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TEACHER´S PERCEPTION ABOUT THE PHYSICAL ERGONOMICS PRINCIPLES IN MEDICINE AND NURSING COURSES[1]

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ABSTRACT
The aim of this study was to analyze the knowledge of professors who work in the scenario of professional practice of the second grade of the Medicine and Nursing courses on the principles of physical ergonomics. The work was carried out in an educational institution located in the state of São Paulo, in 2014. This is a descriptive, cross-sectional study, with a qualitative approach. Data were collected by semi-structured interviews and analyzed according to the content analysis technique in the thematic mode. The analysis of statements allowed identifying three themes: "Ergonomics: between the construction of a concept and its use in practice"; "Musculoskeletal disturbances in health workers: prevent or remedy?"; "Gleaming the principles of ergonomics in undergraduate courses in the health area." One concludes that professors have limited knowledge on the ergonomics theme, usually associated with posture and positions. Respondents established a link between the activities carried out by doctors and nurses with musculoskeletal overload and reinforce the need for preventive measures. They recognized that the academic environment is a field to incorporate the ergonomics theme to professional practice and the professor has an important role in that process.

Keywords: Humane Engineering. Medicine Students. Nursing Students.

INTRODUCTION

Several factors can trigger health problems for workers, including those associated with their own professional practice, originating the occupational diseases. Health professionals, especially physicians and nurses, usually present musculoskeletal occupational diseases[1-2]. In this way, prevention is an important resource to minimize musculoskeletal injuries due to the labor process.

In this sense, ergonomic actions play a fundamental role in the prevention of health problems of musculoskeletal nature and provide protection and safety to workers' health. Ergonomics or human engineering can be defined as the science that aims at adapting work to the psychophysiological characteristics of workers. It can be divided into three domains of specialization: physical, cognitive and organizational[3-4].

Physical ergonomics deals with the relation of the anatomical, anthropometric, physiological and biomechanical characteristics of the man with the physical activity, involving, for example, the study of the work position, postures, repetitiveness, layout, among others[4]. The principles worked in ergonomics meet the main problems faced by doctors and nurses during the execution of their professional activities[2]. An important aspect of ergonomics is the worker's awareness of self-care, providing support for the demand for better conditions to perform the job[5].

Prevention, through ergonomics, is the most effective way to avoid health problems for workers, but, in order to put it into practice, training and knowledge of ergonomic measures are necessary. The process of acquiring that knowledge must begin during the period of training of the health professional, thus forming a foundation to incorporate self-care throughout his/her life.

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In this way, appropriating knowledge in ergonomics throughout graduation will enable the future professional to have greater competence to prevent musculoskeletal disorders. Health workers need to be aware of the risks to which they are exposed and how to control them[6].

The Law of Guidelines and Bases of National Education (Lei de Diretrizes e Bases da Educação Nacional) emphasizes that school education must have a link to the world of work and social practice and aim at the full development of the learner and his/her qualification for work. Specifically on higher education, it emphasizes that institutions should stimulate knowledge of the problems of the present world[7]. Thus, it is important to highlight that occupational diseases represent a public health problem, since musculoskeletal complaints are the main causes of absenteeism in health professionals[1].

Nevertheless, in order to include that topic in graduate courses in the health area, it is important that professors understand the importance of ergonomics in the prevention of occupational diseases. Analyzing the professors' understanding on ergonomics will allow a situational diagnosis about the valuation that such theme has during the period of training of medical and nursing professionals.

This study aims to identify the understanding of professors who work in the scenario of professional practice of the second grade of the medicine and nursing courses on the principles of physical ergonomics.

METHODOLOGY

This is a descriptive, cross-sectional research, with a qualitative approach. There were interviews with all professors who work in the scenario of professional practice of the second grade of the medicine and nursing courses of a higher education institution located in the interior of the state of São Paulo (n=14).

Data collection took place in the first semester of 2014 and was carried out through the use of a semi-structured interview with the professors from the medicine and nursing courses who worked as facilitators in the activities of the Professional Practice Unit (UPP – Unidade de Prática Profissional) and the Professional Practices Laboratory (LPP – Laboratório de Práticas Profissionais). Those scenarios are used for the development of the didactic activities of the students at the institution where this study was carried out, which uses active teaching-learning methods. The UPP represents the real scenario of experiencing professional practices, in this case, portraying the Basic Healthcare Units. The LPP addresses the simulated situations, with the participation of actors trained to stage health and disease situations related to medical and nursing courses[8].

