

Role and Preparedness of Physiotherapists in Prevention of Chronic Diseases, Using Stress Urinary Incontinence in Women as an Example

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Research article

Keywords: primary health care, physiotherapy, stress urinary incontinence

Posted Date: December 22nd, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-127879/v1>

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Abstract

Background: Ageing human population will generate a significant number of patients with chronic diseases, and this will lead to a significant increase in demand for health services and to a deteriorated economic situation in many countries. Stress urinary incontinence is the chronic diseases and one of the most important global health problems. Representatives of medical professions provide their patients with knowledge about the appropriate prevention and treatment of diseases. The aim of the study was to evaluate knowledge among graduates of physiotherapy about stress urinary incontinence in women.

Methods: The study included 401 participants, students in their final year of physiotherapy. Respondents provided answers to open questions about their knowledge about stress incontinence in women.

Results: The complete definition of stress urinary incontinence in women was given by 64.4% of physiotherapy students at the Medical University and 56.3% of physiotherapy students at the Physical Education University. The students of the Medical University, in comparison with the students of the Physical Education University, were more aware of risk factors (86.4% vs 69.4%), prevention methods (85.6% vs 68.7%), and conservative (92.4% vs 77.8%) and surgical treatment (28.0% vs 6.7%) of stress urinary incontinence in women ($p < 0.001$). **Conclusions:** For the future students to better fulfil their role in providing care to female patients with SUI, a greater emphasis should be put on their education in that area. Research has shown that the disciplinary focus of universities educating students of physiotherapy plays a significant role in gaining knowledge about SUI.

Background

Ageing of the society leads to increasing expenditures on the health care system, and this significantly influences requirements towards medical professions, and in particular, towards representatives of the general health care, to initiate activities preventing diseases of civilisation [1–4]. Without doubt, health is the most important and precious value, as only a healthy person can fully benefit from all aspects of both professional and private life, including entertainment and sport. Therefore, health has a great influence on the quality and lifestyle of an individual, their social contacts and economic possibilities [5–7].

Stress urinary incontinence (SUI) is one of the chronic diseases that should be talked about and discussed more often in order to remove the taboo surrounding it. It occurs when coughing, sneezing, laughing or hard physical work increases pressure inside the abdomen, which is accompanied by involuntary leakage of urine [8]. It is the most common form of urinary incontinence and can occur at any age. Representatives of the International Health Organization estimate that more than 200 million people of both sexes suffer from this ailment in both developed and developing countries, with about 67% of women suffering from this condition [9, 10]. Urinary incontinence worsens living conditions in the occupational, social, mental, physical and sexual aspects of a woman's life. In addition, it enormous costs regarding treatment, rehabilitation and significantly increase household spending on hygiene and the purchase of absorbent products [11, 12]. These costs once again confirm that urinary incontinence is not only a medical and psychological problem but also an economic problem. In the time of an ageing

populations and increasing incidences of urinary incontinence, the costs for patients, their families and the general population will continue to increase.

In 1999, the World Confederation for Physical Therapy [13] adopted a general description of a profession of physiotherapist, in which it defines the physiotherapist as a person providing services for individuals and populations to develop, maintain and restore maximum movement and functional ability throughout the lifespan. The physiotherapist performs a medical profession, enabling maximising the quality of patient's life by restoring to them the functional ability to the maximum possible extent [14, 15]. However, despite the common social perception, the range of physiotherapist's skills is not limited just to specialist treatment of the musculoskeletal disorders and medicinal massage. Physiotherapists working in the general health care treat patients at all clinical wards. They work with people with various medical diagnoses and in different functional condition [16–19]. Physiotherapists work to improve the individual's health, thus contributing to better health of the entire society. They promote prevention of chronic diseases, provide various therapies to their patients, preventing development or exacerbation of already existing diseases associated, amongst other, with body ageing or environmental factors. Furthermore, they cooperate with patient's family, and teach them how to adapt conditions at home to new health-related needs of the patient. They can demonstrate emotional resistance and empathy in their daily work with people who suffer from pain, so they have to know how to motivate such patients to undertake movement rehabilitation, frequently overcoming patient's unwillingness to the therapy itself and to their daily life [20–24].

Future physiotherapists can and should improve the quality of life of women suffering from stress urinary incontinence if they get to know that it is an important problem which should be given more attention, and if they have substantial knowledge about this condition. The role of physiotherapists is to talk about stress urinary incontinence, especially with patients at risk, and to inform them about the many possibilities of physiotherapy as far as treatment and preventive measures of this disorder are concerned. Such conversations should always take place, and not only when urine leakage occurs e.g. during physical exercise (kinesitherapy) and creates an embarrassing situation. Physiotherapy students should be aware that shame and embarrassment accompanying urine leakage are the reasons why women have been hiding this disorder for so long and are reluctant to talk about it. In this situation, only appropriate education, awareness of the problem and great tact and sensitivity will make it possible to help the patient cross the embarrassment barrier and engage in a sincere conversation about this condition. The authors decided to check knowledge of physiotherapy students about stress urinary incontinence and find the reasons why the problem of SUI had been passed over in silence by millions of women, and whether a lack of knowledge on the part of medical personnel, including physiotherapists, about this disease could have led to a lack of communication with patients about preventive measures.

