EGITANIA SCIENCIA

Revista journal

Número especial: International Congress on Health and Well Being Intervention

EGITANIA SCIENCIA

Revista journal

Nota de abertura

Dear readers,

RECI and the Jean Piaget School of Health (ESS) - Viseu, promoted the 2nd International Congress of Health and Well-being Intervention (ICHWBI) - Health and Wellbeing in the Life Cycle" and the 1st International Conference on Human Kinesiology (ICOHK) organized by KinesioLab, at the University Campus of Viseu of the Piaget Institute, on May 28 and 29, 2021.

The Congress intended to contribute to the discussion of current and emerging issues related to the health and well-being of the population and to count on the participation of researchers and professionals from different areas of practice and training.

This edition brings together the works presented at this event in various spheres of knowledge in the areas of health and well-being.

This Congress had as main objectives:

· Reflect on the challenges posed to the population's health and well-being;

· Create a space for dialogue that allows for the exchange of experiences between professionals from different areas of intervention and from different regions;

· Sharing of new technologies, techniques and processes between academics, professionals and other stakeholders in the health field;

· Promoting a multidisciplinary view on health intervention and the role to be played by the various sectors of society;

· Share new knowledge and allow others to update themselves;

· Disseminate health and well-being research projects and results;

· Promote debate on the health situation in the country and its dimensions related to the intervention of different professions;

· Bring together partners from different regions to reflect professional experiences and share research results.

The works presented by the Researchers reflected the awareness of the need for innovation and originality in several areas of knowledge, and had as themes:

Child Health and Well-Being - Growth and Development

Adult Health and Well-Being — From the individual to the complexity

Health and Well-being of the Elderly - Current and future perspectives

This is an edition dedicated to the publication of the best works resulting from the event, where the reader will find a significant heterogeneity.

Articles are research papers based on research projects, submitted by researchers of various academic degrees. This diversity is also found in the scientific areas of the authors, reflected in the variety of research topics presented at the Congress itself.

Thus, despite this heterogeneity, it is considered that the aggregating element lies in the seriousness, quality and enthusiasm in contributing to knowledge in the field of research in the various areas of knowledge.

Discussing the theme of education, the Swiss biologist and epistemologist Jean Piaget points out:

"The main purpose of education is to create men who can do new things, not simply repeat what other generations have done. Men who are creators, inventors, discoverers.

The second objective of education is to form minds capable of criticizing, verifying and not accepting everything that is proposed to them".

These investigations show how the authors are aware and able to contribute in an integrated way to research in the different areas of knowledge, which underlines the importance and absolute necessity of continuing to promote health and well-being.

Gustavo Desouzart

President of the Organizing Committee of ICHWBI 2021

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SATISFAÇÃO PROFISSIONAL DOS FISIOTERAPEUTAS EM PORTUGAL **PT**

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SATISFACCIÓN PROFESIONAL DE LOS FISIOTERAPEUTA EN PORTUGAL **ES**

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PROFESSIONAL SATISFACTION OF PHYSIOTHERAPISTS IN PORTUGAL

ABSTRACT

Job satisfaction is a complex phenomenon because it is a subjective state of mind. This study evaluates the job satisfaction of physiotherapists working in Portugal for more than 6 months. In a sample of 780 physiotherapists, through the application of an online questionnaire that included questions of individual and professional characterization and related to job satisfaction, it was found that they were moderately satisfied with the profession (67.4%), with a positive correlation relationship between the dimensions of job content satisfaction (r=0.134; p<0.01) and work compensation (r=0.180; p<0.001) with years of service. Lower pay and general practice are associated with lower levels of satisfaction (p<0.001). Physiotherapists who saw three or more clients per hour had lower levels of satisfaction (p<0.001). With this study we can conclude that satisfaction is positively impacted by the relationship with patients and negatively influenced by the perspectives of career progression, remuneration received and the recognition of work by institutions.

Keywords: Physiotherapist; professional satisfaction; Portugal.

RESUMO

A satisfação no trabalho é um fenómeno complexo por se tratar de um estado subjetivo. O objetivo do estudo é avaliar a satisfação profissional de fisioterapeutas a exercer em Portugal há mais de 6 meses. Numa amostra de 780 fisioterapeutas, através da aplicação de um questionário online que incluía questões de caracterização individual e profissional e relacionadas com a satisfação no trabalho, constatou-se que se encontravam moderadamente satisfeitos com a profissão (67,4%), havendo uma correlação positiva entre as dimensões da satisfação dos conteúdos do trabalho (r=0,134; p<0,01) e compensações do trabalho (r=0,180; p<0,001) com os anos de experiência profissional. Remuneração mais baixa e prática generalista está associada a níveis de satisfação menor (p<0,001). Os Fisioterapeutas que atendiam 3 ou mais utentes por hora apresentaram menores níveis de satisfação (p<0,001). Conclui-se que a satisfação é influenciada negativamente pelas perspetivas de progressão na carreira, remuneração recebida e reconhecimento do trabalho pelas instituições e positivamente pela relação com os utentes.

Palavras-chave: Fisioterapeuta; satisfação profissional; Portugal.

PROFESSIONAL SATISFACTION OF PHYSIOTHERAPISTS IN PORTUGAL

RESUMEN

La satisfacción laboral es un fenómeno complejo porque es un estado subjetivo. El objetivo del estudio es evaluar la satisfacción laboral de los fisioterapeutas que trabajan en Portugal durante más de 6 meses En una muestra de 780 fisioterapeutas, mediante la aplicación de un cuestionario online que incluía preguntas de caracterización individual y profesional y relacionadas con la satisfacción laboral, se encontró que se encontraban medianamente satisfechos con la profesión (67,4%), con una correlación positiva. entre las dimensiones de satisfacción con el contenido del trabajo (r=0,134; p<0,01) y compensación laboral (r=0,180; p<0,001) con años de experiencia profesional. Los salarios más bajos y la práctica general se asocian con niveles más bajos de satisfacción (p<0,001). Los fisioterapeutas que atiendían a 3 o más usuarios por hora tienían menores niveles de satisfacción (p<0,001). Podemos concluir que la satisfacción se ve influida negativamente por las perspectivas de progresión profesional, la retribución recibida y el reconocimiento del trabajo por parte de las instituciones y positivamente por la relación con los clientes.

Palavras-chave: *Fisioterapeuta; satisfacción profesional; Portugal.*

INTRODUCTION

The available literature reveals that job satisfaction significantly interferes in the ability to adapt to work, in the integration, autonomy, motivation, involvement and use of physical and mental capacities of health professionals. As the healthcare area is characterized by dynamic environments and patients sometimes with complex diagnoses, Physiotherapists are challenged to focus their patient-centered intervention efficiently and effectively, while adopting evidence-based practices and attending to best standards of clinical practice (Klappa et al., 2015). These challenges can represent an additional pressure for Physiotherapists, leading to a decrease in the quality of life of professionals, and consequently in their satisfaction with their work.

The relevance of assessing the degree of satisfaction with work is justified by the implications it has on the health and quality of life of professionals, and by the repercussions on organizations, in terms of productivity. A dissatisfied worker can also develop various mental health problems such as lack of motivation, stress and burnout and even physical problems that ultimately prevent them from working, increasing absenteeism and harming employees' goals (Craig & Sprang, 2010; Dias et al., 2010)continuous and prolonged exposure to the stress of working with the myriad of trauma-related stressors experienced by their clients can lead to various responses including burnout, compassion fatigue, and compassion satisfaction. The present study investigates the impact of using evidence-based practices on compassion fatigue, burnout, and compassion satisfaction in a random, national sample of self-identified trauma specialists (N = 532.

Decreasing levels of job satisfaction can compromise, in the medium term, the performance of organizations and consequently the health level of the population (Pegorari et al., 2017).

One of the challenges for organizations is the creation and maintenance of teams with motivated and satisfied Physiotherapists. The possibility of autonomously monitoring patients and attend continuous training can help to build these teams. Some studies show that Physiotherapists seek greater independence in direct patient care activities, as well as in opportunities for promotion and salaries that are aligned with their education and experience (Campo et al., 2009; Harkson et al., 1982).

The creation of conditions for carrying out continuous training is more important for recent graduates, while Physiotherapists with a higher degree of academic training look for opportunities to be involved in the formulation of organizational policies (Limbasiya et al., 2014; Menon et al., 2009).

Professional development is essential for Physiotherapists to provide quality healthcare and meet the changing needs of the community over time. In fact, the increase in patient demand standards requires a level of management of the health services that encompasses constant evolution and continued adaptation of these professionals to new ways of working, a situation that may be more complex for more senior professionals. To respond to this need for professional development, it will be important to integrate continuous education that encompasses learning methods capable of enhancing skills and integrating evidence into clinical practice (Fleet et al., 2008; Grimmer et al., 2017).

In Portugal there are already some research works that assess the professional satisfaction of Physiotherapists. However, the fact that the relationship of Physiotherapists satisfaction with the length of professional practice, as well as the most sought-after continuing education was not studied, proving the high relevance of the present study.

Thus, the main objective of this study is to evaluate the relationship between the length of physical therapy exercise and the professional satisfaction of Physiotherapists in Portugal, in order to verify whether there are statistically significant differences when comparing the professional satisfaction of Physiotherapists with more or less time of experience.

For this purpose, a quantitative, correlational and descriptive study will be carried out, in which Physiotherapists working in Portugal will be invited to participate, by completing a questionnaire that will be sent through digital means. After collecting the data, these will be statistically treated and the results and discussion of them will be presented later.

1. MATERIALS AND METHODS

Human behavior in the work environment has been extensively studied in recent years, with emphasis on the emotional aspect of the satisfaction that workers have in their professional activity. Given the factors addressed about job satisfaction, it was evident that there is not just a single aspect, but a complex network of factors that contribute to the level of job satisfaction (Marqueze & Moreno, 2005)analisando suas diferentes concepções. Associadas a essas concepções, também são apresentadas características do trabalho que interferem e determinam a satisfação, bem como as conseqüências da satisfação e da insatisfação no ambiente de trabalho.The purpose of this article is to present a short review of work satisfaction, analyzing its different conceptions. Associated to such conceptions we also present work characteristics that interfere and determine satisfaction, as well as the consequences of satisfaction and non-satisfaction at the work environment.","author":[{"dropping-particle":"","family":"Marqueze","given":"Elaine Cristina","non-dropping-particle":"","parse-names":false,"suffix":""},{"dropping-particle":"","family":"Moreno","given":"Claudia Roberta de Castro","non-dropping-particle":"","parse-names":false,"suffix":""}],"container-title":"Revista Brasileira de Saúde Ocupacional","id":"ITEM-1","issued":{"date-parts":[["2005"]]},"title":"Satisfação no trabalho - uma breve revisão","type":"article-journal"},"uris":["http://www.mendeley.com/documents/?uuid=9143f968-c548-41c8-89ce-b1e115992cf1"]}],"mendeley":{"formattedCitation":"(Marqueze & Moreno, 2005.

For this purpose, this study aims evaluate the job satisfaction of physiotherapists working in Portugal for more than 6 months.

This is an observational, cross-sectional study with a descriptive analysis model and a correlational component. In empirical research, the quantitative method was chosen since, being a structured approach, it describes and quantifies the variation and diversity of a phenomenon, in addition to being an objective, reliable, generalizable, result-oriented and proof-oriented method (Koche, 2011; Kumar, 2019).

1.1 SAMPLE

In our research, we selected the universe of Physiotherapists who have been working in Portugal for at least 6 months. Physiotherapists who have interrupted their professional activity in the last 6 months, who accumulate another professional activity/profession, or who have not given consent to participate in the study were excluded.

This study was carried out within the scope of the research project of the Kinesiolab research center of the Piaget Institute with the name professional satisfaction of the physiotherapist in Portugal.

Physiotherapists were invited to participate in the study through email marketing and contacted via digital platforms. Platforms and social networks used by professionals were used to request participation in the study. All data collection was authorized by the participants through a consent form and all procedures in this project is in line with national and international guidelines for scientific research involving human subjects, and including the Declaration of Helsinki in 2013 on Ethical Principles for Medical Research Involving Human Subjects, and the 1997 Convention on Human Rights and Biomedicine (the "Oviedo Convention"). The questionnaire was available for online response since February 6 to March 11, 2021.

We obtained 808 responses, 11 of which were excluded for representing Physiotherapists with less than 6 months of professional practice, and 17 for being Physiotherapists who did not exercise their activity in the six months prior to filling out the questionnaire. Thus, the study sample consisted of 780 Physiotherapists.

As a quantitative research, an attempt was made to select the sample so that it was impartial and represented the population from which it was selected (Kumar, 2019). Considering that the number of Physiotherapists working in Portugal exceeds 14000 (Vital et al., 2020), this sample had a margin of error of 3.41% for a confidence level of 95%, according to the BioEstat 5.3 Software, which means being a representative sample of the profession (Thompson, 2012).

1.2 DATA COLLECTION INSTRUMENTS

A two-part questionnaire was designed to assess the sociodemographic and professional characterization data and the professional satisfaction of Physiotherapists. The Google Forms® platform was used to build this instrument, and it was developed in an interactive style, so that respondents feel as if someone was talking to them (Kumar, 2019).

The questionnaire was available for online response in the physiotherapy professional interest groups on the Facebook, Telegram and Whatsapp platform, as well as an authorized mail-list.

As there is no one to explain the meaning of the questions to respondents, an effort was made to make the questions clear and easy to understand. In addition, an easy-to-read, eye-pleasing layout was chosen, with an easy-to-follow question sequence.

In the section to assess the professional satisfaction of Physiotherapists, the questions were adapted from the Satisfaction at Work questionnaire (Vieira & Coimbra, 2006) consisting of 19 items organized into three dimensions: satisfaction with job content, satisfaction with work compensation and satisfaction with relationships at work.

The response scale used was the 5-point Likert type (1- not at all satisfied to 5- completely satisfied) whose items include "Relationships with my superiors" or "I have autonomy". This instrument was developed and validated from the results of an exploratory qualitative study next to the Portuguese higher education finalists. The study of its psychometric properties has been essentially carried out with recent higher education graduates, during the first year of their professional activity (Vieira & Coimbra, 2006).

Results from several studies point to the appropriateness of using this instrument to assess job satisfaction among individuals with different levels of education and years of work experience. This instrument has been used in different investigations in Portugal and Brazil, and in several studies it has shown good psychometric qualities (Vieira, 2012; Vieira et al., 2011, 2014) In the study by Vieira (2012), the internal consistency indexes were satisfactory: α Cronbach 0.88 on the job content satisfaction subscale, 0.84 on the satisfaction with work relationships subscale and 0.85 on the satisfaction with work compensation subscale.

In the dimension of compensation at work, in the question that aims to assess the degree of satisfaction related to "Recognition received for my work" an adaptation was made, in which the aim is to assess the satisfaction related to:

a) "Recognition received by the institution for my work";
b) "Recognition received by patients for my work";
c) "Recognition received for my work by peers";
d) "Recognition received for my work by other professionals".

At the end of the questionnaire, the participant is asked to assess, on a scale from 0 (not at all satisfied) to 10 (extremely satisfied), how much he has felt satisfied with the profession.

1.3 DATA ANALYSIS

After data collection, a first analysis of all questionnaires was carried out to eliminate those that might be incomplete or that did not respect the inclusion criteria, and their coding and tabulation were then processed to prepare the statistical treatment.

For data analysis, and characterization of the sample, descriptive statistics and analytical or inferential statistics were used. Data were analyzed using a statistical analysis program Statistical Package for the Social Sciences (SPSS), version 26.0.

For inferential statistics, parametric statistics were used, as this was a sample with an N greater than 30. To compare the differences in the professional satisfaction of Physiotherapists regarding their area of expertise (generalist or specialist) defined by the profile of competences of the physiotherapist professional (APFISIO, 2018), the student's t-test was used to compare means of independent samples. The One-Way ANOVA test was applied to assess the differences in the professional satisfaction of Physiotherapists in terms of salary earned, and the ratio of patients treated per hour.

The assumption of homogeneity of variance was evaluated using the Levene test, as this test verifies the hypothesis that the variance in the groups is the same (that is, the difference between the variances is zero). Thus, when $p \leq 0.05$, we conclude that the null hypothesis is incorrect and that the variances are significantly different. When Levene's test was not significant (ie, $p > 0.05$), the null hypothesis that the differences between the variances is zero was accepted (Field, 2009). Considering the homogeneity of variance, post-hoc analysis was performed using Tukey's technique. Given the heterogeneity of variance, the post-hoc evaluation was performed using the Games-Howell technique (Field, 2009).

To study the correlation between the dimensions of Physiotherapists job satisfaction, age and years in service, Pearson's correlation coefficient was used. The correlation coefficient is a commonly used measure of the size of an effect: values of ±0.1 represent a small effect, ±0.3 represents a medium effect, and ±0.5 represents a large effect (Field, 2009).

2. RESULTS

2.1. SAMPLE CHARACTERIZATION

The sample comprised a group of 780 Physiotherapists with an age average of 33.7 ±8,358 years, mostly female (78.5%) and licensee´s degree (63.7%).

The Physiotherapists have between 6 months and 45 years in service, which corresponds to an average value of 10.72 ± 8.327 years of experience. The area of expertise of most Physiotherapists in the sample is generalist (76.2%), and more than half (51.5%) earn less than €999 per month. We found that most Physiotherapists have an employment contract of employment. We found that 61.7% of Physiotherapists treat more than 1 patient per hour (Table 1).

	MEAN	STANDARD DEVIATION	MÍN-MÁX
Years in service	10,72	8,327	0,5-45
		n	%
Occupation area			
Generalist		594	76,2
Specialist		186	23,8
Salary earned			
Less than €999		402	51,5
Between €1000 and €1500		294	37,7
More than €1501		84	10,8
Employment relationship			
Employer/entrepreneur		87	11.2
Employment contract		459	58.8
Service provider (green receipt)		234	30.0
Number of patients treated/hour			
1 patient / hour		299	38,3
2 patients/hour		217	27,8
3 or more patients/hour		264	33,8

TABLE 1: CHARACTERIZATION OF PROFESSIONAL FACTORS (N=780)

(left margin, vertical) **PROFESSIONAL SATISFACTION OF PHYSIOTHERAPISTS IN PORTUGAL**

We found that there are few Physiotherapists working in primary health care, as they represent a percentage of less than 5.8% of the elements in the sample. In fact, the 5 places where Physiotherapists work in greater numbers are: home treatments (39.1%), physical medicine and rehabilitation clinics (38.1%), Physiotherapy office (32.9%), hospital (17.6%) and senior home/residence (5.8%). It should be noted that for the analysis of these percentages we must take into account that almost half of the Physiotherapists work in more than one place (46,5%).