The researchers recorded and transcribed the interviews. The instrument initially contemplated a characterization of the professors, followed by four guiding questions that addressed the view of the interviewees on the ergonomics theme and their conduction in graduation, as follows. 1) *What do you understand by physical ergonomics?* 2*) In your opinion, are the principles of physical ergonomics important for the performance of the professional activities of the doctor and the nurse*? 3*) Based on the concept that you have about the principles of ergonomics, do you believe that the students put into practice these concepts during the care of the simulated patients? Exemplify*. 4*) Do you consider relevant the incorporation of this theme in the medicine and nursing graduate courses of the institution? Justify.*

Data regarding the open interview questions were analyzed according to the Content Analysis Technique in Thematic Modality, according to Bardin. In that technique, of qualitative nature, successive readings of the material are carried out, and, then, the sense nuclei are identified, which will base the construction of the main themes (9).

The Ethics Committee for Researches Involving Human Beings of the Medicine College of Marília – Fanema approved this study, under the opinion No. 93,193/12.

RESULTS AND DISCUSSION

All 14 professors involved with the UPP and LPP of the second grade agreed to participate in the research. In the studied population, there was

a representation of both Doctors (6) as Nurses (8). In general, professors were less than 50 years old (9), had less than 15 years of graduation (8) and had been working for less than 10 years at the institution(8).

The approach of the professors with the ergonomics theme was investigated, specifically about physical ergonomics, the importance of implementing ergonomics principles in graduation and the relevance of the theme. The analysis of the professors' statements allowed identifying three main themes: "Ergonomics: between the construction of a concept and its use in practice"; "Musculoskeletal disorders in health workers: prevent or remedy?"; "Gleaming the principles of ergonomics in undergraduate courses in the health area".

Ergonomics: between the construction of a concept and its use in practice

In this theme, the professors conceptualized physical ergonomics; however, they almost exclusively associated the understanding of the theme with the adoption of postures and positions suitable for the execution of the work.

Some interviewees took a closer look at the issue, associating the damage to the body, physical overload and damage to health. The statements allowed identifying that the concepts constructed had to do with a rescue of their professional experiences. This interpretation is understood by the following statements:

> [...] we need to have a posture [...] you can do things that harm your posture [...] so that you have no losses for your body (D4).

> Physical ergonomics relates to the positioning issue to develop activities, physical positioning, it is the way I stand when checking an arterial blood pressure (D8).

> [...] a science that tries, at least, to study the relation of the human being with the environment that he is inserted, especially the work issue, and tries to create instruments, places, positions that try to improve this relation (D2).

However, there are some confusions about the concept of ergonomics, as highlighted below, in which the concept of ergonomics relates to preventing infection:

> Ergonomics is facilitating the practical activity that the professional exercises, preventing both infection as pathologies in the future (D9).

The concept of physical ergonomics does not relate only to postural aspects, but it also encompasses repetitive movements, vigorous efforts and the layout of workplaces. It deals with prevention, protection, limitations or incapacitations related to physical aspects, without overloading the musculoskeletal system, respecting the workers' physical characteristics[10].

Most professors' answers related, in some way, to that concept, either by the construction of an established idea or by a word that referred to that meaning, as the case of prevention.

Ergonomics encompasses the prevention of future disorders, such as musculoskeletal disorders, especially involving the spine[11,1]. Some professors related prevention with ergonomics, highlighting the importance of self-care and patient care. Care with patient safety is an important situation during health care[12], but does not relate to ergonomic principles.

> [...] you have to be careful, regarding making him {patient} as comfortable as possible so that you do not harm yourself (D4).

Another statement, related to care when attending, demonstrated the professor's concern with his body, establishing the prerogative of self-care, essential in the performance of both the doctor's as nurse's activities.

> [...] when performing the physical examination I put the patient in a position where he is comfortable, but where I {professional} am also comfortable in order to make this evaluation (D8).

Self-care represents actions aimed at maintaining life and well-being and relates to health[13]. Considering the magnitude of the problems caused by diseases of musculoskeletal origin for health workers, the activities of caring for the body during patient care end up being a form to prevent those diseases.