A comparison was made of the emphasis put on teaching about this disease at two Universities each with a different disciplinary focus, namely medical, and medical sport. Due to the fact that there are no studies assessing the knowledge of medical graduates, including physiotherapists, about stress urinary incontinence, the authors decided to evaluate these graduates' knowledge in order to find out why stress

urinary incontinence is not discussed as much as other civilizational diseases. Moreover, the authors wanted to call the attention of future physiotherapists to this serious and crucial problem of stress urinary incontinence, and encourage them to widen their knowledge about this syndrome, as well as triggering their willingness to promote health education among their future patients.

The aim of the study was to evaluate knowledge among graduates of physiotherapy about risk factors, prophylaxis, diagnostic tests, and conservative and surgical treatment applied in stress urinary incontinence in women. The article might provide inspiration for considering the importance of the disciplinary focus of a university and the educational effects which it achieves, as well as providing inspiration for future and present physiotherapists to undertake greater action for the benefit of women suffering from stress urinary incontinence.

Methods

The study included 401 participants, students in their final year of physiotherapy, including 288 women and 113 men of a mean age of 25.4 years (SD \pm 3.8). The students represented two Polish universities which have been teaching students of physiotherapy for many generations: The Medical University of Silesia in Katowice (University Med) - was represented by 87 women and 30 men, while The Jerzy Kukuczka Academy of Physical Education in Katowice (University PE) – by 201 women and 83 men. The representatives of these faculties were selected for the research due to their future contact with women at risk of developing SUI or already suffering from this condition. Moreover, students of physiotherapy are required to have specialized knowledge about prophylaxis and preventive treatment, as such activities are included in their professional competences.

5th-year students of the physiotherapy faculty were included in the study during the last semester of their studies, i.e. the 10th semester when they attended mandatory classes on the day of the survey. Students who were absent from classes on the day of the survey were excluded from the questionnaire. Respondents provided answers to open questions about their knowledge of risk factors, prophylactic methods, diagnostic tests and methods of conservative and surgical treatment applied in stress incontinence in women. The authors knew that these students had obligatory classes under their curriculum during which they were taught about incontinence issues. All methods were performed in accordance with the relevant guidelines and regulations.

Data Analysis. Excel 2016 and Statistica 9.0 software were used for archiving and statistical analysis. The χ^2 test was used for analysis. An $\alpha = 0.05$ was considered statistically significant.

Results

When asking about a definition of stress urinary incontinence, the respondents had to select answers from three columns of four statements. The definition provided by the respondents was considered as correct and complete when the study participant selected a correct statement in all three columns, indicating a set corresponding to the definition that urinary stress incontinence occurs when an increase

in the pressure in the abdominal cavity, associated with coughing, sneezing, laughing or heavy physical work, is accompanied by the accidental release of urine [8–12]. The complete and correct definition of stress urinary incontinence in women was given by 64.4% of physiotherapy students at University Med and 56.3% of physiotherapy students at University PE (Fig. 1). A statistically significant difference ($p = 0.02$) was noticed between students of the two universities (University Med 83.9% to University PE 73.2%) over identifying which types of effort contribute to the onset of symptoms.

The same percentage of students – 72.9% - from both universities considered that the effort associated with urinary incontinence was 'normal' and not e.g. significant or professional. A similar percentage of respondents reported that stress urinary incontinence was accompanied by 'involuntary urination', i.e. 89.8% of the students from University Med and 87% of the students from University PE (Fig. 1).

Statistically significant differences ($p < 0.001$) were observed amongst students at the stated universities, regarding their knowledge in terms of risk factors, prevention methods, and conservative and surgical treatment of stress urinary incontinence in women (Fig. 2). In both cases, the percentage of correct answers regarding risk factors of this disease and the preventive methods applied amounted to about 87% of physiotherapy students at University Med, and about 70% of physiotherapy students at University PE. The correct methods of conservative treatment were mentioned by 92.4% of the students from University Med and 77.8% of the students from University PE, whereas, regarding surgical treatment by 28% of students from University Med, but only 6.7% from University PE. Knowledge of diagnostic tests for this disorder was reported by 28% of students from University Med, and 24% of students from University PE. Medical specialties which might be helpful in treating this problem were mentioned by all respondents (Fig. 2).

The only students who were subject to further analysis were those who mentioned: risk factors, prophylactic methods, diagnostic tests, methods of conservative and surgical treatment applied in stress urinary incontinence, and medical specialties that are helpful while treating this condition.