2.2. JOB SATISFACTION

In the question "How satisfied have you felt with the profession" (on a scale of 1 to 10) we obtained an average value of 6.74 (±1.874).

The satisfaction of Physiotherapists, regarding the dimension of satisfaction with the content of the work, we found that the majority answered "Satisfied" (48.6%) and "Totally satisfied" (17.4%) (Graph 1). We can see that for all items in this dimension, the most repeated answer is "Satisfied".

	Not at all satisfied	Not very satisfied	Indifferent	Satisfied	Fully satisfied
absolute frequency	190	765	370	1897	678
relative frequency	4,90%	19,60%	9,50%	48,60%	17,40%
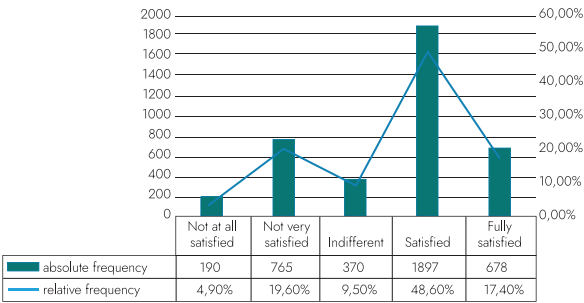
GRAPH 1: ANALYSIS OF SATISFACTION WITH WORK CONTENT (N=780)

In the dimension of satisfaction with work compensation, the distribution of responses is a little different. In fact, as we can see in Graph 2, 35.1% of the answers are "Satisfied", but 23.3% answered "Slightly satisfied".

These values can be explained by the fact that the answer to the item "Progression prospects" that is most repeated is "Not at all satisfied", as well as in the items "Remuneration received" and "Recognition of my work by the institution(s)" the most repeated answer is "Slightly satisfied".

	Not at all satisfied	Not very satisfied	Indifferent	Satisfied	Fully satisfied
absolute frequency	1240	1821	359	2738	1142
relative frequency (%)	15,9%2	3,3%	11,0%	35,1%	14,6%
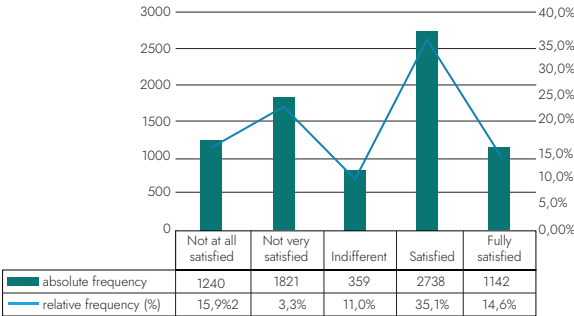
GRAPH 2: ANALYSIS OF SATISFACTION WITH WORK COMPENSATION (N=780)

The dimension of satisfaction with work relationships has the highest satisfaction values. Of all the responses obtained, 44.8% were "Satisfied" and 34% "Totally satisfied" (Graph 3). In this dimension, the item "Relationships with my patients" stands out, whose most repeated answer was "Totally satisfied". In the remaining items, the most repeated answer was "Satisfied".

	Not at all satisfied	Not very satisfied	Indifferent	Satisfied	Fully satisfied
absolute frequency	182	533	605	2797	678
relative frequency	2,9%	8,5%	9,7%	44,8%	17,40%
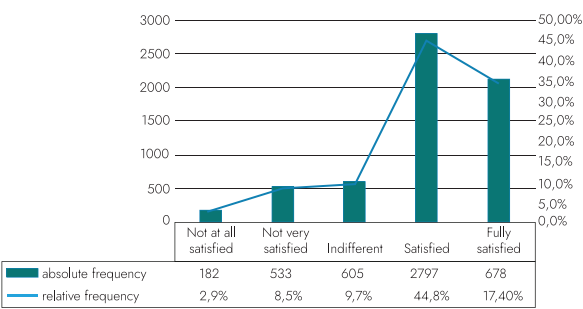
GRAPH 3: ANALYSIS OF SATISFACTION WITH RELATIONSHIPS AT WORK (N=780)

By analyzing the correlation between years in service and job satisfaction, we found that all correlations are positive and statistically significant, except for the correlations between scores in the dimension of relationships at work and years in service (Table 2).

	1	2	3	4
1 - Years in service				
2 - Score work content dimension	,134**			
3 - Score Work Compensation Dimension	,180**	,649**		
4 - Score dimension relationships at work	,050	,612**	,643**	
5 - How satisfied have you been with the profession	,209**	,586**	,649**	,537**

TABLE 2: CORRELATION BETWEEN PHYSIOTHERAPISTS' SATISFACTION AND YEARS IN SERVICE

When analyzing the job satisfaction according to the area of expertise we see that there is a statistically significant difference ($p < 0.001$), with the average satisfaction value of Physiotherapists with a specialized area of expertise higher than those with a general practice (Table 3).

	AREA OF EXPERTISE	N	MEAN	STANDARD DEVIATION	T	P
Score dimension work content	Generalist	594	3,4387	,87955	-6,014	0,000
	Specialist	186	3,8656	,83349		
Score dimension Work Compensations	Generalist	594	2,9943	,76339	-6,355	0,000
	Specialist	186	3,4059	,79438		

Score dimension relationships at work	Generalist	594	3,9289	,62834	-5,009	0,000
	Specialist	186	4,1640	,53492		
How satisfied have you been with the profession	Generalist	594	6,58	1,900	-4,442	0,000
	Specialist	186	7,27	1,690		

TABLE 3: DIFFERENCES IN PHYSIOTHERAPISTS' SATISFACTION REGARDING THE AREA OF EXPERTISE

When we analyzed the differences between the groups with remuneration "≤ €999, "≥ €1000 and ≤ €1500 and "≥ €1500, we verified that there are statistically significant differences for all dimensions (p < 0.001). In fact, according to the analysis of Table 4, the group with the lowest degree of satisfaction in all dimensions is the group of Physiotherapists who earn a lower salary. Thus, it can be said that the Physiotherapists professional satisfaction also depends on the salary earned.

		≤ 999€	≥ 1000€ E ≤ 1500€	≥ 1501€	TOTAL	F	P	POST HOC
		1	2	3				
	n	402	294	84	780			
Score dimension work content	M	3,34	3,66	4,07	3,54	29,762	0,000*	1<2<3
	SD	0,88	0,86	0,68	0,89			
Score dimension Work Compensations	M	2,81	3,26	3,82	3,09	81,102	0,000*	1<2<3
	SD	0,72	0,71	0,76	0,79			
Score dimension relationships at work	M	3,87	4,07	4,24	3,98	17,770	0,000*	1<2<3
	SD	0,60	0,62	0,54	0,62			
How satisfied have you been with the profession	M	6,23	7,06	8,07	6,74	44,551	0,000*	1<2<3
	SD	1,93	1,69	1,28	1,87			

* p<0,05; M: mean; SD: Standard deviation; F: One-Way ANOVA

TABLE 4: PROFESSIONAL SATISFACTION IN RELATION TO THE SALARY EARNED

In Table 5, we can see the differences in Physiotherapists' satisfaction regarding the number of patients seen per hour. In fact, in the "Work Compensation" dimension, the differences are statistically significant (p < 0.001), with Physiotherapists treating 1 patient per hour corresponding to higher average satisfaction values than those treating 2 patients per hour, and these values superior to professionals who treat 3 or more patients per hour.

		1 PATIENT/H	2 PATIENTS/H	+ DE 3 PATIENTS/H	TOTAL	F	P	POST HOC
		1	2	3				
	n	299	217	264	780			
Score dimension work content	M	3,84	3,68	3,09	3,54	62,120	0,000*	1>3 2>3
	SD	0,77	0,78	0,91	0,89			
Score dimension Work Compensations	M	3,37	3,14	2,74	3,09	51,774	0,000*	1>2>3
	SD	0,80	0,68	0,73	0,79			
Score dimension relationships at work	M	4,14	4,02	3,78	3,98	26,216	0,000*	1>3 2>3
	SD	0,55	0,59	0,65	0,62			

| How satisfied have you been with the profession | M | 7,18 | 6,92 | 6,1 | 6,74 | 26,433 | 0,000* | 1>3 |
| | SD | 1,849 | 1,558 | 1,969 | 1,874 | | | 2>3 |

p<0,05; M: mean; SD: Standard deviation; F: One-Way ANOVA

TABLE 5: PROFESSIONAL SATISFACTION REGARDING THE NUMBER OF PATIENTS SEEN PER HOUR

In the dimensions "Work content", "Relationships at work" and "Satisfaction with the profession", Physiotherapists who treat 3 or more patients have lower levels of satisfaction than those who treat 1 or 2 patients per hour. However, between the group of Physiotherapists who treat 1 patient per hour and those who treat 2 patients per hour, there were no statistically significant differences.

DISCUSSION

The degree of satisfaction of the Physiotherapists who participated in the study in relation to the profession is 67.4% (n=780), when asked through a Likert scale-type answer question. These results corroborate the studies of other authors (Alva & Lobo, 2016; Brattig et al., 2014; Gupta & Joshi, 2013; Usman et al., 2013)consequently influencing growth of the profession. Physiotherapy in India is maturing making such data indispensable. This study aims to assess the level of job and career satisfaction among Indian physiotherapists. Methods: A cross-sectional pilot survey was done with a self-administered e-questionnaire and the 265 surveys collected were subjected to descriptive statistical analysis. Results: Overall job satisfaction is 63.68% (3.35±1.32 that indicate that the percentage of Physiotherapists satisfied with their profession is higher to 50%. However, and as this conclusion from just one question seems very reductive, the adaptation that was made to the job satisfaction questionnaire (Vieira & Coimbra, 2006) was considered, where three dimensions of job satisfaction are analyzed.

In fact, when analyzing the dimensions of content satisfaction, compensation, and relationships at work, it appears that Physiotherapists who practice in Portugal present some differences between each of these dimensions.

Regarding the content of the work, most participants answered "Satisfied" and "Totally satisfied". In the dimension of work compensation, Physiotherapists have the worst scores, it being evident that in the item "Progression prospects" the most obtained answer was "Not at all satisfied", and in the items "Remuneration received" and "Recognition of my work by the institution(s)" the most frequent answer was "Slightly satisfied". In the dimension of relationships at work, the best satisfaction scores were evidenced, highlighting the item "Relationship with my patients" which obtained the most frequent answer "Totally satisfied".

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between job satisfaction and years in service, the results show a direct relationship except for the dimension associated with relationships at work. These results, in part, are also aligned with the results found in previous research that concluded that years in service are one of the most significant factors in terms of job satisfaction for health professionals (Al Eisa et al., 2015; Gupta & Joshi, 2013; Śliwiński et al., 2014a).

Regarding the dimension of relationships at work, the fact that there is no statistically significant correlation with years in service can be explained by the scores given in this dimension: it seems that most professionals are "Satisfied" or "Very satisfied" in all investigated items, highlighting the "Relationship with my patients", which makes this feeling of satisfaction transversal to most professionals. Likewise, people who have been working longer adapt and adjust their expectations to reality, leading to higher levels of satisfaction, in other words, decreasing the level of demand.

Also noteworthy is the fact that Health Centers are not included in the first five workplaces where Physiotherapists work, with this figure being less than 5.8% of the sample population. The same fact was found in the study published by APFISIO (2018) concerning a population of 212 Physiotherapists, where, in descending order, Private Physiotherapy Units, Hospitals, Physical Medicine and Rehabilitation Units and Private Solidarity Institutions were identified. Social as the main places of professional practice. The main difference is that in the present study, the practice of Physiotherapy at home (39.1%), followed by practice in Physical Medicine and Rehabilitation Clinics (38.1%), Physiotherapy Offices (32.9 %), Hospital (17.6%) and Senior Home/Residence (5.8%). This reality demonstrates that the offer of Physiotherapy care can be found, with increasing frequency, in Private Physiotherapy Units, and that Physiotherapists are in deficit with regard to primary health care.

However, no significant differences were demonstrated between Physiotherapists with a contract and service providers (green receipt). This result can be explained by the fact that Physiotherapists who provide services enjoy greater autonomy in managing their daily schedule, and therefore, it means having the option of "trying to do it on their own". Thus, a worker with more autonomy is one who, based on the organizational culture and the parameters stipulated for their area of activity, has a little more freedom to take certain actions, which will translate into greater satisfaction (Gupta & Joshi, 2013; Limbasiya, 2014).

It was evident in this study that Physiotherapists with specialized practice have higher scores in all dimensions of job satisfaction. Based on the substantial increase in knowledge and skills, as well as the possibility of academic training at the highest level, Physiotherapists primary objective is to be considered first-contact professionals, which makes the previous performance model completely unreasonable (Cunningham et al., 2020; Soares, 2017).

The analysis of the results shows that lower wages correspond to a lower degree of satisfaction. This conclusion is supported by the results of several studies (Al Eisa et al., 2015; Alva & Lobo, 2016; Arkwright et al., 2018; Bernal-Utrera et al., 2021) associate a lower level of satisfaction with lower wages, situations that can fit into Herzberg's motivational theory (Alshmemri, Shahwan-Akl & Maude, 2017).

It was found that, for all dimensions of job satisfaction, Physiotherapists who see 3 or more patients per hour have less satisfaction. It seems obvious that this ratio of patients per hour may represent excess work, putting into question the quality of the professionals service (Śliwiński et al., 2014b; Speakman et al., 1996; Usman et al., 2013; Wilson, 2015).

Except for the dimension of work compensation in which the degree of satisfaction of Physiotherapists who treat a patient per hour is higher than those who treat two and three patients per hour, in the other dimensions there seems to be no differences in professional satisfaction between professionals who treat a or two patients per hour.

CONCLUSION

In general, Physiotherapists who practice in Portugal are moderately satisfied, although a considerable number of less satisfied professionals cannot be ignored, which should be seen with some concern.

Employers must properly reward professionals, providing opportunities for evolution and conditions for the performance of the profession. Likewise, it is important that the responsible entities understand that quality work cannot be expected when many patients are treated per hour, either due to the lack of time for each treatment, or due to the level of fatigue and dissatisfaction generated by this practice. The ideal is to treat one or two patients, at most, per hour.

It is important to make some considerations around the limitations of this study and to suggest recommendations for future studies. The main limitation of the study is related to data collection, as it was carried out exclusively by disseminating the questionnaire link online through mail marketing and contact via digital platforms. Therefore, Physiotherapists who did not have a social media account or who were not internet users were not included in the sample. However, considering the time option for data collection and the scope of the target population, this proved to be the most effective method, as it is fast and guarantees data confidentiality.

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DRUG-INDUCED PHOTOSENSITIVITY

FOTOSSENSIBILIDADE INDUZIDA POR FÁRMACOS **PT**

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FOTOSENSIBILIDAD INDUCIDA POR FÁRMACOS **ES**

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ABSTRACT

Drug-induced photosensitivity is an abnormal skin reaction in individuals exposed to radiation and certain drugs. A literature review was carried out through a database search of Pubmed, Cochrane Library and Science Direct, in order to identify drugs that cause photosensitivity reactions and acknowledge the role of the pharmacist in the management and prevention of such reactions. Articles dated up to 2020 were included in English, Portuguese and Spanish.

The prevalence of photosensitivity reactions depends on factors such as the geographical area and prescription and use habits. Various drug classes, namely NSAIDs (ketoprofen and piroxicam), Antifungals, Antibiotics (tetracyclines, fluoroquinolones), Antihypertensive, Statins, Antiarrhythmics (amiodarone), Retinoids e Chemotherapeutics (vemurafenib), are among the most frequently associated with the induction of photosensitivity reactions. Chronic exposure to these drugs may be associated with an increased risk of photocarcinogenesis.

A wide range of drugs, including the ones not subject to medical prescription, may induce photosensitivity, meaning that additional photo-protection precautions must be applied to the patient. The role of the pharmacist plays an important part in the medical counselling, prevention and management of eventual cutaneous reactions associated to these therapeutics.

Keywords: Photosensitivity, Drugs, Photoallergy, Phototoxicity, Photoprotection.

RESUMO

A fotossensibilidade induzida por fármacos consiste numa reação cutânea anormal, em indivíduos expostos a radiação e a determinados fármacos. Procedeu-se a uma revisão da literatura através de pesquisa em base de dados como Pubmed, Cochrane Library e Science Direct, com o objetivo de identificar os fármacos promotores de reações de fotossensibilidade e reconhecer o papel do farmacêutico na gestão e prevenção das reações. Foram incluídos artigos publicados até 2020, inclusive, e escritos em língua inglesa, portuguesa e espanhola.

A prevalência das reações de fotossensibilidade depende de fatores como área geográfica e hábitos de prescrição e consumo. Várias classes farmacoterapêuticas, nomeadamente AINE (cetoprofeno e piroxicam), Antifúngicos, Antibióticos (tetraciclinas, fluoroquinolonas), Anti-hipertensivos, Estatinas, Antiarrítmicos (amiodarona), Retinoides e Antineoplásicos (vemurafenib), estão entre as mais frequentemente envolvidas na indução da fotossensibilidade. A exposição crónica a estes fármacos pode estar associada a um aumento do risco de fotocarcinogenese.

Um grande número de fármacos, incluindo Não Sujeitos a Receita Médica, podem induzir fotossensibilidade o que implica cuidados acrescidos de fotoproteção do doente. O farmacêutico tem um papel importante no aconselhamento, prevenção e gestão de eventuais reações cutâneas.

Palavras-chave: Fotossensibilidade, Fármacos, Foto-alergia, Fototoxicidade, Fotoproteção.

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RESUMEN

La fotosensibilidad inducida por fármacos es una reacción cutánea anormal en personas expuestas a radiación y ciertos fármacos. Se realizó una revisión de la literatura mediante búsquedas en bases de datos como Pubmed, Cochrane Library y Science Direct, con el fin de identificar fármacos que promuevan reacciones de fotosensibilidad y reconocer el papel del farmacéutico en el manejo y prevención de reacciones. Se incluyeron artículos publicados hasta 2020 inclusive y escritos en inglés, portugués y español.

La prevalencia de reacciones de fotosensibilidad depende de factores como la zona geográfica y los hábitos de prescripción y consumo. Varias clases farmacoterapéuticas, a saber, AINE (ketoprofeno y piroxicam), antifúngicos, antibióticos (tetraciclinas, fluoroquinolonas), antihipertensivos, estatinas, antiarrítmicos (amiodarona), retinoides y antineoplásicos (vemurafenib), se encuentran entre los más frecuentemente implicados en la fotosensibilidad. La exposición crónica a estos fármacos puede estar asociada con un mayor riesgo de fotocarcinogénesis.