Ergonomic practices meet the definition of self-care. Knowing how to use properly one's body mechanics, organize the work environment so that there is no physical overload and reduce the carried weight contribute to the prevention, protection and promotion of workers' health[11].

Musculoskeletal disturbances in health workers: prevent or remedy?

This issue arose from statements that associated the existence of a temporal relationship with the appearance of musculoskeletal complaints. In this sense, the professors also associated the professional activities of doctors and nurses with the appearance of musculoskeletal complaints and their consequences.

> [...] we have a great contingency of work, problems related to the health of the worker, precisely because this part of the ergonomics, of his corporal posture, the corporeal positioning, has been inadequate during the years of work (D12).

> [...] what we have are chronic diseases, diseases that do not exist now, but which, in the future, generate diseases, musculoskeletal conditions (D2).

The incidence of musculoskeletal disorders has increased every day due to factors such as the increase in the life expectancy of the population, with consequent prolongation of the worked years. Associated with that, one must consider changes in the organizations, with a search for the greater performance of the workers[14].

Adverse working conditions may also trigger or aggravate musculoskeletal complaints. In this study, professors were able to identify that the work activities of physicians and nurses may relate to the appearance of those complaints.

> [...] especially with the nurse, who is in direct contact with the patient, the care you have when it comes to holding, when transporting, you have to make the movement of that patient (D4).

The work performed by the nurses contributes to the fact that nursing represents one of the occupations most susceptible to the involvement of musculoskeletal disorders. Among the main found problems, the high occupational exposure to the repetitive movements with the upper limbs and hands, the long stay in standing positions or traveling long distances, the inadequate postures of the trunk and the lifting and manipulation of load[2,12,14].

The statements also bring examples of work activities in the area of medicine that can trigger problems of musculoskeletal origin:

> [...] because I {doctor} have many problems because of surgeries, a matter of not doing the proper physical examination of the patient (D2).

> [...] one thing is {doctor} examining the patient once, but I do this thirty times a day, every day, this is going to lead to some injury in some part of my body (D13).

The national literature does not address the two highlighted situations regarding the activities performed by the medical class as the main triggers of musculoskeletal complaints. Surgeries and physical examinations, mainly gynecological and pediatric ones, favor the adoption of uncomfortable and incorrect postures during the execution of the work[15,16].

On the other hand, the repetitiveness of the movements is an aggravating factor in the activities performed during the labor processes, being responsible for problems of musculoskeletal origin, with great impact on the physical integrity and the work process of the physician[17].

In general, the consequences of the overload of activities performed by health professionals were widely discussed during interviews. The professors highlighted the problems that have arisen over the years of work.

> [...] at this point in my life, pain started to appear in my body. (D5).

> [...] today I have four disk hernias because of inappropriate positioning (D8).

At the beginning of their professional careers, the problems were distant and unlikely to happen; however, with the development of work activities without proper care over the years, there is the triggering of health problems in those professionals (18). Prevention is one of the most effective ways to combat musculoskeletal disorders, and, for it to happen, ,the principles of ergonomics need to be present in the lives of professionals and permeate their work activities. One of the ways to ensure that the professional activities of doctors and nurses base on the principles of ergonomics is addressing that theme at academic spaces[6].

Gleaming the principles of ergonomics in undergraduate courses in the health area

This theme arose due to the appreciation by professors of the learning of ergonomic techniques during the teaching of professional practices, both in the area of medicine as in nursing. The speeches made clear the difficulty to highlight reliable examples of application of the principles of ergonomics in students' academic practice.

> [...] when we are going to discuss the techniques issue, I think this {ergonomic principles} should be punctuated in a more incisive way, so that these students realize it at the beginning of their formation and at the beginning of their professional career (D8).

> [...] if it is not learned now, when there are addictions, it becomes difficult afterwards for you to heal them, I say it from personal experience (D2).

A study carried out with odontology students demonstrated the value of learning ergonomics during graduation[19]. Associating the learning of the ergonomic techniques with the moment of the teaching of the professional practices is important, because it facilitates the insertion of the students in the real scenarios of action of the health professionals, making them to seek the healthy practice of the profession.