The indices were calculated on the basis of the results achieved which were the proportion of indications in a given category to the number of individuals who made the indications in that group (Fig. 3). The reported indices of indications did not differ significantly among the students from both universities under consideration, although in almost every case the indices were higher among students of physiotherapy from University Med. An exception was the index of surgical treatment methods, which amounted to 1.1 among both groups of the surveyed students (Fig. 3).

Among the risk factors of developing the disease in question, the majority of answers regarded pregnancy, childbirth and its consequences (Table 1) These factors were indicated by 76.3% of students from University Med and 56% of students from University PE. The remaining risk factors were mentioned with a frequency lower than 50%. In comparison with the students from University PE, students from University Med mentioned the following risk factors significantly more frequently: pregnancy, childbirth and the its consequences ($p < 0.001$), neurological and other diseases ($p < 0.001$), urological diseases ($p < 0.001$), age and menopause ($p = 0.01$), and surgeries in the pelvic area ($p = 0.01$). Less frequently

mentioned were: significant physical exercise ($p = 0.05$) and risk factors 'other' than those listed in Table 1, which were often improper ($p < 0.001$).

The most recognizable preventive measures of stress urinary incontinence in women included: Kegel exercises (45.8% - University Med, 28.5% - University PE) and pelvic floor muscle exercises (41.5% - University Med, 30.6% - University PE) (Table 1). In comparison with the students from University PE, students from University Med significantly more frequently indicated the above mentioned preventive measures ($p < 0.001$ and $p = 0.04$) and such methods as: physiotherapeutic procedures ($p < 0.001$), healthy lifestyle ($p = 0.01$) and physical activity ($p = 0.03$).

The students from University Med demonstrated greater knowledge than students from University PE about diagnostic tests used in the case of stress urinary incontinence in women. They mentioned significantly more frequently: cough stress test, pad test, effort test ($p < 0.001$), urodynamic examination ($p < 0.001$), gynecological and urological examination ($p = 0.01$), and diagnostic ultrasound imaging (USG), and electromyography (EMG) ($p = 0.01$) (Table 1). The greatest surprise was regarding pelvic floor muscle exercises as a diagnostic test, as such an answer was given by as many as 20.4% of the students from University PE.

Table 1

The percentage of physiotherapy students from Universities MED and PE who mentioned specific risk factors, types of prophylaxis and diagnostic tests in urinary incontinence.

Risk factors	Med	PE	Prophylaxis	Med	PE	Diagnostic tests	Med	PE
pregnancy, childbirth and the consequences thereof	p < 0.001 76.3	56.0	Kegel exercise	p < 0.001 45.8	28.5	cough stress test, pad test, effort test	p < 0.001 13.6	3.2
age and menopause	p = 0.01 42.4	28.5	pelvic floor muscle exercises	p = 0.04 41.5	30.6	urodynamic examination	p < 0.001 8.5	0.4
neurological and other diseases	p < 0.001 28.0	13.4	healthy lifestyle	p = 0.01 27.1	16.2	gynaecological and urological examination	p = 0.01 7.6	1.8
urological diseases	p < 0.001 27.1	13.4	physical activity	p = 0.03 15.3	8.1	USG, EMG	p = 0.01 7.6	1.4
weakness of pelvic floor muscle	22.0	15.1	frequent health check-ups	12.7	8.8	pelvic floor muscle exercises	p < 0.001 0.0	20.4
obesity	19.5	16.9	physiotherapeutic procedures	p < 0.001 12.7	2.8	others	0.8	1.4
surgeries	p = 0.01 16.1	6.0	educating women about the problem	5.1	5.3			
lack of physical exercise	13.6	11.3	exercises of abdominal and urethral sphincter muscles	2.5	7.4			
significant physical exercise	p = 0.05 6.8	13.7	perinatal prophylaxis	1.7	0.7			
genetic and development defects	4.2	4.2	medication	1.7	1.1			
psychological factors and stress	4.2	4.2	avoiding excessive effort	0.0	1.4			
gynaecological diseases	1.7	2.8	others	0	0.7			
others	p < 0.001							

Risk factors	Med	PE	Prophylaxis	Med	PE	Diagnostic tests	Med	PE
	5.1	10.2						

Among the methods of conservative treatment of stress urinary incontinence in women, respondents mentioned: Kegel exercises (62.7% - University Med, 50% - University PE; $p = 0.02$) and pelvic floor muscle exercises (51.7% - University Med, 25.7% - University PE; $p < 0.001$) (Table 2). The students from University Med mentioned general physical exercises ($p < 0.001$) as a method of conservative treatment significantly more frequently than the students from University PE.

The methods of surgical treatment mentioned by the respondents were not very precise and included such words as: tapes, urethra surgery, artificial sphincter, and surgeries regarding pelvic floor muscles. Respondents were apparently less familiar with those methods. The most frequently mentioned method was tapes, however, the percentage of responses was relatively low, in particular such a response was given by only 3% of the students from University PE, and by 19.5% of the students from University Med ($p < 0.001$) (Table 2).