Una gran cantidad de medicamentos, incluidos los de venta libre, pueden inducir fotosensibilidad, lo que implica un mayor cuidado de la fotoprotección del paciente. El farmacéutico tiene un papel importante en la orientación, la prevención y el tratamiento de las reacciones cutáneas.

Palabras clave: *Fotossensibilidad, Fármacos, Fotoalergia, Fototoxicidad, Fotoprotección.*

INTRODUCTION

Photosensitivity is defined as a sensitivity reaction that occurs between the skin and radiation, which translates into an abnormal skin response (Gouveia, Gameiro, Coutinho, & Gonçalo, 2016). This reaction happens due to the presence in the skin of chromophores of endogenous or exogenous origin (Gonçalo, 2019). It can be classified into five categories: primary photosensitivity, exogenous photosensitivity, metabolic photosensitivity, exacerbated photosensitivity and genetic photosensitivity (Oakley, Badri, & Harris, 2020).

When photo reactive drugs are involved in the photosensitivity reaction, it is called drug-induced photosensitivity reaction. This reaction consists of an abnormal response to radiation in individuals who have been or are exposed to a given drug (Gouveia et al., 2016).

With the growing destruction of the ozone layer, the incidence of photosensitivity reactions is increasing, since the radiation that reaches the earth's surface is increasingly intense (Zuba, Koronowska, Osmola-Mańkowska, & Jenerowicz, 2016). Not only radiation from the sun, but also artificial lights, such as UV lamps, emit UV radiation and may be involved in photosensitivity reactions (Serra, Santiago, Gonçalo, & Figueiredo, 2011).

The list of drugs that can cause photosensitivity reactions depends on geographic and demographic factors, prescription and consumption habits, among others, and has been increasing with the discovery of new molecules (Gouveia et al., 2016). Geographically, epidemiological divergences can be a cause of different prescribing habits.

The objective of this scientific work is to identify the drugs that are frequently involved in photosensitivity reactions and recognize the importance of the pharmacist's role in preventing them and educating populations.

METHODS AND MATERIALS

The Pubmed, Cochrane Library and Science Direct online electronic databases were used to search for relevant literature on drug-induced phototoxicity or and photoallergy, published between 2000 and 2020, in Portuguese, English or Spanish language. Keywords, such as Photosensitivity, Drugs, Photoallergy, Phototoxicity, Photoprotection, were used. A total of 168 papers was selected based on title and abstract and thorough checking of reference lists for additional papers. After full-text analysis, 46 papers were considered more relevant for the present review. The search was carried out during the year 2019 and 2020.

RESULTS AND DISCUSSION

TYPES AND MECHANISMS OF PHOTOSENSITIVITY REACTIONS

In order for a reaction to occur between the skin and radiation, resulting in a response from the body, the radiation must penetrate the stratum corneum, be absorbed by chromophores (endogenous or exogenous) and initiate chemical reactions in the surrounding tissues (Mang, Stege, & Krutmann, 2006). Phototoxicity and photoallergy are two distinct types of reactions. A phototoxic reaction translates into an exaggerated inflammatory response after exposure to radiation, not being an immunological mechanism (Serra et al., 2011).

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When the chromophore, present in the epidermis or dermis, absorbs energy from radiation, it is in an excited state. This state can be called singlet or triplet state (Elkeeb, Elkeeb, & Maibach, 2012). The excited state is unstable and therefore it only exists for a short period of time (Zuba et al., 2016). The return to the ground state is associated with a loss of energy due to radiation, heat or chemical reactions. The chromophore, when in its excited state, can use energy to undergo direct molecular changes such as isomerization, oxidation and breakage of double bonds, or it can transfer this energy to neighboring molecules, giving rise to free radicals that are dependent or not on oxygen (Figure 1). These radicals modify cell membrane lipids, protein amino acids and nucleic acid nitrogen bases (DNA and RNA), and may eventually activate other molecules (Serra et al., 2011). Reactive oxygen species and other "abnormal" molecules can be detected by intracellular sensors. This recognition induces the activation of intracellular signaling pathways such as NF-kB, MAPkinases and the Nrf-2 pathway, and also induces the activation of the inflammasome, which leads to the activation of inflammatory mediators, such as: prostaglandins (PG); interleukins (IL) 1,6 and 8; TNF-[] among other pro-inflammatory cytokines (Gonçalo, 2019).

This exaggerated inflammatory response is responsible for phototoxicity. If the body does not act in time with cell repair mechanisms to control the chain reaction, there will be cell damage and consequently cell death.
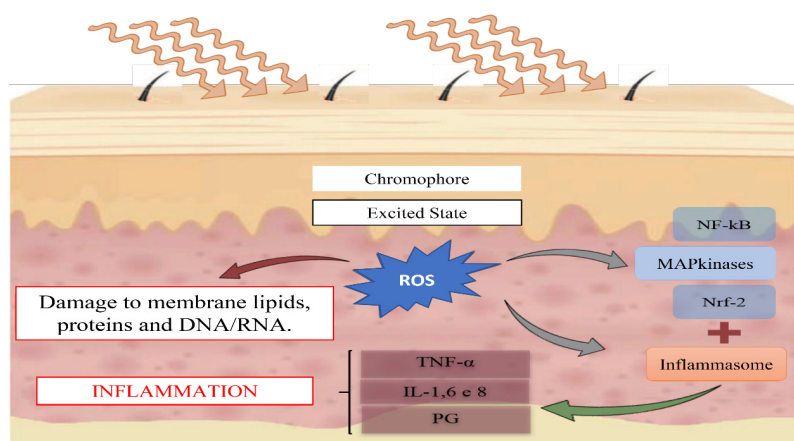
FIGURE 1: MECHANISM OF ACTION OF PHOTOTOXICITY, WITH FORMATION OF REACTIVE OXYGEN SPECIES.

A photoallergic reaction is a T cell-mediated hypersensitivity reaction against an allergen formed after exposure to UV radiation (Salgado et al., 2010). It requires prior sensitization to the photosensitizing agent and is a delayed hypersensitivity reaction because its onset time varies between 24 to 72 hours.

There are two possible mechanisms that lead to the photo-allergy reaction (Figure 2). In the first, and most often, the energy absorbed by the chromophore is used to transform it into a photoproduct. This photoproduct is a hapten that, when linked to a carrier molecule (protein), forms the so-called photo-allergen (Salgado et al., 2010). In the second mechanism, this absorbed energy favors the conjugation of the chromophore to a transporter (protein) through a covalent bond, forming a photo-allergen (Zuba et al., 2016). Allergen formation triggers a hypersensitivity reaction due to a T-cell mediated immune response (Mang et al., 2006).

Antigen-presenting cells, specifically dendritic cells (langerhans cells), upon capturing that allergen, become active and migrate to regional lymph nodes to sensitize T cells to the allergen in association with human leukocyte antigen (HLA) II antigens. Sensitized T cells, including memory and effector cells, will be activated and, on second contact, will circulate to sites exposed to radiation (Zuba et al., 2016).
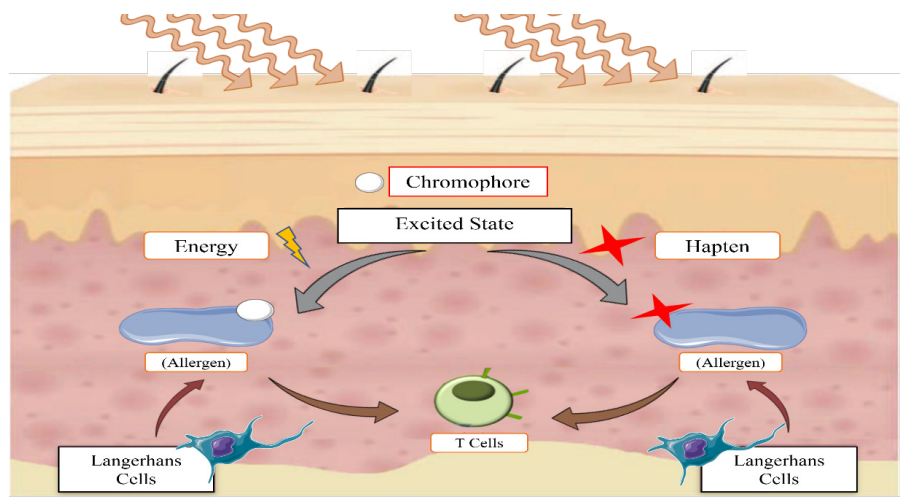
FIGURE 2: MECHANISM OF ACTION OF PHOTOALLERGY.

Classically, phototoxicity reactions are the most common and develop in a large number of individuals whereas photoallergy reactions occur only in a limited number of people (Serra et al., 2011). These reactions are dose-dependent, that is, they are dose-dependent on the photosensitizer and require moderate exposure to UV radiation. Photoallergy reactions are not dependent on the dose of photosensitizer and low exposure to UV radiation.

Despite the clear theoretical distinction (Table 1), in practice it is often difficult to distinguish a phototoxic reaction from a photoallergic reaction.

	PHOTOTOXICITY	**PHOTOALLERGY**
Frequency	High	Low
Latency period/sensitization	No	Yes
UV doses/photosensitizer	High	Low
Cross-reactions	No	yes
Basic morphology of lesions	Erythema similar to sunburn	Eczema Urticaria
Limits	Sharp	Diffuse
Covered areas	Not involved	Possibly involved
Resolution	Fast	May recur
Residual hiperpigmentation	Yes	No
Pathomechanism	DNA damage/cell death Inflammation	Type IV hypersensitivity to photoproducts

TABLE 1: THEORETICAL DIFFERENTIATION OF PHOTOTOXIC AND PHOTOALLERGIC REACTIONS (ADAPTED FROM SALGADO ET AL., 2010).

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CLINICAL MANIFESTATIONS

The chemical and biological processes after radiation penetration and chromophore activation are complex and each chromophore can induce specific mechanisms that lead to different clinical manifestations of photosensitivity (Gonçalo, 2019).

Photosensitivity presents very varied clinical manifestations, sometimes with very typical or atypical patterns. These clinical patterns are conditioned by several factors such as, for example, the type of implicit photosensitivity reaction, the chromophore responsible for the reaction, the duration of the chromophore-radiation exposure, the location of the lesions, among others.

The initial symptoms of phototoxicity are tingling and erythema similar to mild sunburn. Photo-allergy reactions initially present with acute or subacute eczema (Serra et al., 2011). In general, each type of reaction has specific clinical characteristics (Table 2), however, there are other overlapping characteristics.

	PHOTOTOXICITY	PHOTOALLERGY
Clinical Manifestations	Exaggerated "sunburn"	Acute and subacute eczema
	Pseudoporphyria	Photoallergic contact dermatitis
	Photoonycholysis	Cheilitis
	Dyschromia	Urticaria
	Purpura	Lichenoid reactions
		Subacute or chronic lupus erythematosus

TABLE 2: PREDOMINANT CLINICAL PATTERNS BY TYPE OF PHOTOSENSITIVITY REACTION (ADAPTED FROM SERRA ET AL., 2011).

PHOTOSENSITIZING DRUGS

A large number of drugs are involved in phototoxicity and photoallergy reactions, with conclusive clinical and scientific evidence. For a rash to be drug-induced and to be considered photosensitive it must occur in a context of radiation exposure, the drug or its metabolites must be present on the skin at the time of exposure and they must be able to absorb incident radiation (Blakely, Drucker, & Rosen, 2019).

Drug-induced photosensitivity (DIP) can be caused by a topical or systemic agent. Topical agents are more likely to damage keratinocytes because they are more concentrated in the epidermal layer. Systemic agents are more phototoxic to mast cells and endothelial cells present in the dermis (Serra et al., 2011).

Regarding the hydrophilic and lipophilic characteristics of pharmacological agents, a hydrophilic drug mainly damages cell membranes, unlike a lipophilic drug that diffuses into the cell and destroys intracellular components such as liposomes, nucleus and mitochondria (Mang et al., 2006).

1. NON-STEROIDAL ANTI-INFLAMATORY DRUGS

Nonsteroidal anti-inflammatory drugs (NSAID) are a heterogeneous class of drugs that act by inhibiting the activity of the enzyme cyclooxygenase (COX). Its classification may differ, based on chemical structure, potency, selectivity of inhibition of different subtypes of COX, among others.

They are a class with a wide consumption worldwide and have a wide use, including as analgesics, anti-inflammatory and antipyretics (Blakely et al., 2019). Its high consumption has provided several reports of photosensitivity effects, being considered the most common cause of DIP. Their ability to cause an inflammatory skin reaction contrasts with their pharmacological ability to inhibit inflammatory responses (Mang et al., 2006).

The photosensitivity associated with NSAID became evident between 1980 and 1982 with the commercialization of benoxaprofen, a derivative of propionic acid (Serra et al., 2011). This drug was later withdrawn from the European market due to associated adverse effects and the high frequency of phototoxic reactions. Subsequently, all other propionic acid derivatives have been shown to be frequently associated with photosensitivity reactions (Gonçalo, 2011).

Photochemical studies have shown that NSAID phototoxicity is mediated mainly by reactive oxygen species and free radicals (Mang et al., 2006). Ketoprofen and piroxicam, despite not being the most sold drugs within this group, are the main causes of DIP. Both cause photoallergy with very particular clinical patterns of cross-reactivity (Gonçalo, 2011).

1.1 KETOPROFEN

Since 1985, ketoprofen has been associated with a number of reported cases of photosensitivity. This drug, especially when used topically, is known to cause photoallergic reactions (Serra et al., 2011). Sometimes these reactions can be severe, with the presence of edema, blisters and even lesions similar to erythema multiforme that go beyond the application area (Gonçalo, 2011).

Occasionally, relapses can occur only with exposure to radiation, without a clear re-exposure to the drug. This is because the drug can remain on the skin for at least 17 days (Sugiura, Hayakawa, Kato, Sugiura, & Ueda, 2000). Contact with contaminated surfaces such as garments or exposure to substances with possible cross-reactivity may also be a justification (Serra et al., 2011).

Although photoallergy reactions are the most common, ketoprofen may also be involved in phototoxicity reactions. The phototoxicity of ketoprofen can be explained by the production of oxygen free radicals, which are reactive with proteins and lipids (Nakajima, Tahara, Yoshimura, & Nakazawa, 2005). Other authors have shown that irritation caused by ketoprofen in the presence of radiation can cause erythrocyte photolysis, an indicator of cell damage (Zuba et al., 2016).

Ketoprofen has particular clinical patterns of cross-reactions. Considering its chemical structure, this drug has an aromatic ketone (benzophenone) in its constitution. Cross-reactions can occur between propionic acid derivatives, which share the benzophenone radical (tiaprofenic acid and suprofen), with the exception of naproxen and ibuprofen (Gonçalo, 2011). Other drugs, such as fenofibrate and amiodarone, can cause cross-reactions with ketoprofen as they present a radical similar to benzophenone in their chemical structure (Serra et al., 2011).

DRUG-INDUCED PHOTOSENSITIVITY

Photoallergic contact dermatitis is a typical clinical pattern for the use of the drug in question. According to Jenerowicz et al. (2011), 3 cases of photoallergic contact dermatitis were diagnosed after topical use of ketoprofen. All had skin lesions with eczema, restricted only to the area of application of the drug. The interval between the use of the drug and the onset of manifestations ranged from 2 to 60 days (Jenerowicz et al., 2011). Lozzi et al. (2020) reported 2 cases of photodermatitis associated with the use of systemic ketoprofen, in subjects who previously developed reactions to the drug via the topical route.

1.2 PIROXICAM

The photosensitivity associated with piroxicam has been known since 1983, the year in which the first associated case was reported (Zuba et al., 2016). Fjellner (1983) observed, on the skin of a woman exposed to radiation, erythematous eruptions with the presence of blisters after systemic treatment with piroxicam.

In the beginning there was no concrete explanation regarding the underlying mechanism, but later a relationship was established with the already known sensitivity to thimerosal. Effectively, under the action of UV radiation, piroxicam decomposes and gives rise to a photo-product structurally similar to thiosalicylic acid. This acid is the fraction of thimerosal responsible for the photoallergy caused by it and explains the cross-reactivity with piroxicam. Thus, individuals previously sensitized to thimerosal may develop photosensitivity, more specifically photoallergy, to piroxicam (Serra et al., 2011) (Gonçalo, 2011).

Other evidence supporting this cross-reactivity relationship includes positive patch tests to piroxicam in patients with a previously known allergy to thiosalicylic acid in the presence of UV radiation; reproduction of photosensitivity to piroxicam through animal models; and presence of lymphocytes stimulated with both thiosalicylic acid and piroxicam, after irradiation (Serra et al., 2011).

The photosensitivity caused by piroxicam has decreased in the last 20 to 30 years, possibly due to the decrease in medical prescriptions, which leads to a lower consumption of the drug, and in parallel to the discovery and increasing consumption of new NSAID (Gonçalo, 2019) (Serra et al., 2011).

Photoallergy can occur with both topical and systemic formulations (Gouveia et al., 2016). Systemically, it can manifest as an acute eczema diffusely involving the entire face or as erythematous papules and vesicles scattered over photoexposed areas such as the face and back of the hands.

2. TETRACYCLINES

Tetracyclines are a semi-synthetic group of broad-spectrum antibiotics and are considered to be one of the most frequent photosensitizing classes within antibacterials (Zuba et al., 2016). Tetracyclines can give rise to singlet oxygen radicals, which in turn cause oxidation that leads to cell damage. It is possible that phototoxic reactions associated with tetracyclines occur due to the drug's binding to melanin biopolymers and its accumulation in pigmented tissues (Rok et al., 2015).

Rok and collaborators (Rok et al., 2015) analyzed the effect of the tetracycline-solar radiation relationship on cell viability and melanin synthesis in normal human epidermal melanocytes. Cell viability decreases depending on the drug concentration and the body's defense systems undergo changes. Tetracycline by itself has no influence on melanin synthesis but in the presence of UV radiation it causes biochemical changes, such as oxidative stress inside melanocytes.

The typical clinical manifestations of photosensitivity to this pharmacological group are sunburn with or without the association of papules and blisters (Zuba et al., 2016) (Kuznetsov, Weisenseel, Flaig, Ruzicka, & Prinz, 2011). Photo-onycholysis can also occur, usually two weeks after drug administration.

