in using this computer application
Word processor e.g. Word	7*	5**
Spreadsheet e.g. Excel	50	4.29
E-mail application	88	4.46
Discussion forums	85	4.36
Internet browsers (e.g. Internet Explorer)	4	4.95
Statistical package (e.g. Statistica)	536	2.25
Text communicator (e.g. Gadu-Gadu)	80	4.55
Voice communicator (e.g. Skype)	170	4

* - number of persons
** - average rating on a scale of w 2-3-3.5-4-4.5-5

TABLE 3. Analysis of MUW teachers' opinions on e-learning.

It.	Question	Responses	Group T*
1.	Which advantages of e-learning could contribute to improvement in the quality of education provided by the Medical University of Warsaw?	Need to update the educational content conveyed to students by teachers	64%
		Effective use of the learning time	40%
		Enhancing the attractiveness of teaching materials through the use of multi-media	70%
		Possibility of constant monitoring of students' progress through an e-learning platform	39%
		Necessity of constant systematic study owing to the requirement to obtain credits for individual portions of material within a specific period	28%
2.	How often do you use the Internet for educational purposes/to contact your students?	Every day / several times a week	55%
		Once or several times a month	25%
		Less frequently than once a month	7%
		Never; I do not need to	9%
3.	What tasks are you currently using the Internet for as part of your educational duties/ contacting students?	Providing students with teaching materials in an electronic form	65%
		Responding to students' questions concerning the educational content conveyed during classes	40%
		Informing students about the manner of awarding credits/ changes to the schedule, etc.	56%
		Assessing degree theses	29%
		Arranging meetings with students	42%
		Not applicable: I do not use the Internet for educational purposes or to contact my students	9%
4.	Which factors could encourage MUW teachers most to take advantage of e-learning?	Freedom to choose the time of working	73%
		Financial considerations (costs of commuting)	46%
		Interactive, personal contact with students	31%
		Constant updating of the knowledge conveyed	43%
		Opportunity to conduct courses at 'various levels of students' interests'	59%
		Possibility of continuous monitoring of students' knowledge	29%
5.	Would you be interested in supplementing traditional education in the form of lectures, seminars and practical classes with e-learning?	Definitely yes/yes	66%
		I don't know	14%
		Definitely not/no	18%
6.	Do you need additional training in preparation of teaching materials before starting to teach on-line?	Definitely yes/yes	66%
		I don't know	14%
		Definitely not/no	18%
7.	Do you think that, compared to traditional education, a student participating in e-learning spends	More time for studying	14%
		Less time for studying	25%
		The same amount of time for studying	20%

* Group T – group of MUW academic teachers participating in the study

DISCUSSION

A search of the available Polish literature (Polish Medical Bibliography database, key words: distance learning; published in the period 1991-2011) predominantly found publications concerned with life-long learning in the form of online education [8-13] and conference reports on the wide possibilities of using distance learning for teaching medical students [14-16]. Teachers' opinions on e-learning were investigated in one of the papers in the database [17] but none of the publications in the Polish literature analysed views of medical students on the subject.

A review of the available worldwide literature (PubMed/ MEDLINE, SCOPUS, EMBASE, key words: e-learning, health sciences, computer literacy, papers published in English in the last 5 years) found numerous publications of authors from various countries concerned with the use of modern information technology in the education of medical students. The papers predominantly focus on comparing the effectiveness of e-learning and traditional education, use of e-learning for the purposes of life-long education and presentation of individual supplementary tools and e-learning programs. Numerous papers also investigate, as does the present study, students' access to their own computers and the Internet and the frequency of using these for learning purposes [18-27]. The review of the available Polish and worldwide literature found no publications concerned with analysis of students' and teachers' opinions on e-learning evaluated before the introduction of this educational form at a given university-level school.

Studies concerned with students' access to their own computers and the Internet and the frequency of using these for learning purposes are conducted in many countries of the world, since access to the Internet is a prerequisite for the use of distance learning [18-27].