Table 2

The percentage of physiotherapy students from Universities Med and PE who indicated certain methods of conservative and surgical treatment in urinary incontinence and certain types of specialists who treat urinary incontinence.

Methods of conservative treatment	Med	PE	Methods of surgical treatment	Med	PE	Speciality	Med	PE
Kegel exercise	p = 0.02		tapes	p < 0.001		urology	p < 0.001	
	62.7	50.0		19.5	3.0		94.1	75.4
pelvic floor muscle exercises	p < 0.001		urethra surgery, artificial sphincter	6.8	3.2	gynaecology	91.5	90.5
	51.7	25.7						
physiotherapeutic procedures	34.7	31.3	surgeries regarding pelvic floor muscles	4.2	1.4	general medicine	p = 0.03	
							57.6	45.8
general physical exercises	p < 0.001					neurology	p = 0.01	
	16.1	3.9					39.8	25.0
exercises of urethral sphincter muscles	6.8	8.8				nephrology	34.7	41.5
ball and vaginal cones	5.9	7.7				geriatrics	31.4	22.9
medication	5.9	3.5				others	p = 0.01	
							8.5	2.1
visit to a specialist	0.0	1.1						
others	7.6	6.0						

Respondents were asked which specialists should be visited by a woman suffering from SUI, their most frequent responses included: gynaecologists (91.5% - University Med, 90.5% - University PE) and urologists (94.1% - University Med, 75.4% - University PE; $p < 0.001$) (Table 2). In comparison with the students from University PE, students from University Med more frequently mentioned that urinary incontinence is also treated by: general practitioners ($p = 0.03$), neurologists ($p = 0.01$) and other specialists listed in the Table 2 ($p = 0.01$).

Discussion

Representatives of medical professions provide their patients with knowledge about the appropriate prevention and treatment of diseases. Preventive measures which aim to forestall diseases by detecting them early, are the basis for maintaining public health. However, preventive measures cannot be taken if there is no awareness, especially in certain social groups responsible for health, about the harmfulness of

certain factors (risk factors), as well as no ability to distinguish them in society. This knowledge which is transferred to patients should result in their efforts to eliminate danger or at least limit its negative impact on their health [14, 20, 24].

Health education is one of the most important methods of impeding the development or limiting the scale of 'phenomena' considered as socially distressing i.e. the so-called civilizational diseases. It should be targeted at protecting, maintaining, strengthening and restoring health, and providing new, up-to-date information on how to combat civilizational diseases. Adequate substantive preparation of medical professionals (physicians, physiotherapists, nurses and midwives) to their profession, which commenced during their studies and continued throughout their postgraduate education, will significantly affect the health of those people who come to clinics and hospitals. Education and knowledge about health promoting behaviour should be expanded with regard to the existing dangers of losing health, aspects affecting our health, and factors which contribute to diseases [2, 3, 6, 20, 24].

Physiotherapy students are people who are focused on health and physical activity, and as they work in clinics and hospitals, they are obliged to provide health education to their patients. Therefore, they must have knowledge of many diseases, especially those that are civilizational problems. SUI is one of those problems. It is the physiotherapists' duty to educate their patients about the causes of the disease, facilitate their understanding of the problem, inform them about the consequences of neglecting or abandoning treatment, and also to educate patients about behavior which poses a risk to health. It is up to physiotherapists to encourage a healthy lifestyle, and as far as possible, to inform their patients on how to avoid civilizational diseases. However, in order to fulfil this criteria and be able to provide health education in clinics and hospitals, physiotherapists must have adequate knowledge [13, 15–19].

Stress urinary incontinence is not only an embarrassing problem, but it is a chronic disease that forces a woman to change her way of life. Therefore, an attempt has been made in order to determine how future physiotherapists who will be responsible for providing health education among their patients are prepared to support them. The absolute priority is to detect health disorders among patients as early as possible, recognize these disorders and then send the patients for specialized treatment. However, without proper knowledge, the above mentioned tasks are not feasible, as lack of knowledge limits further actions in terms of health promotion. Thus, this study examined knowledge of physiotherapy students regarding some important aspects of SUI in women, and subsequently investigated whether there was any difference concerning knowledge at physiotherapy faculties of two universities. Millions of women do not seek treatment because they are ashamed to talk about it, and medical personnel do not ask about it in their standard procedures. The article touches upon the issue of educating future physiotherapists who will have direct professional contact with women who are at risk of developing urinary incontinence or are already suffering from this disorder [25–28].

It is not satisfactory that only 64.4% of students from University Med and 56.3% of students from University PE were able to provide a full and correct definition of stress urinary incontinence in women. It means that a significant proportion of the respondents in each group do not know exactly what the

disease is. This fact is alarming, the more so as the students were provided with multiple options in the questionnaire, and their task was only to select the correct answer. One might also ask how they will be able to recognize this disease in their future patients and refer them for specialist treatment.