3. FLUOROQUINOLONES

Fluoroquinolones (FQ) are a pharmacological group of antibiotics with a broad spectrum of action. Its chemical structure is based on the double ring system, either with a quinolone nucleus (nitrogen at position 1) or with a naphthyridine nucleus (additional nitrogen at position 8) (Eljaaly, Alkhalaf, Alhifany, & Alshibani, 2020).

When this group undergoes changes in its chemical structure, it can, consequently, affect its antibacterial action, toxicity and the risk of photosensitivity reactions (Zelmat et al., 2020). Photosensitivity is a known adverse skin reaction in this pharmacological group, which can cause various skin conditions.

FQ mainly cause phototoxic reactions, although there are some reports in the literature of photoallergic reactions (Zuba et al., 2016). A recently published study, with the aim of evaluating the different phototoxic potentials of FQ, suggested that the phototoxic potential of this pharmacological group depends on the drug-melanin interaction, its ability to affect melanogenesis and the pigmentation of melanocytes (Beberok et al., 2017).

Through the analysis of several studies, it was possible to establish a relationship between the chemical structure of FQ and the risk of photosensitivity. Zelmat et al. (2020) analyzed the relationship between the chemical structure of FQ and the rate of adverse effects, based on real data provided by Vigibase® database. The results confirmed that the high risk of photosensitivity is associated with the halogen present in the 8th position (Zelmat et al., 2020).

The FQ that contain a halogen at position 8 include sparfloxacin, lomefloxacin and clinafloxacin, and are considered to have the greatest phototoxic potential. Derivatives that contain a hydrogen in the same position include ciprofloxacin and levofloxacin and are considered to have the lowest phototoxic power. In contrast, those with a methoxy group in this position, such as moxifloxacin, are considered more photostable and less phototoxic (Blakely et al., 2019).

A meta-analysis evaluated the photosensitivity potential of lomefloxacin versus other fluoroquinolones. Lomefloxacin entered the market in 1990 and has since been used as a positive control in several studies. Its photosensitivity is attributed to the 8th position fluorine atom, which appears to increase its chemical changes and cytotoxicity (Eljaaly et al., 2020). In this meta-analysis, it was concluded that lomefloxacin has a significantly higher incidence of photosensitivity compared to other FQ.

The incidence and severity of reactions depends on the type, chemical structure of the drug and its derivatives. Phototoxicity induced by FQ can be manifested by sunburn-like lesions, edema, scaling, eczema with bullous eruptions and erythema (Beberok et al., 2017).

Photoallergy, despite being less frequent, is associated with lomefloxacin and ofloxacin (Serra et al., 2011).

4. ANTIFUNGALS

Voriconazole is a second-generation triazole antifungal with a broad spectrum of action, used to treat severe fungal infections (Blakely et al., 2019). Its use is associated with several skin reactions such as photosensitivity, photoaging and skin cancer (Goyal, 2015).

Although it is usually well tolerated, in a recent systematic review it was reported that it is the second most commonly reported drug to induce toxicity reactions (Kim et al., 2018).

In many cases, it is difficult to predict the photoreactivity potential of a molecule according to its chemical structure. In the case of voriconazole, its structure has several components that enhance the possible photosensitizing properties, such as the presence of a halogen atom and its polycyclic character. However, most azoles have similar chemical characteristics and are not associated with cases of phototoxicity (Epaulard et al., 2011).

A study on the UV absorption spectrum of voriconazole showed that the molecule responsible for its phototoxicity is possibly its active metabolite (N-oxide), since it absorbs UVA and UVB radiation (Murayama, Imai, Nakane, Shimizu, & Yamazaki, 2007).

The clinical patterns of voriconazole-induced reactions vary from classic patterns such as erythema and sunburn, to cheilitis, photo-onycholysis and pseudoporphyria (Blakely et al., 2019).

5. ANTIHYPERTENSIVE

Antihypertensive drugs are the most widely used therapeutic group, especially by the elderly (Zuba et al., 2016). The three main categories of antihypertensive drugs most commonly involved in photoinduced skin reactions are: diuretics, calcium channel blockers (CCB) and angiotensin receptor antagonists (ARA).

Thiazide diuretics were first marketed in 1950 and are the most commonly prescribed type of diuretics. Soon after its introduction on the market, photosensitivity reactions associated with its use began to be documented (Blakely et al., 2019).

Of the thiazide diuretics, hydrochlorothiazide is the drug with the most case reports in the literature associated with photosensitivity (Gomez-Bernal et al., 2014). Exaggerated sunburn, eczema, lichenoid lesions, and dyschromia are clinical patterns associated with hydrochlorothiazide photoinduction (Blakely et al., 2019) (Johnston & Coulson, 2002). Indapamide, although not associated with skin reactions, is associated with the induction of photoonycholysis (Rutherford & Sinclair, 2007).

Within loop diuretics, furosemide is a possible inducer of phototoxicity. Unlike thiazide diuretics, furosemide is associated with blistering rash (Blakely et al., 2019).

It is suspected that the possible photosensitizing character comes from a substituent, chlorine, which is present in the chemical structure of thiazide diuretics and furosemide. Chlorine dissociates with UV radiation and promotes reactions between lipids, proteins and DNA (Zuba et al., 2016).

Regarding CCB, amlodipine and nifedipine are examples from the dihydropyridine group that are associated with photosensitivity reactions. They are mainly associated with facial telangiectasia. Nifedipine is also associated with photodermatitis (Blakely et al., 2019).

Based on a retrospective study where cases reported between 1968 and 2014 were evaluated through Vigibase® database, it was concluded that there is a strong association between skin photosensitivity and the use of ARA. The reported cases analyzed occurred mainly with the use of losartan, irbersartan and valsartan (E. Viola, Coggiola, Agnes, Ugo, & Conforti, 2015).

6. AMIODARONE

Amiodarone is a drug belonging to the class III antiarrhythmics group used to prevent and treat ventricular arrhythmias and atrial fibrillation (Blakely et al., 2019). It has been associated with several adverse cutaneous reactions, including photosensitivity (Lozzi et al., 2020).

Amiodarone, including its active metabolite desethylmiodarone, accumulates in the skin where it can be detected at ten times higher concentrations in pigmented areas compared to non-pigmented areas (Lozzi et al., 2020). It has been shown that the drug in question is stored in secondary lysosomes linked to lipofuscin (intracellular pigment), as a consequence of phagocytosis of dermal macrophages.

During exposure to radiation, erythema, burning and/or immediate sunburn may occur. Amiodarone-induced photosensitivity is classified as exaggerated sunburn, hyperpigmentation, pseudoporphyria, and erythema (Zuba et al., 2016). Long-term exposure can induce a blue-gray pigmentation in areas exposed to solar radiation, which can be explained by the accumulation of the drug in lysosomes (Lozzi et al., 2020). Manifestations usually resolve months after stopping treatment (Blakely et al., 2019).

7. STATINS

Statins are HMG-CoA reductase inhibitors, a class of anti-dyslipidemics very commonly used to lower cholesterol levels. Cases of skin reactions, including photosensitivity, induced by the use of statins have been reported, although this is not a common adverse effect of this class of drugs (Zuba et al., 2016).

One study, based on photochemical and photophysical results, attributed the phototoxicity of atorvastatin to the formation of singlet oxygen via a photoproduct similar to phenanthrene. The degradation of atorvastatin by radiation gives rise to photoproducts resulting from the oxidation of the pyrrole-like ring. Another way is the stilbene-like structure of atorvastatin, which causes a cyclization process and leads to the formation of a photoproduct similar to phenanthrene (Montanaro, Lhiaubet-vallet, lesce, Previtera, & Miranda, 2009).

DRUG-INDUCED PHOTOSENSITIVITY

Atorvastatin-induced photosensitivity has been reported to manifest as erythema with edema in the photoexposed areas (Blakely et al., 2019).

According to Viola et al. (2010), after the incidence of radiation, fluvastatin phototoxicity is mediated by the formation of a polycyclic photoproduct similar to benzocarbazole. In that study, it was concluded that fluvastatin and its photoproducts induce phototoxicity mainly in cell membranes.

8. RETINOIDS

Retinoids are a group of vitamin A derivatives and include the active substances tretinoin, isotretinoin, adapalene, acitretin, bexarotene, and tazarotene. They are available in topical and oral formulations and are mainly used in cases of severe acne and psoriasis.

Retinoids are known to be involved in photosensitivity reactions, however there is very little recent scientific evidence to support this (Blakely et al., 2019) (Fu et al., 2003).

Retinoid photosensitivity may be associated with the concomitant use of voriconazole. Tretinoin is metabolized by CYP450 isoenzymes and voriconazole as an inhibitor of these enzymes may potentiate the increase in retinol levels (Denning & Griffiths, 2001).

9. VEMURAFENIB

Vemurafenib is a BRAF enzyme inhibitor indicated for the treatment of melanoma with BRAF V600 mutation. In a study that included 520 patients and evaluated the cutaneous adverse effects of vemurafenib treatment, approximately 35 to 63% of patients had photosensitivity (Lacoutute et al., 2013).

In vitro studies support that vemurafenib-induced photosensitivity consists of phototoxic mechanisms with inhibition of DNA damage repair. Its hydrophobic characteristics favor that its toxicity is associated with damage to cell membranes and consequent damage to DNA repair mechanisms.

Several studies confirm that the photosensitivity of vemurafenib lies within the UVA spectrum. Heppt et al. (2020) confirmed that most BRAF inhibitors have a phototoxic potential after exposure to UVA radiation. Dummer (2012) also demonstrated that the photosensitivity induced by vemurafenib is dependent on UVA radiation, since the use of sun protection with UVA filters prevented the occurrence of photosensitive reactions.

Clinically, vemurafenib-induced photosensitivity initially presents as a feeling of heat, erythema with edema, and sunburn. Unlike other drugs, vemurafenib induces an immediate and direct reaction during exposure to UV radiation, characterized by a feeling of heat and sunburn, with possible edema (Eberlein, Hein, Biedermann, & Posch, 2020).

PHOTOCARCINOGENESIS
Radiation plays an important role in promoting photocarcinogenesis and in recent years the properties of various drugs and their carcinogenic capacity have been addressed. There are numerous drugs with distinct and well elucidated mechanisms that enhance the development of photocarcinogenesis, but, in contrast, there are still many drugs in which the mechanisms are not yet known (Gorman & Murphy, 2013).

Chronic use of drugs with photosensitizing properties and exposure to radiation can promote cutaneous photocarcinogenesis (Serra et al., 2011). Many phototoxic drugs generate free radicals (eg, ROS) and cause cell damage, also causing chromosomal damage in the presence of radiation such as photogenotoxicity and photomutagenicity, with consequent implications for photocarcinogenesis (Gonçalo, 2019).

Although free radical formation is a feature of photosensitivity reactions, subsequent chronic inflammation may be related to the development of photocarcinogenesis. That is, both oxidative stress and the resulting inflammatory responses are factors that contribute to and potentiate the risk of photocarcinogenesis (Kreutz, Abdel, Algharably, & Douros, 2019).

Several studies suggest the association between prolonged use of photosensitizing drugs and an increased risk of skin cancer. Pharmacological classes such as NSAID, antibacterials, antifungals, antihypertensives and antineoplastics are associated with photocarcinogenesis.

Through a case-control study, the association between the use of phototoxic drugs and the development of cutaneous melanoma (CM) was investigated. The results showed that the use of phototoxic drugs is associated with an increased risk of developing CM and that, of all drug classes analyzed in the study, FQ and NSAID presented the greatest evidence of this association (Siiskonen et al., 2013).

It is speculated that the possible carcinogenic characteristics of FQ may not be of significant importance in clinical practice, as they are generally prescribed for a short period of time. However, in this study this was not confirmed.

Li et al. (2017) analyzed the use of tetracyclines and the risk of skin cancer through a prospective study. The use of tetracyclines was associated with a risk of basal cell carcinoma (BCC) but was not associated with CM or squamous cell carcinoma (SCC).

Sheu et al. (2015) through a retrospective review, analyzed the incidence of phototoxic reactions and skin cancer in pediatric patients treated with voriconazole. They concluded that voriconazole-associated phototoxicity is relatively common and that its long-term use increases the risk of photocarcinogenesis. Miller et al. (2015) reported 2 cases of CM in patients with extreme photosensitivity during long-term treatment with voriconazole.

Regarding antihypertensive drugs, through a case-control study in Denmark, the use of antihypertensive drugs and the risk of photocarcinogenesis were investigated. The authors found a strong association between the long-term use of ARA and CM, and the use of diuretics and SCC. Associations with the other classes of antihypertensive drugs were inconclusive in this study (Schmidt, Schmidt, Mehnert, Lemeshow, & Sørensen, 2015). Bendinelli et al. (2019) also stated that the use of thiazide diuretics and the increased risk of skin cancer, more specifically SCC, seems to be related.

Gandini et al. (2018) also analyzed the association between the use of antihypertensive drugs and the risk of CM and concluded that there is a significant increase in risk with the prolonged use of CCB and β-blockers.

MANAGEMENT AND PREVENTION OF REACTIONS

The list of drugs, including non-prescription drugs, that induce photosensitivity reactions is wide, which is worrying and requires increased attention from health professionals, such as doctors, nurses and higher pharmacy professionals. A multidisciplinary approach is crucial for the correct identification and management of these situations. Indeed, diagnosis requires careful assessment. The patient's clinical history is essential, and it is important to understand the duration of the onset of photodermatosis, its distribution and evolution, and identify which topical and/or systemic drugs may be involved. To assist, patch tests such as photopatch test, phototest and photoprovocation test can be performed.

Once a rash occurs, if the discontinuation of the drug is not possible, there is a need to evaluate and implement other alternatives. In milder situations, the use of emollients and photoprotection may be recommended to alleviate symptoms, but in more severe cases there may be a need for topical or systemic treatment with antihistamines or corticosteroids (Blakely et al., 2019) (Moore, 2002).

Nevertheless, the mainstay of treatment is prevention as, in most cases, discontinuation of the photosensitizing drug(s) is not possible. Prevention essentially involves informing and alerting the patient of the possibility of increased skin photosensitivity and advising the adoption of preventive measures such as the use of broad-spectrum sun protection with a protection factor equal to or greater than 30 and the use of physical protection such as hat, sunglasses and protective clothing (Gouveia et al., 2016) (Nahhas, Oberlin, Braunberger, & Lim, 2018). It should also be noted that solar radiation is not the only one involved in photosensitivity. UV-emitting lights, found in solariums and beauty centers, may also be involved and should be avoided by patients.

Another strategy that, in some cases, can be implemented is the administration of the drug at night, although this is highly dependent on its pharmacokinetic properties (Blakely et al., 2019). In strict photoprotection settings, the patient may be at increased risk of vitamin D deficiency due to lack of sun exposure. Vitamin D counseling should be considered (Nahhas et al., 2018).

Patients are rarely aware of the potential risk of an adverse skin reaction and in their daily life they use medication, especially over-the-counter drugs, without informing and consulting their physician. Thus, as the pharmacist is often the patient's first line of contact, it is essential to educate and make the patient aware of photosensitivity and the possible associated risks (Zuba et al., 2016).

DISCUSSION

Drug-induced photosensitivity is a common and frequent problem worldwide. Activation of the chromophore by UV radiation induces a nonspecific inflammatory reaction (phototoxicity reaction) or a T-cell mediated immune reaction (photoallergy reaction). Many of the drugs involved in the reactions have the ability to cause both reactions, which does not facilitate the process of differentiation and diagnosis.

Phototoxicity presents as the most common clinical pattern erythema similar to sunburn. Photoallergy is more commonly associated with eczema and photoallergic contact dermatitis.

The photosensitizing properties of pharmacological therapies are, in large number, associated with their chemical structure. Drugs with polycyclic aromatic rings are more involved in the reactions. They can also be associated with cross-reactions between compounds with similar chemical structures.

The photosensitivity induced by ketoprofen is non-specific as it can induce both reactions. It can be justified by the production of ROS and cross reactions derived from the benzophenone compound. The photosensitivity to fenofibrate is also associated with this compound and with this, there must be a double attention in individuals who make both therapies together.

In the case of piroxicam, its photosensitizing properties are associated with sensitization to thimerosal, that is, individuals previously sensitized to thimerosal may develop photoallergy in the first contact with it, through a cross-reaction.

FQ that contain a halogen in the 8th position of their chemical structure are considered to have the greatest phototoxic potential. This is the case of lomefloxacin, sparfloxacin and clinafloxacin.

Voriconazole-induced phototoxicity is associated with its active metabolite: N-oxide. Retinoid-induced photosensitivity may be associated with voriconazole co-administration, as tretinoin is metabolized by CYP450 isoenzymes and voriconazole is an inhibitor of these enzymes.

Antihypertensive drugs and statins, being chronic therapies, require special attention because chronic exposure to photosensitizing drugs is associated with an increased risk of skin complications, such as skin cancer.

Unlike other drugs, vemurafenib induces a direct and immediate reaction during exposure to UV radiation. It presents as a feeling of heat and erythema with possible edema.

CONCLUSION

Drug induced phototoxicity and photoallergy are two types of photoreactions than can result from the exposure of the patient to a UV radiation, due to interaction with drugs. A large number of associations between drugs and photoreactions have been reported, both with systemic and topic formulations. Nevertheless, the level of evidence for most associations between oral drugs and phototoxicity has not been assessed. Vemurafenib, NSAID, fluoroquinolone, retinoids and tetracycline antibiotics seem to have the strongest level of evidence as inducers of phototoxicity and special care should be taken during treatments with those drugs, regarding exposition to the sun or other source of UV radiation.

As for future perspectives, DIP requires further investigation on the mechanisms involved and the associated risk, since severe reactions can limit the use of drugs and have consequences for the health of the population. It would be important to analyze the role of drug excipients in inducing photosensitivity. Likewise, it is of utmost importance to assess and improve the populations' literacy on DIP. A multidisciplinary team of healthcare professionals should be involved in the management and prevention of photoreactions, and the use of phototesting is also recommended.