The professors interviewed in this study also agreed on the importance of implementing ergonomic principles in medicine and nursing graduate courses. Most of them answered favorably, and only one professor reported that graduation already contemplates that item, but agrees that it is an important point to work on.

> [...] it should be worked out (ergonomics) since the first grade, because they seek to put into practice everything they learn, but if it is not part of the hourly schedule, they end up not putting into practice what they do not learn (D10).

Reinforcing the need to further deepen the ergonomics approach in undergraduate courses in the health area, studies carried out with nursing and odontology students have concluded that those students are partially familiar with the subject, have difficulty putting it into practice, pointing to a lack of training of these future professionals[6,20].

The problems of musculoskeletal origin cause several difficulties in the life of the health professional. Therefore, considering that representation, it is necessary to formalize their prevention in the teaching and learning scenarios. The learning of techniques guided by the principles of ergonomics is essential for the performance of professional activities and can be multiplied within the working environment[19-20], according to the following professor's discourse:

> I consider it very important {implementing the principles of ergonomics in the graduation), it is so, here we are forming the professional and in the future he will multiply the knowledge (D6).

Problems related to the world of work should serve as inspiration for the academy's activities. Including that topic in graduation should take into account the preparation of professors, since they present the role of facilitators of learning and are responsible for stimulating those practices with the students. It is important to include that learning in graduation, for it is the moment when the professional assimilates the execution of the technique[6].

FINAL CONSIDERATIONS

The objective of this study was to analyze professors' understanding of the principles of physical ergonomics. Through the evaluation of the reports, it was possible to conclude that they have a limited understanding on the subject, generally associating physical ergonomics with the adoption of postures and positions suitable for the execution of the work. The experience lived during the years of work allowed some of the interviewed professionals to construct a concept that also covered the prevention issue.

In the professors' evaluations, there was an association of the specific professional activities performed by both physicians and nurses with the triggering of musculoskeletal overload and the appearance of complaints. It was also possible to identify that the professionals did not care about that overload in a preventive way and that they remembered it only after the symptoms appeared. It is worth mentioning that it was common the report of interviewees with musculoskeletal complaints.

Professors recognized the academic environment as an important field to incorporate

the ergonomics theme into professional practice, since "students tend to put everything they learn into practice". With the introduction of ergonomics, since the graduate course of medicine and nursing, it is possible to improve the training of those professionals, to envisage the multiplication of ergonomic practices in health work environments and, consequently, to contribute to the control of possible musculoskeletal complaints that they may present in the future.

Therefore, thinking about ergonomics in graduation should also take into account the work with the professor, since any activity performed at college is put into practice through them, facilitators of the learning process.

PERCEPÇÃO DE PROFESSORES SOBRE OS PRINCÍPIOS DE ERGONOMIA FÍSICA NOS CURSOS DE MEDICINA E ENFERMAGEM

RESUMO

O objetivo deste estudo foi identificar o conhecimento dos professores que atuam no cenário de prática profissional da segunda série dos cursos de medicina e enfermagem sobre os princípios da ergonomia física. O trabalho foi realizado em uma instituição de ensino localizada no interior do estado de São Paulo, no ano de 2014. Trata-se de uma pesquisa descritiva, transversal com abordagem qualitativa. Os dados foram coletados por entrevista semiestruturada e analisados de acordo com a técnica de Análise de Conteúdo na Modalidade Temática. A análise dos depoimentos permitiu a identificação de três temáticas: “Ergonomia: entre a construção de um conceito e a utilização na prática”; “Distúrbios osteomusculares em trabalhadores da saúde: prevenir ou remediar?”; “Vislumbrando os princípios da ergonomia nos cursos de graduação da área da saúde”. Conclui-se que o conhecimento dos professores sobre o tema ergonomia é limitado, geralmente associado à postura e posições. Os entrevistados estabeleceram uma relação entre as atividades desenvolvidas por médicos e enfermeiros com a sobrecarga osteomuscular e reforçam a necessidade de medidas preventivas. Reconheceram que o ambiente acadêmico é um campo para a incorporação do tema ergonomia à prática profissional e que o professor possui um importante papel neste processo.

Palavras-chave: Engenharia Humana. Estudantes de Medicina. Estudantes de Enfermagem.