Risk factors of stress urinary incontinence were indicated by 86.4% of the physiotherapy students from University Med and 69.4% from University PE, and the index of indications per person was 3.1 and 2.8 respectively. Knowledge about this subject constitutes the basis for effective support for a future patient already suffering from SUI or at risk of developing it. Not being familiar with risk factors [9, 10] means that the therapist will not convey appropriate knowledge about SUI to patients, and thus, the patient will not be aware of the need to eliminate the underlying factor that caused or is exacerbating the disease.

The risk factors reported by the respondents in both groups are consistent with those reported in literature [29–37], in particular those regarding pregnancy and childbirth and their consequences influencing the occurrence of stress urinary incontinence, age and menopause, obesity, and weakness of pelvic floor muscles. However, special attention should be paid to the fact that the physiotherapy students from University PE put greater emphasis, in comparison with the students from University Med, on 'significant physical effort', as this factor was indicated by 13.7% of the respondents compared to 6.8%. This is probably related to the knowledge of those students about the problem of stress urinary incontinence in sportswomen professionally practicing sport disciplines such as running or jumping.

Prophylaxis aims to take actions in order to prevent the emergence or development of certain diseases in the population. 85.6% of physiotherapy students from University Med and 68.7% from University PE demonstrated knowledge about preventive methods. The index of indications per person was 1.9 and 1.6 respectively. That almost 90% of responses regarding SUI prevention methods was obtained among physiotherapy students from University Med shows that they are well prepared to undertake preventive measures in terms of urinary incontinence in women. The prophylactic methods mentioned by them mainly included pelvic floor exercises [38–40]. This was exactly the answer which had been expected from students of physiotherapy, the professional training of whom includes movement and physical measures, as mentioned in their statements. The specificity of this profession is to make their patients realize that moderate physical activity is a source of health and a way to avoid many civilizational diseases, including urinary incontinence, by strengthening the pelvic floor muscles. However, it should be noted that 27.1% of students from University Med and 16.2% from University PE regarded a healthy lifestyle as a preventive measure. The concept of a 'healthy lifestyle' is very general and each person can interpret it in a different way. That is why it does not mean a lot for a woman at risk of developing urinary incontinence or already suffering from this disorder. Physiotherapists, as medical personnel, should provide professional and very precise terms regarding preventive measures with regard to a specific disease entity. A similar situation took place in relation to the concept of 'physical activity' [37, 38], as 15.3% of the respondents from University Med and 8.1% from University PE gave this answer.

Unfortunately, this answer is laconic and imprecise, because it does not say explicitly what kind of physical activity actually serves to prevent stress urinary incontinence in women, and which kind of physical activity may even favor the disease or aggravate the symptoms if they have already occurred.

Students of University PE emphasized the need to educate women about the problem more strongly than did students of University Med. Education about SUI should constitute an absolute basis of all preventive methods. Unfortunately, only a very small percentage of students stressed the need for perinatal prophylaxis - it is also a key element that needs to be addressed in order to prevent this condition. As is known, the greater the extent of soft tissue injuries experienced during childbirth by nature, the more frequent are incidents of urinary incontinence in the future. To summarize the prophylactic methods of SUI, it should be noted that in addition to educational activities that should be addressed to the whole of society, there are groups of women at higher risk of developing this disease, as well as those already chronically ill, so assistance should be prioritized for these groups.

Similarly, as in the case of prophylactic methods, pelvic floor muscle exercises and physiotherapeutic procedures came to the fore in conservative treatment. It was satisfactory to get this response, as it is reported in literature that conservative treatment should include, first and foremost, pelvic floor muscle exercises. These exercises, also known as Kegel exercises, can take various forms and may involve exercises with additional equipment or without it, and can often be combined with a physical factor such as electrical current that strengthens the muscle contraction [34–40]. Unfortunately, a certain percentage of students again gave less precise answers such as ‘general physical exercise’. These exercises, if they do not involve strengthening pelvic floor muscles, are not regarded as conservative treatment of stress urinary incontinence.

A significant difference in the percentage of responses regarding the methods of surgical treatment applied in the case of SUI was observed - in the group of physiotherapists from University Med 28.0% mentioned methods of surgical treatment, while in the group of students from University PE only 6.7%, whereas the index of indications per person was 1.1 in both groups. The highest percentage of replies regarded tapes – this answer is compatible with literature where tension free vaginal tapes (TVT) are a widely described and applied method of surgical treatment for this disorder [41, 42].