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PHARMACOTHERAPY IN THE OLDER ADULT: CHARACTERIZATION, MEDICATION ADHERENCE AND POTENTIALLY INAPPROPRIATE MEDICATIONS

FARMACOTERAPIA NO IDOSO: CARATERIZAÇÃO, ADESÃO À TERAPÊUTICA E MEDICAMENTOS POTENCIALMENTE INAPROPRIADOS **PT**

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FARMACOTERAPIA EN ANCIANOS: CARACTERIZACIÓN, ADHESIÓN AL TRATAMIENTO Y MEDICAMENTOS POTENCIALMENTE INAPROPIADOS **ES**

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PHARMACOTHERAPY IN THE OLDER ADULT: CHARACTERIZATION, MEDICATION ADHERENCE AND POTENTIALLY INAPPROPRIATE MEDICATIONS

ABSTRACT

Introduction: Aging is a dynamic process in which biochemical and physiological changes are related to a higher frequency of pathological processes, which ultimately lead the human being to death. Part of these alterations and pathologies are improved using medicines, so older adults are great consumers of medicines. Several instruments have been used to evaluate the use of inappropriate medications in older adults, with Beers Criteria frequently used. The concept of medication adherence has undergone changes over time and represents the degree to which the patient's behaviour corresponds and agrees with the recommendations of a doctor or other health professional. Medication non-adherence to entails a decrease in the quality of life of the patients and high costs for the health systems. Objectives: To characterize drug therapy in older adult users of a northern Portuguese community pharmacy, as well as to identify the presence of potentially inappropriate medications (PIMs) in the older adult and to assess medication adherence. Methods: Exploratory and descriptive study. The target population was older adult users of a community pharmacy in the municipality of Valpaços, Portugal. The data collection instrument used was a questionnaire applied in the form of a structured interview. The potentially inappropriate medications (PIMs) identification was based on the most recent version of the Beers Criteria published in 2019. The MAT (Measurement of Adherence to Treatments) scale was used to evaluate medication adherence. The statistical treatment included the calculation of absolute and relative frequencies, measures of central tendency and dispersion. Results: 60 older adult people were interviewed, 53.3% of them women. The average age was 78.35 years. Among these, 55.0% were married/had a non-marital partner, 71.7% lived accompanied, 26.7% had primary school education, 40.0% received less than 300 Euros monthly and 95.0% lived in the municipality of Valpaços. Each older adult person consumes on average 6 different types of medication per day. Major polymerization was present in 66.7% of older adults, and 94.2% of the drugs being prescribed by the physician. In 34.7% of the cases, the medication had been used for at least 1 year and only 3.4% reported feeling adverse reactions. Of the total 326 drugs identified, the most prescribed pharmacotherapeutic groups were drugs acting in the cardiovascular system 27.2% and in the digestive system 24.2%. Additionally, 15 drugs classified as potentially inappropriate medication were identified in the older adult. Most of the older adults (76.7%) did not adhere to drug therapy, these being mainly females with primary education, living with a partner and less than 300 euros/month. Conclusion: Polymedication and the use of potentially inappropriate medications are common in older adults. Medication adherence is low.

Keywords: Older adult, Pharmacotherapy, Medication adherence, Potentially inappropriate medications, MAT scale, Beers criteria.

RESUMO

Introdução: O envelhecimento é um processo dinâmico que provoca alterações bioquímicas e fisiológicas, que ocasionam maior incidência de processos patológicos. Parte destas alterações e patologias são melhoradas recorrendo a medicamentos, pelo que os idosos são grandes consumidores de medicamentos. Têm sido criados diversos instrumentos para avaliação do uso de medicamentos inapropriados no idoso, sendo os Critérios de Beers dos mais frequentemente utilizados. O conceito de adesão à terapêutica, que tem sofrido alterações ao longo do tempo, representa o grau em que o comportamento do doente corresponde e concorda com as recomendações de um médico ou outro profissional de saúde. A não adesão à terapêutica acarreta diminuição da qualidade de vida dos doentes e elevados custos para os sistemas de saúde. Objetivos: Caracterizar a terapêutica medicamentosa nos idosos utentes de uma

farmácia comunitária do interior Norte de Portugal, bem como identificar a presença de medicamentos potencialmente inapropriados (MPI) no idoso e avaliar a adesão ao regime terapêutico medicamentoso. Métodos: Estudo do tipo descritivo exploratório. A população alvo foram idosos utentes de uma farmácia comunitária no concelho de Valpaços, Portugal. O instrumento de recolha de dados utilizado foi um questionário aplicado sob a forma de entrevista estruturada. A identificação do uso de medicamentos potencialmente inapropriados (MPI) teve por base a versão mais recente dos Critérios de Beers, publicada em 2019. Foi utilizada a escala MAT (Medida de Adesão aos Tratamentos) para avaliar a adesão ao regime terapêutico medicamentoso. O tratamento estatístico incluiu o cálculo de frequências absolutas e relativas, medidas de tendência central e de dispersão. Resultados: Foram entrevistados 60 idosos, sendo 53,3% mulheres. A idade média foi de 78,4 anos. Verificou-se que 55,0% eram casados/ união de facto, 71,7% viviam acompanhados, 26,7% tinham concluído o 1° ciclo, 40,0% recebiam mensalmente menos de 300 euros e 95,0% viviam em Valpaços. Em média, cada idoso consome 6 medicamentos diferentes por dia. A polimedicação major esteve presente em 66,7%, sendo que 94,2% desses fármacos foram prescritos pelo médico. Em 34,7% dos casos, a medicação já era usada há pelo menos 1 ano e apenas 3,4% referiu sentir alguma reação adversa. Dos 326 fármacos identificados, os grupos farmacoterapêuticos mais prescritos foram medicamentos usados no sistema cardiovascular 27,2% e no sistema digestivo 24,2%. Identificaram-se 15 medicamentos potencialmente inapropriados em idosos. A maioria dos idosos (76,7%) não adere ao regime terapêutico medicamentoso, sendo estes principalmente do sexo feminino, com ensino primário, que viviam com companheiro e menos de 300 euros/mês. Conclusão: A polimedicação e a toma de medicamentos potencialmente inapropriados são frequentes nos idosos. A adesão à terapêutica medicamentosa é baixa.

Palavras-chave: Idosos, Farmacoterapia, Adesão à terapêutica, Medicamentos Potencialmente Inapropriados, Escala MAT, Critérios de Beers.

RESUMEN

Introducción: El envejecimiento es un proceso dinámico que provoca cambios bioquímicos y fisiológicos, que se relacionan con una mayor incidencia de procesos patológicos, que finalmente conducen a la muerte. Algunas de las alteraciones y patologías se mejoran con el uso de medicamentos, lo que lleva a que los ancianos sean grandes consumidores de medicamentos. Se han creado varios instrumentos para evaluar el uso de medicamentos inapropiados en el anciano, siendo los Criterios de Beers de los más utilizados. El concepto de adherencia al tratamiento ha cambiado con el tiempo y representa el grado en el que el comportamiento del paciente corresponde y está de acuerdo con las recomendaciones de un médico u otro profesional de salud. La no adherencia al tratamiento resulta en reducción de la calidad de vida de los pacientes y altos costos para los sistemas de salud. Objetivos: Caracterizar la farmacoterapia en usuarios ancianos de una farmacia comunitaria del norte de Portugal, así como identificar la presencia de medicamentos potencialmente inapropiados (MPI) en ancianos y evaluar la adherencia al régimen terapéutico. Métodos: Estudio descriptivo y exploratorio. La población en estudio fueron ancianos usuarios de una farmacia comunitaria en el municipio de Valpaços, Portugal. Se aplicó un cuestionario en forma de entrevista estructurada. La identificación del uso de medicamentos potencialmente inapropiados (MPI) se basó en la versión más reciente de los Criterios de Beers, publicada en 2019. La escala MAT (Medida de adherencia a los tratamientos) se utilizó para evaluar la adherencia al tratamiento con medicamentos. El tratamiento estadístico incluyó el cálculo de frecuencias absolutas y relativas, medidas de tendencia central y dispersión. Resultados: Se entrevistaron 60 personas mayores, de las cuales 53,3% eran mujeres. La edad media fue de 78,35 años. Se constató que el 55,0% estaba casado/ pareja de

hecho, el 71,7% vivía acompañado, el 26,7% había completado la educación primaria, el 40,0% recibía menos de 300 euros al mes y el 95,0% vivía en Valpaços. Cada anciano consume, en promedio, 6 medicamentos diferentes al día. La polimedicación mayor estuvo presente en el 66,7% y el 94,2% de estos fármacos fueron prescritos por el médico. En el 34,7% de los casos, los medicamentos se utilizaban al menos hace 1 año, y solo el 3,4% informó haber experimentado reacciones adversas. De los 326 fármacos diferentes identificados, los grupos farmacoterapéuticos más prescritos fueron los usados para el sistema cardiovascular (27,2%) y para el sistema digestivo (24,2%). Se identificaron 15 medicamentos potencialmente inapropiados en ancianos. La mayoría de las personas mayores (76,7%) no cumple el régimen terapéutico, siendo mayoritariamente mujeres, con estudios primarios, viviendo en pareja y con menos de 300 euros/mes. Conclusión: La polimedicación y el uso de medicamentos potencialmente inapropiados son frecuentes en los ancianos. La adherencia a la terapia con medicamentos es baja.

Palavras-clave: Ancianos, Farmacoterapia, Adherencia al tratamiento con medicamentos, Medicamentos Potencialmente Inapropiados, Escala MAT, Criterios de Beers.

PHARMACOTHERAPY IN THE OLDER ADULT: CHARACTERIZATION, MEDICATION ADHERENCE AND POTENTIALLY INAPPROPRIATE MEDICATIONS
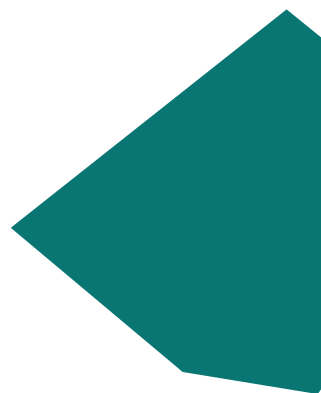
1. INTRODUCTION

Aging is a dynamic process that causes biochemical and physiological changes, and related to a higher frequency of pathological processes, which ultimately lead the human being to death (Mosca & Correia, 2012; WHO, 2019; OMS, 2015). The World Health Organization (WHO) considers that older age starts between 60 and 65 years (OMS, 2015). Nowadays, aging is a stage in the course of life and not always is synonymous of being sick (OMS, 2015). Portugal has one of the oldest populations in Europe (OECD, 2021). According to data in the INE (INE, 2018), Portugal maintains the trend of demographic aging as a result of the reduction of the young population (0-14 years old), working age (15-64 years old) and the increase in the number of older adult people (over 65 years old).

Aging leads to progressive changes in pharmacokinetics (factors affecting the concentration and distribution of drugs) and pharmacodynamics (effect of drugs on organs and tissues) (Mosca & Correia, 2012; Santos & Almeida, 2010; Cunha et al., 2018). Pharmacokinetics includes the absorption, distribution, metabolism and excretion of drugs while pharmacodynamic changes contribute to increased sensitivity to drugs (Santos & Almeida, 2010). However, pharmacodynamic changes are less studied than pharmacokinetics given the difficulties in doing so. In the older adult patients, pharmacodynamic changes may be related to the sensitivity of the receptors; changes in homeostasis; nutritional factors and polypathologies (Mosca & Correia, 2012).

With advancing age the number of chronic diseases and medicines used tends to increase. Although not all older adult people require medicines, the existence of multiple chronic diseases in the same person may involve the prescription of drugs from different therapeutic groups. Polymedication has been defined in a number of ways, including the use of several medicinal products, the use of more medicines than indicated, the therapeutic regimen that includes at least one unnecessary medicine and/or the use of medicinal products that may cause adverse reactions/drug interactions (WHO, 2019; Souto & Pimentel, 2018; Rosa & Camargo, 2014). Polymedication can be classified as minor polymedication, from two to four drugs, and major polymedication when five or more drugs are used (Souto & Pimentel, 2018; Rosa & Camargo, 2014). Overall, these conditions associated with pharmacokinetics and pharmacodynamic changes increase the risks with medications (Delafuente, 2008; WHO, 2019; OMS, 2015). In fact, drug therapy for the older adult patients requires increased care, taking into account its pathophysiological changes and multiple pathologies, which makes them more susceptible to adverse events (Santos & Almeida, 2010). In addition, the presence of different diseases in the older adult leads them to the search for different medical specialties, subjecting themselves to a pharmacological arsenal. Polymedication, lack of medication adherence and pharmacokinetic changes are among the main causes of drug-related problems (Delafuente, 2008; Creaque & Eaton, 2020; Santos & Almeida, 2010; Soares et al., 2011).

Prescription of potentially inappropriate medications occurs when the risk of adverse events outweighs the clinical benefit. It also includes overuse, prescription of multiple drugs with known interactions, indication or incorrect dose, and use for a longer period of time than necessary (Soares et al., 2011).

Several instruments have been created to evaluate and prevent the use of potentially inappropriate medications in the older adult, being the Beers Criteria one of the most frequently used, which was created by Beers and his contributors in 1991and has already undergone 4 updates, the most recent being in 2019 (Creaque & Eaton, 2020; Fick et al., 2019).

According to the WHO, adherence to therapy can be defined as the degree to which a person's behaviour corresponds and agrees with the recommendations of the doctor or other health professional and include not only the medication intake, but also the following of the established diet or lifestyle changes (WHO, 2003). Drugs are one way to improve quality of life, preservation of cognitive and physical functions, reduction of additional risks of comorbidity and death (Cabral & Silva, 2010; Cima et al., 2011; Remondi et al., 2014), however a high number older adult do not comply with the pharmacological prescription (Monterroso et al., 2015). Medication adherence is extremely important, especially in chronic diseases, due to the impact on the quality of life of patients and expenditures in the health system (Remondi et al., 2014) According to literature (Cabral & Silva, 2010), there are several factors that influence medication adherence and can be grouped into three major dimensions: (a) demographic, social and economic factors; (b) factors relating to the disease itself or the prescribed therapeutic regimen; (c) factors related to the relationship with health professionals and services.

The world population ageing, and associated comorbidities are related to a high consumption of medicines by the older adult resulting in potentially inappropriate medicines use and medication non-adherence. In this sense, being the control of diseases and older adult life quality important concerns of pharmacy professionals, exploratory studies on these phenomena are required, in order to better understand the pharmacotherapeutic profile of the regular users of community pharmacies. The results of studies of this nature can promote a more accurate and consistent communication of information about medication, through therapeutic reconciliation, improving monitoring and counselling of older adult patients, regarding the safer and more effective use of the prescribed therapy. Hence, the reduced drug-related problems and increased medication adherence, improve older adult health and quality of life.

2. AIM

The present research study aimed to characterize drug therapy in older adult users of northern portuguese community pharmacy, as well as to identify potentially inappropriate medications in the older adult and evaluate medication adherence.

3. METHODOLOGY

The present study is descriptive and exploratory. The sample consisted of 60 older adult users of a community pharmacy located in municipality of Valpaços, Portugal. A non-probabilistic convenience/accidental sampling technique was used (Ribeiro et al., 2010) and the users were recruited taking advantage of the moment when they moved to the pharmacy. In the sampling process, individuals of both sexes aged 65 years or over to take medication were included. Data collection was carried out between September and December 2019, with a participation rate of 98%.

For data collection, a questionnaire in the form of a structured interview performed by an investigator was applied. Participants were informed about the objectives and purpose of the study, as well enlightened when they had doubts about questions. After providing informed consent, data were collected from the older adult who agreed to cooperate with this investigation. All constitutional rights of individuals have been guaranteed, respecting the Helsinki Declaration and the Oviedo Convention (WMA, 2001; DR, 2001). The right to anonymity and confidentiality were maintained in this study. The personal data were not disclosed or shared and the results were presented collectively. Participation in the study was voluntary and individuals could, at any time, refuse or interrupt their participation.

The questionnaire consisted of three parts: Part 1 - Sociodemographic Characterization; Part 2- Pharmacotherapeutic Profile; Part 3 - MAT Scale (Treatment Adhering Measure) (Delgado & Lima, 2001).

The first part, which included questions related to sociodemographic characterization, aimed to characterize the older adult concerning age, residence, gender, marital status, schooling, with whom they live and health problems.

The second part referred to the pharmacotherapeutic profile of the respondents. In addition to identifying each drug in use, they were asked about the purpose for which it is used, who prescribed/advised them, how long they have been taking them and if they have noticed any adverse reactions. The pharmacotherapeutic profile aimed also to identify the PIMs (potentially inappropriate medications) in the older adult. Taking into account the nature of the study, the identification of PIMs was performed according to Table 2 of Beers Criteria (Fick et al., 2019) that includes drugs potentially inappropriate in most older adults, because they are ineffective, entail unnecessary risk or there are safer alternatives. Thus, the Tables 3, 4, 5 and 6 of Beers Criteria were not consider for the study although they include Drugs that should normally be avoided in the elderly with certain diseases or syndromes (Table 3); Drugs that should be used with precautions (Table 4); Drug-drug interactions that can be serious in the elderly (Table 5); Drugs to be avoided or whose dose should be adjusted with reduced renal function (Table 6) (Creaque & Eaton, 2020; Fick et al., 2019). All drugs used by the participants of this study are holders of Marketing Authorization in Portugal.

In the third and final part, the objective was to evaluate the medication adherence. The study of medication adherence can be done through direct or indirect methods. The direct method is based on medical procedures, which allow to detect the properties of the drug in the body, through analysis of the biological fluids of patients and are therefore considered more reliable. The indirect method refers to the collection of information through interviews or questionnaires and are the most used due to their ease of application and reduced cost (Cabral & Silva, 2010). Data collection was made through the application of the Measure Adherence to Treatment (MAT) questionnaire developed by Delgado and Lima (2001). The following criterion was used to convert the Likert scale to dichotomic: from the median of the 7 items, the categories never (6) and rarely (5) of the Likert scale, become adhere (1) to the dichotomic scale, and sometimes (3), frequently (4), almost always (5) and always (6) of the Likert scale, become non-adhere (0) of the dichotomic scale (Delgado & Lima, 2001). So, the classification of the subjects as adherent or as non-adherent will be made according to values close to the median, in which medians ≥5 correspond to subjects as adherents.

The statistical treatment of the collected data was processed in the Excel computer program, version 16.41 and included the distribution of absolute and relative frequencies, measures of central trend (mean, mode and median) and dispersion measures (standard deviation).

4.   RESULTS AND DISCUSSION

The 60 older adult who participated in this study were between 66 and 93 years old, with an average age of 78.3 years, and a standard deviation of 7.41, which is justified taking into account the inclusion criteria and average life expectancy of the Portuguese population (INE, 2018; SNS, 2017). The majority of respondents (95,0%) lived in the municipality of Valpaços (Table 1). The distribution by gender shows a predominance of females (53,3%), data corroborated by other studies (Cima, et al., 2011; Soares et al., 2011; Souto & Pimentel, 2018) and corresponding to the expected, since in Portugal the longevity of females is higher than the male, although less healthy (INE, 2018; SNS, 2017).