PERCEPCIÓN DE PROFESORES SOBRE LOS PRINCIPIOS DE ERGONOMÍA FÍSICA EN LOS CURSOS DE MEDICINA Y ENFERMERÍA

RESUMEN

El objetivo de este estudio fue identificar el conocimiento de los profesores que actúan en el escenario de la práctica profesional de la segunda serie de los cursos de medicina y enfermería sobre los principios de la ergonomía física. El trabajo fue realizado en una institución de enseñanza ubicada en el interior del estado de São Paulo-Brasil, en el año de 2014. Se trata de una investigación descriptiva, transversal con abordaje cualitativo. Los datos fueron recolectados por entrevista semiestructurada y analizados según la técnica de Análisis de Contenido en la Modalidad Temática. El análisis de los relatos permitió la identificación de tres temáticas: “Ergonomía: entre la construcción de un concepto y la utilización en la práctica”; “Trastornos músculo-esqueléticos en trabajadores de la salud: ¿prevenir o remediar?”; “Vislumbrando los principios de la ergonomía en los cursos de pregrado del área de la salud”. Se concluye que el conocimiento de los profesores sobre el tema ergonomía es limitado, generalmente asociado a la postura y posiciones. Los entrevistados establecieron una relación entre las actividades desarrolladas por médicos y enfermeros con la sobrecarga músculo-esquelética y señalan la necesidad de medidas preventivas. Reconocieron que el ambiente académico es un campo para la incorporación del tema ergonomía a la práctica profesional y que el profesor posee un importante rol en este proceso.

Palabras clave: Ingeniería Humana. Estudiantes de Medicina. Estudiantes de Enfermería.

REFERENCES

1. Silva LA, Jenal S, Robazzi MLCC, Marziale MHP, Rocha FLR, Mendes AMOC. Atendimentos aos trabalhadores da saúde em unidade de pronto atendimento hospitalar. Cienc Cuid Saude [on-line]. 2014 abr/jun [citado 2015 set 15]; 13(2):286-93. Disponível em: http://periodicos.uem.br/ojs/index.php/CiencCuidSaude/article/view/21419

2. Silva NR. Fatores determinantes da carga de trabalho em uma unidade básica de saúde. Cien Saude Colet [on-line]. 2011 [2015 set 5]; 16(8): 393-402. Disponível em: http://www.scielo.br/pdf/csc/v16n8/a06v16n8.pdf

3. Ministério do Trabalho e Emprego (BR). NR 17-Ergonomia. In: Equipe Atlas, coordenadores. Segurança e medicina do trabalho. 68ª ed. São Paulo: Atlas; 2011. p. 305.

4. Pichler RF, Garcia LJ, Seitz EM, Merino GSAD, Gontijo LA, Merino EAD. Erros de medicação: análise ergonômica de utensílios da sala de medicação em ambiente hospitalar. Cad Saude Colet [on-line]. 2014 [citado 2015 set 23]; 22(4):365-71. Disponível em:

http://www.scielo.br/pdf/cadsc/v22n4/1414-462X-cadsc-2013026.pdf

5. Almeida LGN, Torres SC, Santos CMF. Riscos ocupacionais na atividade dos profissionais de saúde da atenção básica. Rev Enferm Contemp [on-line]. 2012 [citado 2015 set 17]; 1(1):142-54. Disponível em: https://www5.bahiana.edu.br/index.php/enfermagem/article/view/51

6. Soares MMML, Takeda E, Pinheiro OL. Avaliação sobre os conhecimentos ergonômicos de estudantes do curso de enfermagem. Rev Bras Pesqui Saude [on-line]. 2013 [citado 2015 set 23]; 15(1):113-21. Disponível em: http://periodicos.ufes.br/RBPS/article/viewFile/5587/4072

7. Lei Federal n. 9.394, de 20 de dezembro de 1996. Estabelece as Diretrizes e Bases da Educação Nacional. Diário Oficial da União. Distrito Federal; 1996 [citado 2015 set 23]. Disponível em: http://www.planalto.gov.br/CCIVIL_03/leis/L9394.htm

8. Costa MCG, Mazzoni CJ, Braccialli LAD, Moraes MAA. Exercício de avaliação da Prática Profissional como estratégia de ensino e aprendizagem. Avaliação. 2011 [citado 2015 set 23]; 16(3):675-84. Disponível em: http://www.scielo.br/pdf/aval/v16n3/v16n1a10.pdf

9. Gomes R. A análise de dados em pesquisa qualitativa. In: Minayo MCS. Pesquisa social: teoria, método e criatividade. 11ª ed. Petrópolis (RJ): Vozes; 1999. p. 67-80.