Diagnosing stress urinary incontinence is a task intended for physicians, but studies have shown that a small percentage of physiotherapists demonstrated adequate knowledge on this subject. However, large discrepancies regarding knowledge of students from the two universities were found. Correct answers including: cough stress test, test pad, effort test and urodynamic examinations [43, 44], were provided by a total of 22.1% of the students from University Med but only 3.6% of the students from University PE. As many as 20.4% of the respondents from University PE said that diagnostic tests included pelvic floor muscle exercises. This answer is completely wrong and has nothing to do with diagnostics for this condition. Physiotherapy students correctly selected specialists and physicians who a woman suffering from SUI should consult. They included: urologists, gynaecologists and family doctors.

Very soon, the ageing human population will generate a significant number of patients with chronic diseases, and this will lead to a significant increase in demand for health services and to a deteriorated economic situation in many countries. Comprehensive professional cooperation between specialists working in a health care team is increasingly often appreciated and considered an effective method for

improving health care services to the population. Presence of physiotherapists in the multidisciplinary health care is considered a crucial and important factor of services provided to the patient, and indispensable in terms of health and economic needs of the society. In the days of fast technological progress and options for a contact e.g., with a patient who is at home, this way of communication may become a basic route for reaching an individual and sharing knowledge on prevention of diseases of civilisation. Changes of this type show us a path to being “flexible”, even in the health care system, and generating new solutions helping to expand knowledge. Introduction of appropriate education on diseases of civilisation, including SUI, in societies may be a foundation for limiting health care expenditures and achieving promising results for the future.

Conclusions

Students of physiotherapy have not shown satisfactory knowledge about stress urinary incontinence in women. However, despite this fact, the authors believe that most of the respondents have knowledge good enough to conduct a conversation about stress urinary incontinence with their future patients. It is worrying though, that some percentage of future physiotherapists gave imprecise answers, which for a woman who is at risk of developing urinary incontinence or is already suffering from this disorder may mean little or could create misconceptions about preventive measures or conservative treatment of this disorder. Research has shown that the disciplinary focus of universities educating students of physiotherapy plays a significant role in gaining knowledge about SUI. The students of physiotherapy from University Med demonstrated greater knowledge of risk factors, prophylactic methods and methods of conservative and surgical treatment in stress urinary incontinence in women compared with the students of University PE. The emphasis put on individual risk factors, diagnostic tests, conservative treatment methods and medical specialties useful in SUI treatment differed between the students of physiotherapy from the two universities which were the subject of this study.

Declarations

Ethics approval and consent to participate: As the study is not a medical experiment (due to its survey-based nature) The Committee for Bioethics of the Medical University of Silesia in Katowice, Poland waived the need for ethics approval (KNW/0022/KB/40/18).

Verbal informed consent was obtained from all participants according to the Act of 29 August 1997 concerning *Data Protection Regulation, Journal of Laws of the Republic of Poland* [45]. According to Polish law [45], research based on an anonymous questionnaire does not require the written consent of the participants. Before the surveys were distributed, the subjects were asked if they agreed to fill in a survey. The authors of this study do not have detailed documentation of the written consent of the participants as this would have taken the form of refusals to participate in the questionnaire, when, in fact, all students willingly took part in the survey.

Consent for publication: Not applicable

Availability of data and materials: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests

Funding: Not applicable

Authors' contributions: JW design of the work, data collection, data analysis, manuscript writing/editing, MHP data analysis, manuscript editing. All authors have read and approved the final manuscript.