VARIABLES	CATEGORIES	N	%
Gender	Male	28	46.7
	Female	32	53.3
Age (years)	65-74 (Young older adult)	18	30.0
	75-84 (Older adult)	28	46.7
	85-94 (Very old)	14	23.3
Marital Status	Married/Non-marital partnership	33	55.0
	Divorced/Separated)	1	1.7
	Single	9	15.0
	Widower	17	28.3
With those who live	Accompanied	43	71.7
	Alone	17	28.3
Schooling	Can't read/write	10	16.7
	Attended primary school	15	25.0
	4th Year (1st cycle)	16	26.7
	6th Year (2nd cycle)	12	20.0
	9th Year (3rd cycle)	4	6.7
	12th Grade (Secondary School)	1	1.7
	Higher Education	2	3.3
Residence	Valpaços	57	95.0
	Mirandela	3	5.0
Monthly Income	Less than 300 Euros/month	24	40.0
	Between 300 and 635 Euros/month	18	30.0
	More than 635 Euros/month	18	30.0

TABLE 1: SOCIODEMOGRAPHIC CHARACTERIZATION OF THE OLDER ADULT (N=60)

It was found that 55,0% of the interviewees were married and 28,3% were widowed, and 71,7% lived accompanied, as well as the results of Monterroso et al (2015) and Souto & Pimentel (2018). More than a quarter of respondents (26,7%) had completed primary school, which matches with other studies carried out previously in the same age group (Cima et al., 2011; Serrão et al., 2015). As it's a predominantly female and older adult sample, cannot safely inferred that it's a population with low schooling. Regarding monthly income, 40,0% of the older adult receive less than 300 euros per month, with retirement being the main source of income, also as verified in previous studies (Monterroso et al., 2015; Santos et al., 2013) (Table 1).

PHARMACOTHERAPY IN THE OLDER ADULT: CHARACTERIZATION, MEDICATION ADHERENCE AND POTENTIALLY INAPPROPRIATE MEDICATIONS

Most of used drugs were prescribed by the doctor (94,2%) and 34,7% have been taken for more than 1 year while 28,8% have been taken for more than 5 years. On average, 6 different medications are taken daily (standard deviation of 2,7). Is important highlight that two thirds of the sample was composed by older adult with major polymedication, use of five or more drugs, (Table 2), similar to the described in the study by Souto et al and eventually related to the typical comorbidities of the older adult (Souto & Pimentel, 2018).

VARIABLES	CATEGORIES	N	%
Number of different medications taken per day	2	1	1.7
	3	7	11.7
	4	12	20.0
	5	9	15.0
	6	18	30.0
	7	7	11.7
	8	2	3.3
	9	3	5.0
	10	1	1.7
Potentially inappropriate medications (PIMs)	Pantoprazole	19	28.4
	Alprazolam	9	13.4
	Omeprazole	8	11.9
	Diclofenac	6	9.0
	Ibuprofen	6	9.0
	Esomeprazole	5	7.5
	Etodolac	4	6.0
	Digoxin	2	3.0
	Zolpidem	2	3.0
	Clorazepate dipotassium	1	1.5
	Estazolam	1	1.5
	Lansoprazole	1	1.5
	Lorazepam	1	1.5
	Nitrofurantoin	1	1.5
	Ketoprofen	1	1.5

TABLE 2: NUMBER OF DIFFERENT MEDICATIONS TAKEN PER DAY BY PARTICIPANTS (N= NUMBER OF OLDER ADULTS) AND POTENTIALLY INAPPROPRIATE MEDICATIONS (PIMS)

Previous studies suggest that the prescription of essential drugs, for the shortest period of time, at the appropriate dose and the regular reassessment of their therapeutic effect through therapeutic reconciliation whenever there are new prescriptions, can contribute to ensuring the safety of polymedicated individuals (Cabral & Silva, 2010; Soares et al., 2011; WHO, 2019).

Despite the high number of medications per day, the large majority of participants (315, 96,6%) did not report experiencing any adverse effects. Bonita et al (2020) showed the exposure (taking the drug), outcome (adverse reaction) and the intrinsic variable aging, as confounding factors (Bonita et al., 2020).

Concerning the pharmacotherapeutic groups of most used drugs, about one third is included in the drugs used in cardiovascular system (28,2%), followed by the central nervous system (24,2%) and digestive tract (11,9%) (Table 3), which are similar to the reported in the Souto et al (Souto & Pimentel, 2018) and Cima et al studies (Cima et al., 2011).

PHARMACOTHERAPEUTIC GROUPS	THERAPEUTIC CLASSES	N	%
1. Anti-infectious medicines	1.1. Antibacterials	1	0.3
2. Central Nervous System	2.3. Muscle relaxers	1	0.3
	2.5. Anti-parkinson drugs	1	0.3
	2.10. Analgesics and antipyretics	9	2.8
	2.12. Narcotic painkillers	13	4.0
	2.13. Other medicines with action on the Central Nervous System	10	3.1
	2.6. Antiepileptics and anticonvulsants	5	1.5
	2.7. Antiemetics and antivertiginous	6	1.8
	2.9. Psycholeptics and psycoanaleptics	35	10.7
	Subtotal	80	24.2
3. Cardiovascular system	3.1. Cardiotonics	2	0.6
	3.4. Anti-hipertensors	53	16.3
	3.5. Vasodilators	3	0.9
	3.6. Venotropics	2	0.6
	3.7. Antidislipidemics	32	9.8
	Subtotal	92	28.2
4. Blood	4.3. Anticoagulants and antithrombotics	20	6.1
	4.1. Antianemics	3	0.9
	Subtotal	23	7.0
5. Respiratory tract	5.1. Antiasthmatics and bronchodilators	9	2.8
	Subtotal	9	2.8
6. Digestive tract	6.2. Antacids and anti-ulcers	34	10.4
	6.3. Modifiers of gastrointestinal motility	1	0.3
	6.6. Enzyme supplements, dairy bacilli and analogues	2	0.6
	6.8 Intestinal anti-inflammatory drugs	2	0.6
	Subtotal	39	11.9
7. Genitourinary system	7.1. Topical medicines in vagina	1	0.3
	7.3. Anti-infectious and urinary antiseptics	1	0.3
	7.4. Other medicines used in genitourinary dysfunctions	20	6.1
	Subtotal	22	6.7
8. Hormones and medicines used to treat endocrine disorders	8.3. Thyroid hormones and antithyroid drugs	4	1.2
	8.4. Insulins, antidiabetics and glucagon	21	6.4
	Subtotal	25	7.6

9. Locomotor apparatus	9.1. Non-steroidal anti-inflammatory drugs	20	6.1
	9.3. Medicines used for the treatment of gout	6	1.8
	Subtotal	26	7.9
10. Antiallergic medication	10.1. Antihistamines	2	0.6
	Subtotal	2	0.6
11. Nutrition	11.3. Vitamins and minerals	4	1.2
	Subtotal	4	1.2
12. Medicines used in skin diseases	13.1. Anti-infectious of skin application	1	0.3
	Subtotal	1	0.3
15. Medicines used in eye disorders	15.4. Medicines used to treat glaucoma	1	0.3
	Subtotal	1	0.3
16. Antineoplastic and immunomodulating agents	16.3. Immunomodulators	1	0.3
	Subtotal	1	0.3
Total		326	100

TABLE 3: PHARMACOTHERAPEUTIC GROUPS OF MEDICINES USED

According to Beers criteria (Creaque & Eaton, 2020; Fick et al., 2019), 15 potentially inappropriate medications (PIMs) in the older adult were found in the present study (Table 2) namely pantoprazole (19), alprazolam (9), omeprazole (8), ibuprofene (6), diclofenac (6), and esomeprazole (5). It is important to note that, in some cases, more than one PIMs were consumed by the same person. Among these drugs, the more prescribed are proton pump inhibitors (pantoprazole, omeprazole, esomeprazole and lansoprazole), in which the decreasing gastric acidity cause by these drugs, increases the risk of gastrointestinal infections by Clostridium difficile and also increases the risk of bone fractures following decreased calcium absorption (INFARMED, 2017; Ribeiro et al., 2014). Non-steroidal anti-inflammatory (NSAID) drugs (ibuprofen and diclofenac) are also among the most widely used drugs, especially to treat rheumatic pain (Laires, et al., 2017), which can increase the risk of gastrointestinal bleeding and peptic ulcers, as well as increased blood pressure and induce kidney damage. Although the consumption of NSAIDs were significant, it was discontinuous, and in some cases of topical use, which minimizes adverse effects and systemic toxicity (Símon, 2020). The consumption of drugs that act on the central nervous system verified in the present study was also high (24,2%) (Table 3) although similar to the observed in previous studies of Souto et al (Souto & Pimentel, 2018). The high consumption of benzodiazepines and other sedatives and hypnotics is a serious public health problem, since the older adult have greater sensitivity to these drugs. Their metabolism was reduced by age, which can cause sedation and motor alterations, whit consequent falls, bone fractures and road accidents (Souto & Pimentel, 2018; ARSLVT, 2017).

PIM NUMBER PER USER	N	%
0	16	27
1	25	42
2	17	28
3	2	3
Total	60	100

TABLE 4: DAILY CONSUMPTION OF PIMS PER USER

Due the high prevalence of PIMs consumption, it would be appropriate to establish prescription parameters that take into account the potential risks in the geriatric patients. In this sense, the Beers Criteria are an important tool for safe and efficient prescribing (Soares, 2011; Souto et al., 2018)

Regarding medication adherence, it was found that 76,7% of the older adult do not adhere to the prescribed medication therapy. The average score obtained was 4,4 points and a median of 4,5 points. As showed in Table 5 the non-adherent older adult were female, between 75 and 84 years, married/ with non-marital partnership, attended or finished primary school who lived accompanied in Valpaços with less than 300 euros/ month. Concerning medication profile, these older adult are polymedicated and use potentially inappropriate medications.

The rates of drug treatment obtained by indirect method usually tend to underestimate non-adhering (Cabral & Silva, 2010) and this study counteracts this trend. It is difficult to define absolutely the predictors of lack of medication adherence because it is a problem with multifactorial etiology (Cabral & Silva, 2010). Some studies show that the low medication adherence may be related to the absence of adverse reactions perceived, with low monthly income and the polymedication (Chin, et al., 2012; Cabral & Silva, 2010; Monterroso et al., 2015).

VARIABLES	CATEGORIES	NON-ADHERENT N (%)	ADHERENT N (%)
Gender	Male	21 (35,0)	7 (11,7)
	Female	25 (41,7)	7 (11,7)
Age (years)	65-74 (Young older adult)	13 (21,7)	5 (8,3)
	75-84 (Older adult)	20 (33,3)	8 (13,3)
	85-94 (Very Old)	13 (21,7)	1 (1,7)
Marital Status	Married/Non-marital partnership	25 (41,7)	8 (13,3)
	Divorced/Separated)	0 (0,0)	1 (1,7)
	Single	6 (10,0)	3(5,0)
	Widower	15 (25,0)	2 (3,3)
With those who live	Accompanied	34 (56,7)	9 (15,0)
	Alone	12 (20,0)	5 (8,3)
Schooling	Can't read/write	9 (15,0)	1 (1,7)
	Attended primary school	13 (21,7)	2 (3,3)
	4th Year (1st cycle)	12 (20,0)	4 (6,7)
	6th Year (2nd cycle)	9 (15,0)	3 (5,0)
	9th Year (3rd cycle)	1 (1,7)	3 (5,0)
	12th Grade (Secondary School)	1 (1,7)	0 (0,0)
	Higher Education	1 (1,7)	1 (1,7)
Monthly Income	Less than 300 Euros/month	21 (35,0)	3 (5,0)
	Between 300 and 635 Euros/ month	14 (23,3)	4 (6,7)
	More than 635 Euros/month	11 (18,3)	7 (11,7)
Polymedication	Yes	32 (53,3)	8 (13,3)
	No	14 (23,3)	6 (10,0)
Potentially inappropriate medications	Yes	34 (56,7)	10 (16,7)
	No	12 (20,0)	4 (6,7)

TABLE 5: CHARACTERIZATION OF MEDICATION ADHERENCE, SOCIODEMOGRAPHIC VARIABLES AND MEDICATION

4.   CONCLUSION

The sample of the present study was mostly consisted of married females, with primary school education and monthly income below 300 euros.

The most used drugs were those who act on the cardiovascular system and central nervous system following the digestive system. Overall, the three most prevalent drugs in this study were pantoprazole, alprazolam and simvastatin. Is important highlighted that major polymedication was verified in the older adult.

Moreover, the study identified 15 PIMs in the older adult, with a higher frequency in proton pump inhibitors, non-steroidal anti-inflammatory drugs and psychotropic drugs, and in some cases, more than one PIMs per person was used.

Medication adherence in these older adult is low, what does not correspond to the expected result and verified in other studies performed in older adult people. The non-adherent older adult were female, between 75 and 84 years, married/ with non-marital partnership, attended or finished primary school who lived accompanied in Valpaços with less than 300 euros/ month, polymedicated and use potentially inappropriate medications.

Despite the important contributions of the present study, this also presents some limitations. More specifically, the non-probabilistic sampling technique does not allow and measure the accuracy of the results and its extrapolation to the older adult Portuguese population can't be done. In addition, since it is an exploratory study the results cannot be accurately interpreted for the generalized population.

The prevalence of PIMs use may have been underestimated, because the potential drug-drug and drug-disease interactions have not been considered, drugs that should be avoided or should have their dose adjusted according to the renal function of the older adult and drugs with strong anticholinergic properties.

However, the results contributed to evidence the high consumption of PIMs and that therapeutic non-compliance is one of the main challenges for patient safety associated with medication.

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CHARACTERIZATION OF THE ORAL HEALTH OF INDIVIDUALS WITH SPECIAL NEEDS AT CERCI PORTALEGRE

CARACTERIZAÇÃO DA SAÚDE ORAL DE INDIVÍDUOS COM NECESSIDADES ESPECIAIS DE PORTALEGRE **PT**

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CARACTERIZACIÓN DE LA SALUD BUCAL DE PERSONAS CON NECESIDADES ESPECIALES EN PORTALEGRE **ES**

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CHARACTERIZATION OF THE ORAL HEALTH OF INDIVIDUALS WITH SPECIAL NEEDS AT CERCI PORTALEGRE

ABSTRACT

Introduction: At the present time, progress has been made between the relation in oral health and general health. Therefore, deepen knowledge of the oral health status of a population is essential for the establishment of health promotion measures. Since populations with special needs require a multidisciplinary approach, it is even more important to define these measures. The first step will be to establish the baseline values of a population, and thus to better understand their oral health needs. Objectives: This work aims to characterize the oral health status of a population with special needs at Cerci Portalegre. Methods: After obtaining the informed consent of the heads of the institution and the individuals' legal guardians, as well as the consent of the individuals, the observation of the oral cavity was carried out to collect the present and past history of dental caries using the DMFT index (index of decayed, missing and filled teeth) and the evaluation of bacterial plaque accumulation on the dental surface by the DI'S index (bacterial plaque index). Results: Forty individuals were observed, 29 men and 11 women, with a mean age of 35 years. It was observed that these individuals had a mean value of DMFT of 4.7 decayed, missing and filled teeth, with no statistically significant difference between men and women (p=0.952). The mean value of DI'S was 2.02 which represents a high value of bacterial plaque accumulation which, being an etiological factor of oral diseases, indicates a risk of developing oral health problems. Conclusions: Patients with disabilities in most cases require more care at the level of oral health, due to their physical and mental inability to perform correct oral hygiene habits. Therefore, promoting oral health and educational measures may play a relevant role in the study population for the prevention of oral health problems and consequently other health problems.

Keywords: *Oral Health, Dental Caries, Health Promotion*

RESUMO

Introdução: Atualmente, tem existido um progresso na forma como a saúde oral é encarada face à saúde geral. Desta forma, o conhecimento do estado da saúde oral de uma população é essencial para o estabelecimento de medidas promotoras de saúde. Dado de que estas populações com necessidades especiais querem uma abordagem multidisciplinar, é então ainda mais relevante a definição destas mesmas medidas. O primeiro passo será estabelecer valores de base da população, e desta forma conhecer mais adequadamente as suas necessidades de saúde oral. Objectivos: Este trabalho tem por objetivo caracterizar o estado de saúde oral de uma população com necessidades especiais da Cerci Portalegre. Métodos: Após a obtenção do consentimento informado e esclarecido dos responsáveis da instituição e responsáveis legais dos indivíduos, assim como o assentimento dos indivíduos, efetuou-se a observação da cavidade oral para recolha da história presente e passada de cárie dentária pelo índice CPOD (índice de dentes cariados, perdidos e obturados) e a avaliação de acumulação de placa bacteriana na superfície dentária pelo índice DI'S (índice de placa bacteriana). Resultados: Foram observados 40 indivíduos, 29 homens e 11 mulheres, com uma idade média de 35 anos. Observou-se que estes indivíduos apresentavam um valor médio de CPOD de 4.7 dentes cariados, perdidos e obturados, sem diferença estatisticamente significativa entre homens e mulheres (p=0.952). O valor médio de DI'S foi de 2.02 o que representa um valor elevado de acumulação de placa bacteriana que, sendo um fator etiológico das doenças orais indica um risco de desenvolvimento de problemas de saúde oral. Conclusões: Na

maioria dos casos de indivíduos com deficiências, devido à sua incapacidade física e mental para realizar hábitos correctos de higiene oral requerem mais cuidados ao nível da saúde oral. Por conseguinte, a promoção da saúde oral e medidas educativas podem desempenhar um papel relevante na população estudada para a prevenção de problemas de saúde oral e, consequentemente, de outros problemas de saúde.