TABLE 4. MUW students' and teachers' opinions on e-learning

It.	Question	Responses	Group S[1]	Group T[2]	p[3]
1.	Which traditional teaching form could be taught on-line?	Lectures	93%	73%	NS[4]
		Seminars	63%	39%	
		Practical classes	11%	12%	
		Laboratory classes	5%	1%	
2.	Which courses could be most successfully taught on-line?	General academic courses	48%	67%	NS
		Basic science courses	36%	76%	<0.001
		fundamentals of clinical science	8%	29%	<0.001
		clinical classes	2%	3%	NS
3.	Would you like to participate in e-learning? Would you be interested in teaching classes online?	Definitely yes/yes	58%	54%	NS
		I don't know	13%	23%	<0.05
		Definitely not/no	10%	20%	<0.05
4.	What factors would most successfully encourage students to participate in e-learning?	Freedom to choose the time of studying	50%	73%	<0.01
		Interactive, personal contact with the teacher	17%	31%	<0.05
		Financial considerations (commuting costs)	14%	46%	<0.001
		Possibility of developing my interests	25%	59%	<0.001
		Constant updating of the knowledge conveyed	26%	43%	<0.01

1 Group S – group of the students participating in the study
2 Group T – group of MUW academic teachers participating in the study
3 p – the significance level of differences between the groups of MUW students and teachers
4 NS –not significant difference

In the present study as well as in those of other authors, a majority of students had their own computers and a permanent Internet connection [18-27]. A majority of the MUW students surveyed (53%) always use a computer and the Internet while studying, which is consistent with the results of other authors. In a study conducted by Rzymski et al. among 180 female students of midwifery at the Medical University of Poznań, 82% of the respondents used the Internet and 79.3% of the group used medical resources available on-line while studying [23]. The female students in Rzymski's study used the Internet from 5.3 to 8.4 times a month on average, i.e. less frequently than the respondents in the present study. Various authors have emphasised that the frequency of using the Internet largely depends on students' self-assessment of their computer literacy. In the present study, the participants rated their familiarity with basic computer applications as high, while in Rzymski's study the score was significantly lower, at 3.7. Similar results were obtained by Castelló Castañeda et al., who analysed computer use patterns in a group of 90 dentistry students. In their study, 93.3% of the respondents used the computer at home but the level of computer literacy was assessed by the students as average [20]. Numerous publications in the world literature stress that students' computer and Internet literacy correlates with the frequency of the students' participation in online learning and their willingness to do so. Therefore, with e-learning being introduced at an increasing number of university-level schools, it is necessary to constantly raise students' computer literacy to avoid a situation when their insufficient skills would discourage them from participating in e-learning.

Uribe et al. obtained similar results to those of the present study with regard to the availability of computers and the Internet to students [25]. In a group of 162 dentistry students, all the participants owned a computer and 96.4% of them used the Internet. A vast majority of the respondents (73.4%) had an Internet connection at home. Additionally, electronic mail and Internet browsers were used at least once a week by 92.2% and 88.3% of the group, respectively. However, in Uribe's study a considerably smaller percentage of respondents (21.1%) used the Internet to obtain information for studying purposes. This finding may be associated with the students' self-assessment of their computer literacy, as a vast majority of the group rate the use of the Internet as easy or very easy (95.4%), while a significantly smaller proportion (56.2%) described searching for information on-line as easy. On-line queries for information may be associated with a language barrier, which frequently impedes the use of online resources by students from different countries. Fusilieret al. analysed factors influencing the popularity of the Internet use among students from such countries as India, Mauritius, Reunion and the United States of America [18]. The participants from India, Mauritius and Reunion more frequently declared willingness to use non-English resources of the World-Wide Web. However, there is a need for a follow-up and further investigation, as in Ayatollahi J. et al. study, 96.6% of Iranian students assessed online English material as considerably more useful than educational contents in their mother tongue [26].

The present study did not analyse the effect of gender on opinions about the introduction of e-learning at the Medical University of Warsaw, while the world literature emphasises differences between the frequency of computer and Internet use by women and men.

Joiner R. et al., who surveyed 608 British students (490 women and 118 men), found that male participants had their own websites more commonly and used the Internet more frequently and longer than their female counterparts [27]. The trend was especially pronounced with regard to online games, specialist websites and downloading films and music from the Internet. On the other hand, there were no significant differences between the genders with respect to using the Internet for communication with friends and family.