Acknowledgements: Not applicable

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Figures

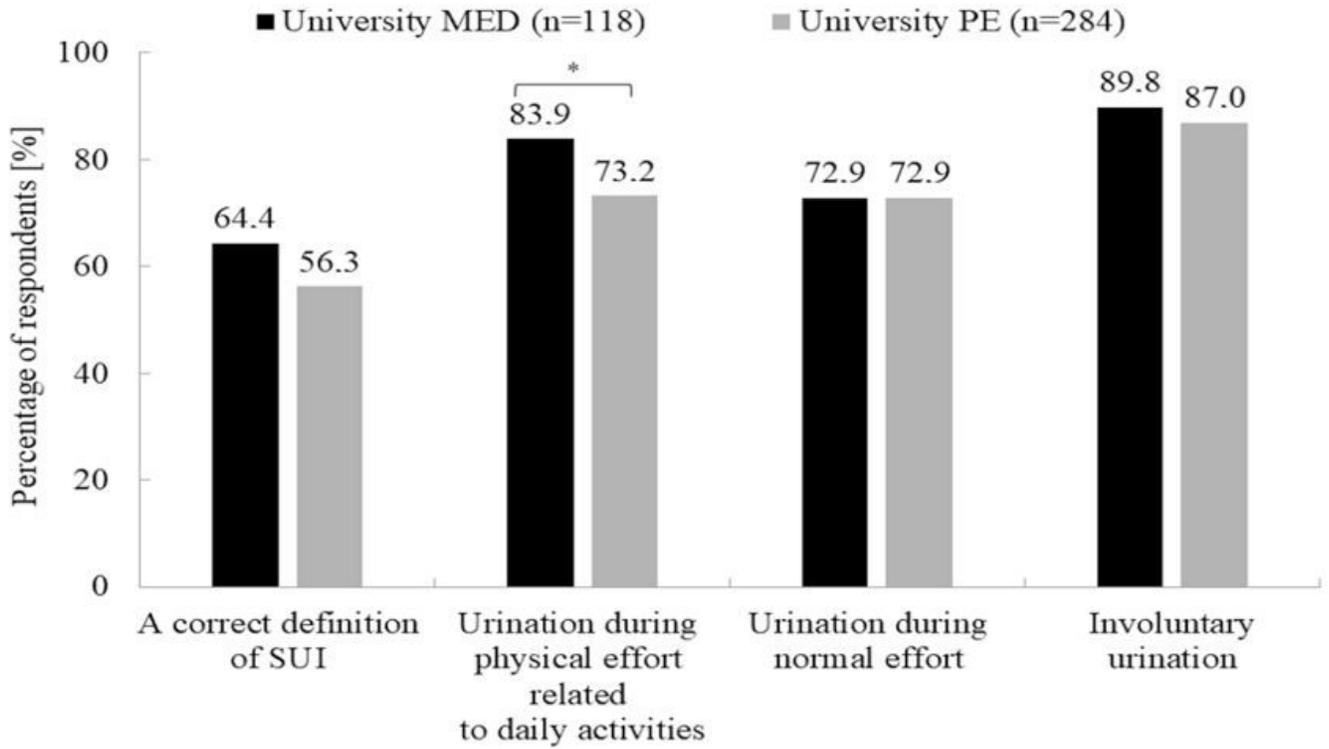


Figure 1

The percentage of physiotherapy students at Universities Med and PE who correctly defined stress urinary incontinence (*p=0.02).