Palavras-chave: *Saúde oral, cárie dentária, promoção de saúde,*

RESUMEN

Introducción: En la actualidad, se han producido avances en la forma de considerar la salud bucodental en relación con la salud general. Por lo tanto, el conocimiento del estado de salud bucodental de una población es esencial para el establecimiento de medidas de promoción de la salud. Dado que las poblaciones con necesidades especiales requieren un enfoque multidisciplinar, es aún más importante definir estas medidas. El primer paso será establecer los valores de referencia de la población, y así conocer más adecuadamente sus necesidades de salud bucodental. Objetivos: Este trabajo tiene como objetivo caracterizar el estado de salud bucal de una población con necesidades especiales en Cerci Portalegre. Métodos: Luego de obtener el consentimiento informado e informado de los responsables de la institución y de los tutores legales de las personas, así como el consentimiento de las personas, se realizó la observación de la cavidad bucal para recolectar la historia actual y pasada de caries dental. utilizando el índice CPOD (índice de dientes cariados, perdidos y obturados) y la evaluación de la acumulación de placa bacteriana en la superficie dental mediante el índice DI'S (índice de placa bacteriana). Resultados: Se observaron 40 individuos, 29 hombres y 11 mujeres, con una edad promedio de 35 años. Se observó que estos individuos tenían un valor medio de CPOD de 4,7 dientes cariados, perdidos y obturados, sin diferencia estadísticamente significativa entre hombres y mujeres (p = 0,952). El valor medio de DI'S fue 2,02 lo que representa un alto valor de acumulación de placa bacteriana que, al ser un factor etiológico de enfermedades bucodentales, indica riesgo de desarrollar problemas de salud bucal. Conclusiones: En la mayoría de los casos de personas con discapacidad, debido a su incapacidad física y mental para llevar a cabo unos hábitos de higiene bucal correctos, requieren más cuidados a nivel de la salud bucodental. Por lo tanto, las medidas de promoción y educación de la salud bucodental pueden desempeñar un papel relevante en la población estudiada para la prevención de problemas de salud bucodental y, en consecuencia, de otros problemas de salud.

Palavras-chave: *Salud bucal, Caries dental, Promoción de la salud*

INTRODUCTION

Oral health and quality oral healthcare contribute to holistic health. It should be a human right, not a privilege. Disability is the loss or limitation of opportunities to participate in normal   community life on an equal level with others due to physical and social barriers. The barriers to oral health that people with special needs encounter vary according to age and the level of parental or social support received. Attitudes toward oral health, dental hygiene, and dental health care and the relative value placed on these factors should be viewed in the context of disease, disability, socioeconomic status, and the stress imposed on daily life for individuals, family members, and caregivers.

Oral health can have a low priority in the context of these pressures and other disabilities, which are more life threatening. It therefore requires a change in attitude and practice for parents/carers to help with oral health as part of routine care. Evidence confirms that screening services for people with learning disabilities are lower and they have poor oral health compared to the general population. Poor oral health can add to a problem, whereas good oral health has holistic benefits as it can improve general health, dignity and self- esteem, social integration and quality of life.

Regarding the oral health of people with special needs, it only started to be considered a need a few years ago. Some studies refer that these individuals have poor oral hygiene and a high prevalence of oral diseases compared to the general population (Glassman & Miller, 2009; Koneru & Sigal, 2009).

The knowledge of the oral health status of a population is essential for the establishment of health-promoting measures, since the relationship between oral health and general health is well established (Haumschild & Haumschild, 2009). The information of populations with special needs is even more relevant when defining these same measures, as well as their multidisciplinary approach (Borbolla et al., 2018). A first step is to establish baseline values of the population to know their oral health needs (Mullan & Epstein, 2002).

Several studies state that continuous plaque control intervention is necessary for a reduction in oral diseases.

Tooth brushing is the main mechanical method of removing plaque and, when carried out effectively, is one of the main procedures in the fight against dental caries and periodontal pathology. To be effective, this measure must follow a certain technique and sequence so that all dental surfaces are cleaned. However, not all individuals have the motor and intellectual abilities to do this correctly. It has been shown that individuals with special needs have greater difficulty in plaque control than their non-disabled peers, and that for plaque removal to be effective, greater attention from caregivers and/or tools adapted to the motor function may be necessary.

This study aims to characterize the oral health status of a population with special needs at Cerci Portalegre.

1. THEORETICAL FRAMEWORK

Oral health in people with special needs is a very complex issue that, for most of these people, includes several factors besides oral health and has a major impact on overall health.

Individuals with special needs are considered a high-risk group for the development of oral diseases such as dental caries, periodontal disease, and occlusion challenges. The presence of enamel changes, soft sticky diet, frequent intake of carbohydrates, chronic use of medication, difficulty or inability to perform dental hygiene, inadequate movement of the masticatory muscles and tongue, changes in salivary flow, and difficulty in maintaining oral hygiene are risk factors that contribute to the higher prevalence of oral diseases in this population.

These people have worse oral health when compared to the general population due to their limitations in performing an adequate dental hygiene, and also due to feeding difficulties and medication associated with their condition (Pereira et al., 2010).

In some Portuguese studies done with this population, it was possible to verify that people with disabilities have a worse oral health status when compared to the rest of the population (Bizarra and Graça, 2010; Bizarra, 2015).

Individuals with disabilities often have many oral problems due to their own characteristics, and most of the time, they have reduced access to diagnosis, prevention and treatment.

In addition to these difficulties, they often lack financial resources from family members/caregivers, which contributes to many only receiving dental treatment in emergency situations.

Most individuals with special needs usually lack the ability to effectively control dental plaque and often do not allow others to do so adequately because they exhibit involuntary movements or even aggressive behavior.

Individuals with special needs show high rates of periodontal disease, dental caries, and have worse levels of care and more teeth with untreated active dental caries; however, they receive far fewer dental treatments than the general population (Silva, 2020).

In the most vulnerable groups, such as people with disabilities, oral health is generally worse than in the general population due to the limitations they have in adopting behaviors that promote or maintain good oral health status (Pereira et al., 2010).

Given this reality, there is a need for the implementation of health education and prevention activities, and the participation of the oral health professional in the rehabilitation and integration of these special patients in the social environment is of utmost importance.

In order to implement any intervention in oral health prevention and promotion, it is first necessary to obtain information to characterize the oral health.

The maintenance of good oral health depends on the individual being able to have good dental hygiene habits, promoting a plaque-free mouth, performing a proper tooth brushing and flossing technique, which allows for a proper hygiene of the tooth surfaces (Sherman et al., 2008).

As individuals have difficulties in performing correct oral hygiene, family members and caregivers of institutions should be guided and taught to perform it.

The improvement of access to oral health care by individuals with special needs has been developed in order to reduce inequalities, due to their characteristics, are the fact that they are more susceptible to oral diseases and have greater difficulty in accessing appointments in this area of health (Silva, 2020).

The level of access to oral health appointments results from multiple factors that may be related to the individual, but also to the service system, to oral health professionals and to the society where they live.

Individual-related barriers focus on the characteristics of people with special needs and the difficulty they have in achieving or maintaining good oral health. The inability to understand, to communicate, anxiety and fear result in reduced access to dental treatment, mainly due to the difficulty of collaboration in consultations.

Regarding satisfaction with oral health services, people with higher education have lower levels of satisfaction, this may be related to greater knowledge about the quality of services and increased expectations. Socioeconomic level is described by several authors as one of the factors that produces more inequalities in access to oral health services (Patel, 2012). People from more advantaged socioeconomic groups access more oral health services and have better oral health status (Silva, 2020).

In Portugal, dentistry is mostly private, which makes it more difficult for family members to bear the costs of appointments and treatments. People with special needs belong to vulnerable groups, which in general have more difficulty in accessing oral health care.

Regarding health attitudes, people who give greater importance to oral health also give greater importance to dental hygiene habits and the need to make oral health appointments, and consequently, have a better oral health (Silva, 2020).

People living in rural areas access oral health services less because they are more isolated and have less oral health services available. Besides being associated with differences in access to oral health services, the place of residence may also influence oral health status.

Regarding the level of independence, there are no studies that allow establishing a relationship between the level of independence in walking and the regular use of oral health services. However, it is understood that associated with a lower degree of independence there may be a lower degree of autonomy to go to appointments.

Regarding the degree of independence in performing dental hygiene, the study by Esteves et al. (2017) found that people with special needs that are more dependent had better oral health status. This result, according to the authors, can be justified by the fact that third parties perform the oral hygiene of the person with special needs more effectively.

This study aimed to characterize the oral health status of a population with special needs from an institution.

2. METHODS

The present work is characterized as a community-based study where a convenience sample was used, having been obtained through a non-probabilistic sampling technique. This sample consisted of institutionalized and non-institutionalized young people from Cerci de Portalegre.

The young people who participated in this study were authorized by their guardians and/or guardians, where the intention of the intervention by the group of students of the 3rd year of Oral Hygiene at ESS/IPP was explained.

Inclusion criteria: For this study, only young people who met the inclusion criteria stipulated by the researchers were included: having special needs, having authorization from the parent/guardian for the intervention, having been observed by the 3rd year Oral Hygiene students.

Exclusion criteria: The young people who were excluded from this study did not meet the following criteria, not being authorized by the parent/guardian, not having been observed by the students of the 3rd year of Oral Hygiene.

Data collection instruments: After obtaining the informed consent of those responsible for the institution and the individuals' legal guardians, as well as the consent of the individuals, the oral cavity was observed to collect the present and past history of dental caries using the DMFT index (decayed, missing and filled teeth index) and the evaluation of bacterial plaque accumulation on the tooth surface using the DI'S index (Debris - bacterial plaque index).

Data collection for this study was conducted by a group of six 3rd year students of the Degree in Oral Hygiene of the School of Health of the Polytechnic Institute of Portalegre.

After the organization of students by pairs, observations and data collection were carried out. Within each pair there was an observer and a recorder and at the end the teacher in charge confirmed the data collected.

For the DMFT Index, which is used to measure the prevalence of dental caries, regarding the number of decayed teeth (D), teeth lost by caries (M) and teeth filled due to caries (F), on the number of observed individuals, a mouth mirror and a probe were used as means of observation aid. According to its evaluation criteria, established by the WHO (WHO, 1997), all teeth present in the oral cavity are observed, assigning a code according to the type of dentition to which they belong. The codes assigned for each permanent tooth were, respectively: 0 - healthy and without clinical evidence of caries, where healthy teeth are considered as white, pigmented or rough spots, fissures without softening, areas with moderate or intense fluorosis and, finally, areas with attrition/abrasion; 1 - decayed and presenting one of the following characteristics: loss of substance, soft cavity or a softened wall. Also considered decayed are teeth that have provisional fillings and have recurrent caries despite being restored or sealed; 2 - restored and carious where there is no distinction between primary and secondary caries, having one or more restored and carious areas; 3 - restored without caries with one or more fillings; 4 - extracted due to caries where they are excluded for other reasons; 5 - absent for other reasons that tooth that extracted due to trauma, periodontal disease, orthodontics or absent for congenital reasons; 6 - sealants on occlusal surface; 7 - bridge abutment, crown or implant; 8 - unerupted applying when there is an unoccupied space; T (for both dentitions) - trauma with loss of part or all of the tooth with no evidence of caries; 9 - not recorded when the tooth cannot be observed due to orthodontic bands, severe hypoplasia or other congenital malformation.

As for the DI'S index it evaluates the presence of soft deposits and consists in the observation of the six teeth (16; 11; 26; 36; 31 and 46). The surfaces are evaluated according to the following criteria: 0 - absence of soft deposits or extrinsic staining; 1 - soft deposits covering no more than one third of the observed surface; 2 - soft deposits present on more than one third, but not more than two thirds of the observed surface; 3 - soft deposits present on more than two thirds of the observed surface.

The Community Periodontal Index (CPI) allows the evaluation of the periodontal condition in terms of bleeding, presence of calculus and pockets (WHO, 1997). The examination is performed with the CPI probe. The mouth is divided into sextants according to the following criteria: 0 - healthy; 1 - presence of bleeding; 2 - presence of calculus; 3 - pockets of up to 5.5 mm; 4 - pockets greater than 6 mm. Each sextant is classified based on the worst situation found.

Statistical analysis: All data collected during the work were statistically analyzed using the SPSS application (Statistical Package for the Social Science) version 26. Descriptive statistics were used to process the collected data, and inferential statistics were applied to study the relationship between the variables and to obtaining significance.

3. RESULTS

Forty individuals were observed, 29 males and 11 females, with a mean age of 35 years. It was observed that these individuals had a mean DMFT (DMFT result = D + M + F (number of teeth) value of 4.7 decayed, missing and filled teeth (figure 1), with no statistically significant difference between gender (p=0.952). The mean number of decayed teeth, missing teeth and filled teeth was 1.4; 0.1 and 3.1 respectively.
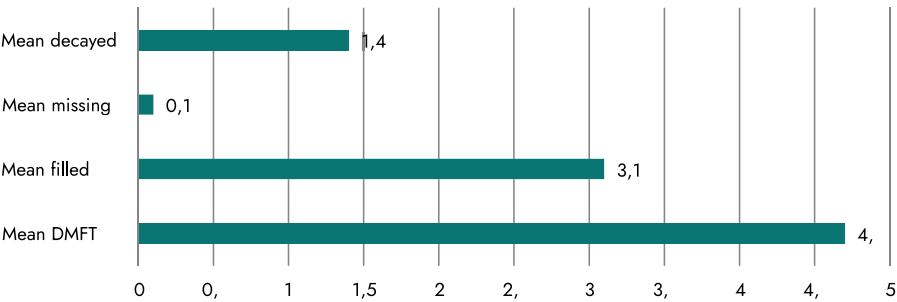
FIGURE 1: MEAN NUMBER OF DECAYED, MISSING AND FILLED TEETH AND DMFT.

When the individuals were evaluated regarding the ID index, only 28 individuals had teeth for this evaluation. The mean DI'S value was 2.02 which represents a high value of bacterial plaque accumulation that, being an etiological factor of oral diseases, indicates a risk of developing oral health problems (figure 2).

CHARACTERIZATION OF THE ORAL HEALTH OF INDIVIDUALS WITH SPECIAL NEEDS AT CERCI PORTALEGRE
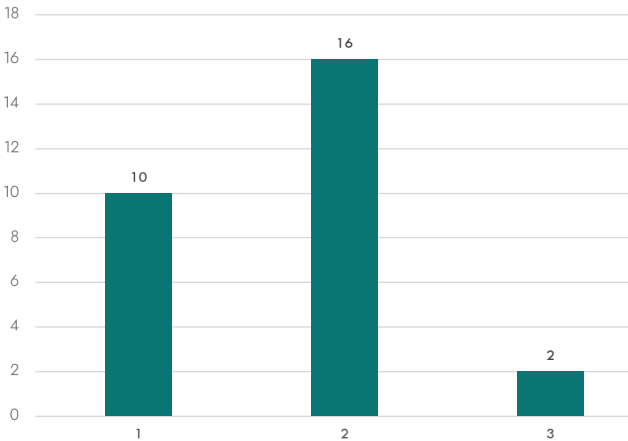
FIGURE 2: DI'S BY INDIVIDUALS.

As for the evaluation of the CPI index, only 34 individuals had dental pieces to perform this. Of the 34 (85%) participants assessed as to CPI it was concluded that the maximum value observed was 3.4 and that the posterior sextants presented on average the worst periodontal situation (figure 3).
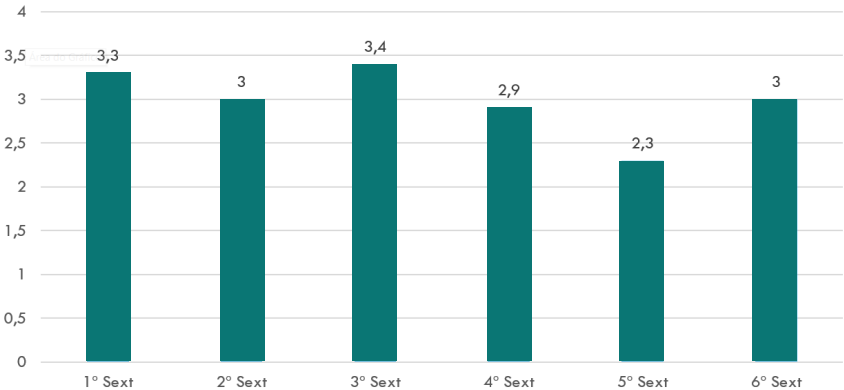
FIGURE 3: AVERAGE CPI BY SEXTANT.

Of the 40 participants 47.5% have manual dexterity to brush their teeth, 67.5% need and allow help to brush, 40% use excessive force and long movements, 22.5% have dental trauma and 17.5% abrasion injuries.

The buccal surfaces of all sextants were the most brushed surfaces by an average of 60% of participants, followed by occlusal surfaces (38%) and lingual surfaces (18%).

4. DISCUSSION

The population of this study was composed of individuals with special needs who attend the Cerci Institution of Portalegre. Although the sample was conducted in only one institution, this study aimed to know the state of oral health in order to establish health-promoting measures.

In this study, we observed that the mean number of decayed, lost and filled teeth was 4.7, which means a high DMFT value, the mean number of decayed teeth was 1.4, the mean number of lost teeth was 0.1, and the mean number of filled teeth was 3.1. When compared to other studies, these results are relatively lower than those of other studies, which showed DMFT values of 8.7 and 7.21, respectively (Pini et al., 2016, Bizarra, 2016). As for the mean number of decayed teeth, the mean number of lost teeth and the mean number of filled teeth also showed lower values compared to the means of the study of Pini (Pini et al., 2016), who obtained the mean number of decayed, lost, and filled teeth of 3.70; 3.85; and 1.17 and (Bizarra, 2016) found the following mean number of decayed, lost, and filled teeth of 1.65; 4.11, and 1.41, respectively.

In relation to plaque accumulation, this study found a DI`S value of 2.02, which means poor oral hygiene; this result is similar to that of Pini et al. The study of Bizarra, (2016) found a value of 1.8 for plaque accumulation.

With regard to the CPI, we concluded that the maximum value observed was 3.4, with the posterior sextants having on average the worst periodontal situation. This is in line with other studies that refer that the posterior sextants are those where individuals have greater difficulty in removing deposits (Pini et al., 2016; Bizarra, 2016).

In the study by Garcez et al., (2012) it was found that inadequate oral hygiene is the main cause of periodontal disease in people with some type of disability, and that there is a relationship between the levels of oral hygiene and the degree of disability.

When oral hygiene habits were studied in our study, we found that 47.5% have manual dexterity to brush their teeth, 67.5% allow help for brushing, 40% use excessive force and long movements, 22.5% have dental trauma and 17.5% present bruxism. The buccal surfaces of all sextants were the most brushed surfaces on average 60% of the participants, followed by occlusal surfaces (38%) and lingual surfaces (18%). Data from the study of Pini et al. (2016) are consistent with our study, most participants had regular oral hygiene, brushing 3 times a day without the help of third parties.

CONCLUSION

The present study aimed to characterize the oral health status of a population with special needs.

Patients with disabilities in most cases require more care at the level of oral health, due to their physical and mental inability to perform correct oral hygiene habits. The prevalence of dental caries, as well as of periodontal diseases and poor plaque control found in the course of the study of the assessment of these individuals may be explained by their inability and lack of dexterity, lack of knowledge of effective oral hygiene practices by those around them, i.e., parents and caregivers, lack of motivation and lack of economic support for treatment needs.