Contrasting results were obtained by Ayatollahi J. et al., who found that women used the Internet more frequently than men in their sample ($p< 0.0001$) [26]. The differences may probably be attributed to the cultural context, since the study of Ayatollahi J. et al. was conducted in Iran. Moreover, the results of Ayatollahi J. et al. were also different with regard to the students' use of computers and the Internet. In the Iranian group, 79% of the dentistry students used the Internet but only 13.79% used it to search for general information, with a considerably larger proportion using online resources to find information related to their field of study and necessary for education: texts posted by teachers were most frequently searched for (73%), followed by clinical photographs (47%) and histopathological material (12%). These findings are inconsistent with the results of the studies described above, where use of the computer for studying represented only one of the students' online activities.

The other papers did not analyse how frequently medical students used the Internet for studying. In a study by Ceyhan et al., involving 437 Turkish students, the respondents usually used the Internet to communicate with family and friends, predominantly by night [19], while in that by Hanauer et al. over 80% of the students had an Internet connection at home but a majority of participants were interested in the subjects of nutrition and diet [21].

The only publication where data concerning the frequency of Internet and computer use by students were completely different from those of the above studies was a paper by Palesh et al. describing a survey of 198 students of the University of Moscow [22]. Half of the participants declared that they used the Internet at least several times a year, while only 8% was online every day. A majority of the students used the Internet at home or at their friends' and 16% of the group did this at work, school or in an Internet café. The students were most frequently online to search for educational materials (60%), use the electronic mail (55%), use entertainment facilities (50%), chat (24%) and visit pornographic websites (6%).

CONCLUSIONS

1. A vast majority of students currently have access to the computer and use the Internet for studying. Therefore, they have the technical means to take part in distance learning.
2. It is necessary to improve students' computer skills and the ability to use e-learning platforms to avoid a situation when their insufficient skills would impede teaching and affect their perception of this modern form of education.
3. The introduction of e-learning at medical universities should begin with general academic courses conducted in the form of lectures and seminars.
4. The findings of the present study represent a basis for conducting a prospective representative multi-centre study.

REFERENCES:

1. Wilkinson A, While AE, Roberts J. Measurement of information and communication technology experience and attitudes to e-learning of students in the healthcare professions: integrative review. J Adv Nurs. 2009;65(4):755-72.
2. Booth A, Carroll C, Papaioannou D, Sutton A, Wong R. Applying findings from a systematic review of workplace-based e-learning: implications for health information professionals. Health Info Libr J. 2009;26(1):4-21.
3. Lee TS, Kuo MH, Borycki EM, Yunyong D. Critical success factors for implementing healthcare e-Learning. Stud Health Technol Inform. 2011;164:64-8.
4. Moule P, Ward R, Lockyer L. Nursing and healthcare students' experiences and use of e-learning in higher education. J Adv Nurs. 2010;66(12):2785-95.
5. Luke R, Solomon P, Baptiste S, Hall P, Orchard C, Rukholm E, Carter L. Online interprofessional health sciences education: From theory to practice. J Contin Educ Health Prof. 2009;29(3):161-7.
6. Hege I, Ropp V, Adler M, Radon K, Mäsch G, Lyon H, Fischer MR. Experiences with different integration strategies of case-based e-learning. Med Teach. 2000;29(8):791-7.
7. Białoszewski D, Kasperska K, Gotlib J. Tradycja i/czy nowoczesność? Nauczanie na odległość wyzwaniem dla kształcenia studentów kierunków medycznych. Medycyna Dydaktyka Wychowanie; 2011; 2:36-40.
8. Bilski D. Potrzeby, możliwości i metody kształcenia w zakresie orzecznictwa lekarskiego. Orzecz Lek. 2008;5(1):11-7.
9. Cisek Maria, Górkiewicz M, Brzostek T. Polish on-line resources for community nurses. Rocz AM Białyst. 2005;50(suppl. 2):59-60.
10. Sobański Jerzy A, Klasa K. Distant psychotherapy learning. Leonardo da Vinci – SEPTIMUS programme. Arch Psychiatr Psychother. 2004;6(3):89-99.
11. Szosland D, Marcinkiewicz A. Modern technology in lifelong learning of occupational medicine. Int J Occup Med Environ Health. 2004;17(4):411-6.
12. Marcinkiewicz A, Cybart A, Chromińska-Szosland D, Nosko J. Nowe formy kształcenia w medycynie pracy. Med Pr. 2003:54(6):573-8.
13. Marcinkiewicz A, Cybart A, Chromińska-Szosland D. Możliwości wykorzystania metod distance learning do podyplomowego kształcenia lekarzy na przykładzie specjalizacji z medycyny pracy. Wiad Lek. 2002:55:330-4.
14. Michowska M. E-learning i jego wykorzystanie w nauczaniu etyki In: Nauczanie etyki w uczelniach medycznych. Gdańsk; 2007. p.169-73.
15. Hippe Zdzisław S, Paszczyński S. Zdalne nauczanie i zdalne uczenie się w medycynie. Telemedycyna 2001: II Krajowa Konferencja Naukowa. Łódź; 2001. p.5-9.
16. Oehlsen A, Baer-Dubowska W. E-learning : TellRight - providing language competence for medics online (LEONARDO Programme) In: International Conference "Medical Education in Central and Eastern Europe – from status quo to changes. Poznań; 2005. p.73-9.
17. Brodziak A, Piotrowska E. Zdalne wspomaganie nauczania poprzez Internet – nowe narzędzie nauczyciela akademickiego – doświadczenia własne. Ann Acad Me Siles. 2001;48/49:45-51.
18. Fusilier M, Durlabhji S, Cucchi A, Collins M. A four-country investigation of factors facilitating student internet use. Cyberpsychol Behav. 2005;8(5):454-64.
19. Ceyhan AA. Predictors of problematic Internet use on Turkish university students. Cyberpsychol Behav. 2008;11(3):363-6.
20. Castelló Castañeda C, Ríos Santos JV, Bullón P. Analysis of the knowledge and opinions of students and qualified dentists regarding the use of computers. Med Oral Patol Oral Cir Bucal. 2008;13(1):E71-6.
21. Hanauer D, Dibble E, Fortin J, Col NF. Internet use among community college students: implications in designing healthcare interventions. J Am Coll Health. 2004;52(5):197-202.
22. Palesh O, Saltzman K, Koopman C. Internet use and attitudes towards illicit internet use behavior in a sample of Russian college students. Cyberpsychol Behav. 2004;7(5):553-8.
23. Rzymski P, Wilczak M, Pieta B, Opala T, Woźniak J. Evaluation of internet use in university education by midwifery students. Med Inform Internet Med. 2006 ;31(3):219-25.
24. Peterson D, Kaakko T, Smart E, Jorgenson M, Herzog C. Dental students attitudes regarding online education in pediatric dentistry. J Dent Child (Chic). 2007;74(1):10-20.
25. Uribe S, Mariño RJ.Internet and information technology use by dental students in Chile. Eur J Dent Educ. 2006;10(3):162-8.
26. Ayatollahi J, Ayatollahi F, Bahrololoomi R. Using the internet among dental students in Yazd. Dent Res J (Isfahan). 2010;7(1):7-11.
27. Joiner R, Gavin J, Duffield J, Brosnan M, Crook C, Durndell A, Maras P, Miller J, Scott AJ, Lovatt P. Gender, Internet identification, and Internet anxiety: correlates of Internet use. Cyberpsychol Behav. 2005;8(4): 371-8.

Informacje o Autorach
Dr n. o zdr. Joanna Gotlib – adiunkt, Zakład Dydaktyki i Efektów Kształcenia, Wydział Nauki o Zdrowiu, Warszawski Uniwersytet Medyczny; dr n. med. Dariusz Białoszewski – kierownik, Zakład Rehabilitacji, Oddział Fizjoterapii, II Wydział Lekarski, Warszawski Uniwersytet Medyczny; Anna Mosiołek – Oddział Fizjoterapii, II Wydział Lekarski, Warszawski Uniwersytet Medyczny; lek. Filip Dąbrowski – Samodzielny Publiczny Centralny Szpital Kliniczny w Warszawie.

Adres do korespondencji
Joanna Gotlib
Warszawski Uniwersytet Medyczny
E-mail: Joanna.gotlib@wum.edu.pl