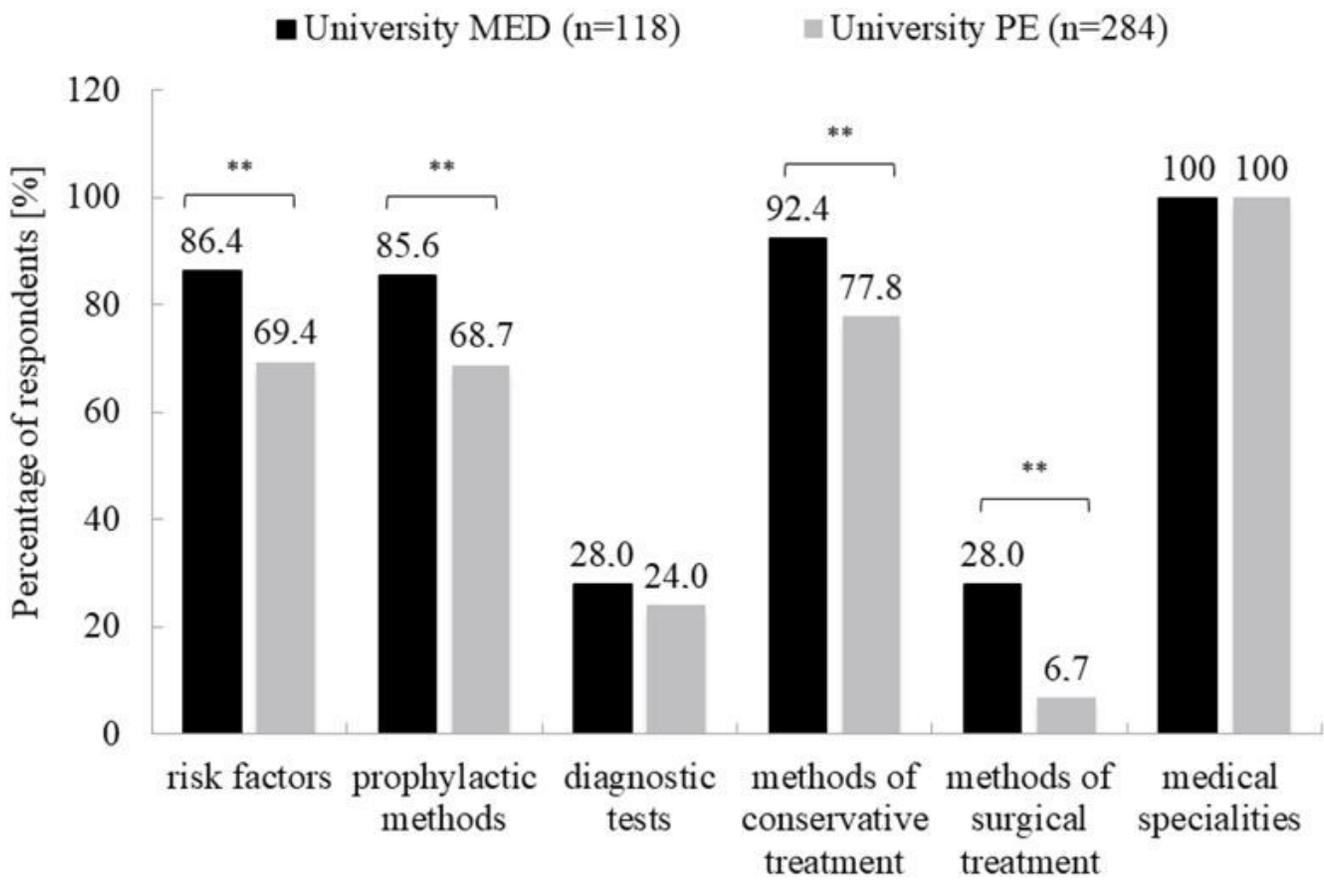


Figure 2

The percentage of physiotherapy students at Universities Med and PE who expressed knowledge of risk factors, prophylactic methods, diagnostic tests and methods of conservative and surgical treatment (**p<0.001).

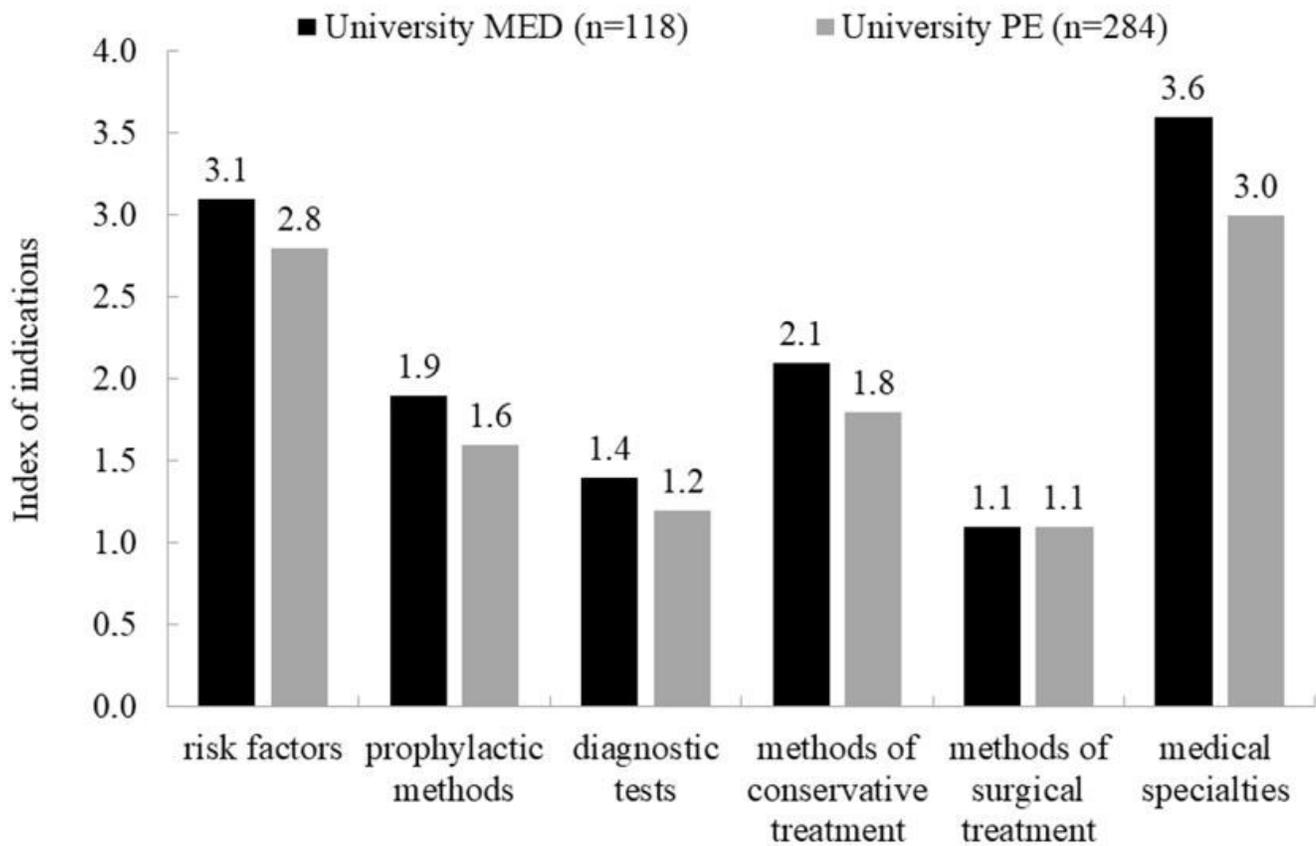


Figure 3

The index of indications of risk factors, prophylactic methods, diagnostic tests and methods of conservative and surgical treatment, and medical specialties helpful to treat stress urinary incontinence in the groups of physiotherapy students at Universities Med and PE.