10. Moore SM, Krajewski JT. National Institute for Occupational Safety and Health. Pratical Demonstrations. Manual Niosh [on-line]. 2011 [citado 2015 set 23]. Disponível em: http://www.cdc.gov/niosh/mining/UserFiles/works/pdfs/2011-191.pdf

11. Santos RGF, Nascimento JL. Lombalgia provocada pelo transporte manual de carga: uma reflexão coletiva sobre a saúde do trabalhador. Rev Saúde Desenv [on-line]. 2015 [citado 2015 out 29]; 8(4):207-21. Disponível em: http://www.grupouninter.com.br/revistasaude/index.php/saudeDesenvolvimento/article/view/497

12. Reis CT, Martins M, Laguardia J. A segurança do paciente como dimensão da qualidade do cuidado de saúde – um olhar sobre a literatura. Cien Saude Colet [on-line]. 2013 [citado 2016 out 29]; 18(7):2029-36. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-81232013000700018

13. Araújo AAS, Campelo LL, Alves VGS. O comportamento dos profissionais de enfermagem em relação ao autocuidado. Rev Interd [on-line]. 2013 [citado 2016 out 29]; 6(4):112-23. Disponível em: http://revistainterdisciplinar.uninovafapi.edu.br/index.php/revinter/article/view/119

14. Ribeiro NF, Fernandes RCP, Solla DJF, Santos Junior AC. Prevalência de distúrbios osteomusculares relacionados ao trabalho em profissionais de enfermagem. Rev Bras Epidemiol [on-line]. 2012 [citado 2015 set 23]; 15(2):429-38. Disponível em: http://www.scielo.br/pdf/rbepid/v15n2/20.pdf

15. Mehrdad R, Dennerlein JT, Morshedizadeh M. Musculoskeletal disorders and ergonomic hazards among Iranian physicians. Arch Iran Med. 2012 jun [citado 2016 set 17]; 15(6):370-4. Disponível em: http://www.ams.ac.ir/AIM/NEWPUB/12/15/6/0011.pdf doi: 012156/AIM.0011.

16. Knudsen ML, Ludewig PM, Braman JP. Musculoskeletal pain in resident orthopaedic surgeons: results of a novel survey. Iowa Orthop J. 2014 [citado 2015 set 17]; 34:190-6. Disponível em: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4127715/

17. Vasconcelos SP, Fischer FM, Reis AOA, Moreno CRC. Fatores associados à capacidade para o trabalho e percepção de fadiga em trabalhadores de enfermagem da Amazônia occidental. Rev Bras Epidemiol [on-line]. 2011[citado 2016 set 19]; 14(4):688-97. Disponível em: http://www.scielo.br/pdf/rbepid/v14n4/15.pdf

18. Davis KG, Kotowski SE. Prevalence of Musculo skeletal Disorders for Nurses in Hospitals, Long-Term Care Facilities, and Home Health Care: A Comprehensive Review. Human Factors: The Journal of the Human Factors and Ergonomics Society. 2015 [citado 2016 set 19]. 57(5):754-92. Disponível em: http://hfs.sagepub.com/content/57/5/754.full.pdf+html

19. Rovida TAS, Garbin AJI, Peruchini LFD, Machado ACBM, Moimaz SAS. Ergonomia odontológica: integrando teoria e prática para o avanço do ensino. Revista da ABENO [on line]. 2015 [citado 2016 out 29]; 5(4):37-44. Disponível em: http://revodonto.bvsalud.org/pdf/abeno/v15n4/a06v15n4.pdf

20. Vieira AJO, Julião Filho CAB, Firmino RT, Garcia AFG, Menezes VA. Conhecimento de ergonomia e desordens osteomusculares entre estudantes de Odontologia. RFO [on line]. 2014 [citado 2016 out 31]; 19(3):304-10. Disponível em: http://seer.upf.br/index.php/rfo/article/view/3996

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