Promoting oral health, - a way to boost awareness of the importance of oral health and the necessity to seek dental health treatment early, - and educational measures may play a relevant role in the studied population for the prevention of oral health problems, and consequently other health problems. The existence of a present and past history of high dental caries and poor oral hygiene and periodontal condition reinforces the need for this intervention.

Although we can learn a lot from this study, and especially from working with the individuals from CERCI Portalegre, there are some limitations:

The few numbers of individuals studied (40), despite being a moderately high number for a small town in Portugal, it still is a small amount to be able to give a concrete conclusion on what measures to take. In Portugal alone there are over 250.000 people physically and/or mentally ill (Pordata, 2001), so in order to give our study a better background, we should invest further in studying and characterizing a greater number of individuals that are affected by these disabilities, whether in private institutions like this one or even in public ones,

There was also a greater number of men, more than double that of women. Woman have a higher risk of developing dental cavities when compared to men (92.66% vs 90.57%) (Ferraro, 2010), in this study that wasn't the case, with both men and women showing no statistically significant difference. And although dental cavities may not represent a statistically significant difference, recent data from the National Health and Nutrition Examination Survey showed that men were more likely to develop periodontal diseases than women (56.4% vs 38.4%), in that way, in future studies we could also identify and determinate what individuals are affected by this disease and what oral health habits and educational measures we could partake on that population.

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SEXUAL KNOWLEDGE AND ATTITUDES AND SEXUAL RISK BEHAVIOURS AMONG COLLEGE STUDENTS

CONHECIMENTOS, ATITUDES E COMPORTAMENTOS SEXUAIS DE RISCO ENTRE ESTUDANTES UNIVERSITÁRIOS/AS **PT**

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CONOCIMIENTOS, ACTITUDES Y COMPORTAMIENTOS SEXUALES DE RIESGO ENTRE ESTUDIANTES UNIVERSITARIOS **ES**

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SEXUAL KNOWLEDGE AND ATTITUDES AND SEXUAL RISK BEHAVIOURS AMONG COLLEGE STUDENTS

ABSTRACT

Several factors, including sexual knowledge and attitudes, influence sexual behaviours among college students. Scientific research suggests that positive information and attitudes regarding condom use and sexually transmitted infections (STI) have a strong association with protective behaviours. This study aimed to analyze knowledge and attitudes about STIs and attitudes towards condom use. This a cross-sectional study with a representative sample of college students (n = 840) in one university in Portugal. A validated self-reported questionnaire was administered to a proportional stratified random sample of students. By analyzing the sexual risk behaviours of sexually active students in the last 12 months, it was found that 18.7% of respondents reported having two or more sexual partners, 60.1% did not always use or almost always a condom and 32.3% had sexual intercourse after ingesting alcohol or consuming illicit psychoactive substances. The level of knowledge about STI transmission is 3.99±1.194 (6 possible correct answers), and the level of attitudes towards STIs and condom use were moderate. University students present gaps in knowledge and attitudes about STIs and condom use that may condition the adoption of protective health behaviours. These results show the importance of promoting health in higher education, especially in the area of sexuality.

Keywords: sexual knowledge, sexual attitudes, sexually transmitted infections, condom use, higher education.

RESUMO

Vários fatores, incluindo os conhecimentos e as atitudes sexuais, influenciam o comportamento sexual entre estudantes universitários/as. As investigações científicas sugerem que informações e atitudes positivas em relação ao uso de preservativos e infeções sexualmente transmissíveis (IST) têm uma forte associação com os comportamentos sexuais de risco. Este estudo teve como objetivo analisar o conhecimento e as atitudes sobre as IST e em relação ao uso do preservativo. Trata-se de um estudo transversal com uma amostra representativa de estudantes universitários (n = 840) de uma universidade em Portugal. Um questionário de autorrelato validado foi administrado a uma amostra estratificada e proporcional de estudantes. Ao analisar os comportamentos sexuais de risco dos/as estudantes sexualmente ativos nos últimos 12 meses, constatou-se que 18,7% dos/as inquiridos/as relataram ter dois ou mais parceiros sexuais, 60,1% não usava sempre o preservativo e 32,3% teve relações sexuais após a ingestão de álcool ou do consumo de drogas ilícitas. O nível de conhecimento sobre a transmissão de IST foi de 3,99 ± 1,194 (6 possíveis respostas corretas), e o nível de atitudes em relação ao IST e ao uso de preservativo foi moderado. Os/as estudantes universitários/as apresentam lacunas no conhecimento e nas atitudes sobre as IST e o uso do preservativo que podem condicionar a adoção de comportamentos de proteção. Esses resultados mostram a importância da promoção da saúde no ensino superior, principalmente na área da sexualidade.

Palavras-chave: conhecimento sexual, atitudes sexuais, infeções sexualmente transmissíveis, uso de preservativo, ensino superior.

SEXUAL KNOWLEDGE AND ATTITUDES AND SEXUAL RISK BEHAVIOURS AMONG COLLEGE STUDENTS

RESUMEN

Varios factores, incluidos los conocimientos y las actitudes sexuales, influyen en el comportamiento sexual entre los estudiantes universitarios. La investigación científica sugiere que la información y las actitudes positivas hacia el uso de condones y las infecciones de transmisión sexual (ITS) tienen una fuerte asociación con el comportamiento sexual de riesgo. Este estudio tuvo como objetivo analizar el conocimiento y las actitudes sobre las ITS y en relación con el uso del condón. Se trata de un estudio transversal con una muestra representativa de estudiantes universitarios (n = 840) de una universidad de Portugal. Se administró un cuestionario de autoinforme validado a una muestra estratificada y proporcional de estudiantes. Al analizar las conductas sexuales de riesgo de estudiantes sexualmente activos en los últimos 12 meses, se encontró que el 18,7% de los encuestados reportaron tener dos o más parejas sexuales, el 60,1% no siempre usó condón y el 32,3% tuvo relaciones sexuales luego de beber alcohol o consumir drogas ilegales. El nivel de conocimiento sobre la transmisión de ITS fue de 3,99 ± 1,194 (6 posibles respuestas correctas) y el nivel de actitudes hacia las ITS y el uso de condones fue moderado. Los estudiantes universitarios tienen lagunas en el conocimiento y las actitudes sobre las ITS y el uso de condones que pueden afectar la adopción de comportamientos protectores. Estos resultados muestran la importancia de la promoción de la salud en la educación superior, especialmente en el área de la sexualidad.

Palabras clave: conocimiento sexual, actitudes sexuales, infecciones de transmisión sexual, uso del condón, educación superior.

INTRODUCTION

The stage of one's life that corresponds to the academic path (re)presents an era of quick changes in the psycho-social development of young people. In this stage, youngsters typically experiment reinforced sensations and emotions which are reinforced by the concept of invulnerability granted by youth (Dutt & Manjula, 2017; Shiferaw et al., 2014), which, when put and acting together along with the concentration of peers and with the absence of paternal supervision (Des Rosiers et al., 2013), exposes young adults to behaviors which constitute a danger and a risk for their health, including sexual ones.

The most recent international data estimates that young people with age ranges between 15 and 24 years are responsible for half of the new sexually transmissible diseases (Centers for Disease Control and Prevention, 2017) and account for almost or nearly/ around 33% of new HIV infections (Joint United Nations Programme on HIV/AIDS, 2018). In Portugal, about 10% of all new infections, in 2017, occurred among young people of ages between 20 and 24, with sexual transmission being the most common way of contracting the disease (Direção-Geral da Saúde & Instituto Nacional de Saúde Doutor Ricardo Jorge, 2019). In this sense, the best way to substantially diminish the prevalence of Sexually Transmissible Illnesses (ISTs) continues to be the reduction of risky sexual behaviors (Gebresllasie et al., 2017; Yang et al., 2019), which is why it is important to fully comprehend or achieve a higher and better understanding of the predictive factors for this type of behavior(s).

In accordance with the findings stemming and arising from scientific investigations, including the most recent ones, and, although it is considered that students attending higher education are fully aware of the risks and preventive mechanisms of/for ITSs, the risky sexual behaviors are (still) highly prevalent (Abiodun et al., 2014; Díaz-Cárdenas et al., 2014; Merki-Feld et al., 2018; Oppong Asante, 2013; Sherab et al., 2019; Shiferaw et al., 2014; Yang et al., 2019). These behaviors encompass initiating sexual activity at an early age, having multiple sexual partners, having sexual relations under the influence of alcohol or drugs and unprotected sex due to failure to use the condom.

Early sexual relations appear in the available scientific literature associated to a higher tendency to having multiple sexual partners and thus higher probabilities of contracting STIs, including HIV (Ma et al., 2009). Sexual relations with multiple partners display a high prevalence among students belonging to higher education, especially when combined with sexual relations carried out after the ingestion of alcohol (Agardh et al., 2011). Although the scientific evidence indicate that the consistent usage of condom reduces up to 80% the risk of HIV infection (Weller & Davis-Beaty, 2002), unprotected sexual relations continue to be at the top in the list of risky sexual behaviors (Castro, 2016; Dolphin et al., 2018; Fairfortune et al., 2020; Folasayo et al., 2017; Golbasi & Kelleci, 2011; Hoffman et al., 2017; Kebede et al., 2018; Magalhães, 2016; Makgale & Plattner, 2017; Mavhandu-Mudzusi & Asgedom, 2016; Pastor & Rojas-Murcia, 2019; Perera & Abeysena, 2018; Santos et al., 2016; SaraçoǦlu et al., 2014; Shapiro et al., 1999; Xu et al., 2019).

Risky sexual behaviors may be attributed to various factors, among which a low level of knowledge about sexuality in general or negative attitudes towards STIs, or the usage of condom. Although the cognitive factor may provide a basis for action (Abiodun et al., 2014; Oppong Asante, 2013), it will not by itself be enough, which means, a higher level of knowledge cannot necessarily guarantee a responsible and safe sexual behavior. Therefore, along with knowledge, attitudes are among the theoretical constructs that more accurately predict sexual behaviors (Fernández Rouco et al., 2018; Salam et al., 2016), functioning as facilitators for changes in sexual behavior.

Scientific research has shown that, in many societies, university students do not possess enough knowledge about sexuality, namely ways of transmitting or preventing STIs (Chen et al., 2016; Dutt & Manjula, 2017; Elias et al., 2017; Evcili & Golbasi, 2017; Fernández Rouco et al., 2018; Mukherjee et al., 2019; Olubola, 2014; Oppong Asante, 2013; Soleymani et al., 2015).

This study aimed to analyze the knowledge about STIs, the attitudes towards STIs and those towards the usage of condom and risky sexual behaviors among university students attending a University in Northern Portugal.

2. METHODS

2.1 SAMPLE
A total of 5447 students were registered in the 1st and 3rd year of integrated bachelors and master's degrees, in the 2018/2019 academic year. For this purpose, a stratified probabilistic sampling of university students was performed according to the year of study (1st and 3rd year) and the scientific area (Human and social sciences, Law and economic sciences, Exact and natural sciences and Engineering sciences).

In this study of transversal nature and scope with a representative sample of university students (n = 840) of a university in Portugal, the data was collected by means of a validated self-report questionnaire, without biochemical confirmation.

2.2 INSTRUMENTS
Nowadays there are multiple scientific instruments duely validated in order to efficiently monitor the prevalence of risky sexual behaviors in university students, such as the National Youth Risk Behavior Survey (CDC, 2017). Similarly, we can also find in the scientific literature various scales developed to analyze the knowledge and attitudes about sexuality present in the Handbook of sexuality-related measures (Davis et al., 1998). Therefore, in order to satisfy the purposes of the present study, we developed a questionnaire, in accordance with the procedures defined by Bowling (1998): building on the scale (1st stage); validation of content (2nd stage); psychometric validation (3rd stage). The preliminary version of the questionnaire was applied to a sample of 32 students, which was not included in the final sample.

In the questionnaire, we included socio-demographic variables (sex, age, scientific area, academic year, weight and height (to calculate the BMI), romantic status, professional situation and current residence) and specific questions related to:

- Risky sexual behaviors: Having sexual relations; Age of the 1st sexual relation; Number of sexual partners in the last 12 months; Usage of condom in the last 12 months; Having sexual relations after the ingestion of alcohol in the last 12 months;

- Knowledge about the STIs: scale of 6 items with the following answering options — True, False, I Don't Know.

- Attitudes related to the knowledge about risky sexual behaviors: scale composed by 5 items (Perception of STIs - 3 items and Perception regarding usage of condom — 2 items) in a Likert scale of 5 points (1 — I totally disagree, 5 — I totally agree).

2.3 PROCEDURES AND STATISTICAL ANALYSIS
All students belonging to the courses selected for the stratified sampling were personally invited to take part in the study. At the end of a class, randomly selected, belonging to the respective courses, the objectives of the study were presented and after informed consent

(with information about confidentiality, anonymity and voluntary participation), the students filled a questionnaire in paper format, in the context of the classroom. The answer rate was of 96.2% (95% CI 94.8-97.6), 33 questionnaires were excluded because they had not been answered or were incorrectly filled. This way, a total of 873 university students were invited.

All ethical procedures regarding research with human beings referred to by Christensen, Johnson and Turner (2015) were complied with and the study was approved by the Ethics Commission of the University.

The data was analyzed by means of statistical software, namely IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, NY, USA). The results show the analysis of the frequencies and the contingency tables, as well as the execution of tests of statistical inference, such as Pearson's correlation, the Chi-Square test and independence tests such as t-student and single-directional unity (ANOVA).

The linear generalized model was developed including only the variables which showed to have a statistically significant effect in the probability of resulting in risky sexual behaviors. A significance level of 0.05 was given.

Risky sexual behaviors were defined as: having had sexual relations at 16 years of age or less; having two or more sexual partners in the last 12 months; failing to always use condom during the sexual relation in the last 12 months; having sexual relations after the ingestion of alcohol in the last 12 months. We classified and categorized the questions according to a binary method, attributing 1 point to those who reported had these risky sexual behavior.

For the knowledge scale, the number of correct answers was added in order to provide us with a general figure for knowledge, which means that the higher the number in the scale, the higher the level of knowledge is.

The scale regarding perceptions of STIs made up of 3 items varies between 3 and 15 and the scale of perceptions of condom usage is composed of 2 items, varying between 2 and 10, with the highest figure attributed to the sum of the items meaning the more negative the attitudes of university students will be regarding STIs and the usage of condom.

3. RESULTS

The sample is composed of 464 students attending the 1st year (55.2%) and 302 students (36.0%) are enrolled in engineering courses. 376 students in the 3rd year (44.8%). The majority of enquired students was female (55.4%), was not currently in a romantic affair (58.3%), had changed their residence after entering Higher Education (64.9%), was a full-time student (88.8%) and had an BMI corresponding to the normal weight (73.1%). The average age of the sample is 20.78 (SD = 4.221).

Results show that the majority of university students (65.6%) was sexually active, with a higher prevalence of sexually active students frequenting the 3rd year (73.4%) and in the group of older students (75.5%) when compared to students in the 1st year (59.3%) and younger ones (52.1%) ($\chi2$ (1) = 18.393, p = .000; $\chi2$ (1) = 49.524, p = .000, respectively). Moreover, we noted that at the moment of data-gathering the students that had a romantic relationship (91.9%) were more sexually active and students who had no romantic partner (46.3%) ($\chi2$ (1) = 186.081, p = .000). We also found that students who worked and studied (87.1%) were also more sexually active than full-time students (62.8%) ($\chi2$ (1) = 21.603, p = .000). (Table 1).

SEXUAL KNOWLEDGE AND ATTITUDES AND SEXUAL RISK BEHAVIOURS AMONG COLLEGE STUDENTS

		BEING SEXUALLY ACTIVE			EARLY SEXUAL RELATIONS			SEXUAL RELATIONS WITH MULTIPLE PARTNERS			UNPROTECTED SEXUAL RELATIONS			SEXUAL RELATIONS UNDER THE EFFECT OF ALCOHOL		
		f	%	p	f	%	p	f	%	p	f	%	p	f	%	p
Academic Year	1st year	275	59.3	***	109	41.1	ns	60	21.9	ns	166	60.8	ns	73	26.7	**
	3rd year	276	73.4		104	38.0		43	15.6		163	59.5		104	37.8	
Scientific Area	Engineering Sciences	191	63.2	ns	70	36.6	ns	25	13.0	ns	107	56.0	ns	66	34.7	ns
	Exact and Natural Sciences	80	58.8		31	40.8		15	18.8		45	56.3		19	23.8	
	Jurisdictional and Economic Sciences	94	71.2		43	46.7		22	23.7		64	68.8		30	32.3	
	Social and Human Sciences	186	68.9		69	38.3		41	22.2		113	61.7		62	33.5	
Sex	Male	259	69.1	ns	110	42.8	ns	52	20.2	ns	148	57.6	ns	94	36.7	*
	Female	292	62.8		103	36.5		51	17.5		181	62.4		83	28.4	
Age	< 20	185	52.1	***	77	42.5	ns	36	19.5	ns	102	55.4	ns	46	25.0	**
	>= 20	366	75.5		136	38.0		67	18.4		227	62.5		131	36.0	
Romantic relationship	Yes	319	91.9	***	126	40.5	ns	32	10.1	***	197	61.9	ns	92	28.9	*
	No	225	46.3		86	38.9		70	31.1		128	57.7		83	37.2	
Residence	Dislocated	202	69.4	ns	74	37.4	ns	52	25.7	***	119	59.2	ns	87	43.3	***
	Not dislocated	340	63.3		134	40.4		49	14.5		203	60.2		88	26.0	
BMI	Low weight	33	56.9	ns	13	41.9	ns	6	18.2	ns	20	60.6	ns	8	24.2	ns
	Normal weight	388	64.8		143	37.7		77	19.8		235	60.7		133	34.4	
	Excessive weight	117	72.2		53	45.7		20	17.2		68	59.1		33	28.7	
Professionl situation	Full-time student	464	62.8	***	176	38.4	ns	87	18.8	ns	265	57.5	**	151	32.7	ns
	Working-student	81	87.1		35	46.1		16	20.0		61	76.3		25	31.3	
Total		551	65.6		213	39.5		103	18.7		329	60.1		177	32.3	

* p < .05; ** p < .01; *** p < .001; ns — not significant

TABLE 1- PREVALENCE AND CHI-SQUARE TEST OF RISKY SEXUAL BEHAVIORS DEPENDING ON SOCIO-DEMOGRAPHIC CHARACTERISTICS

The students who initiated their sexual life at an early age corresponded to 39.5% of the sexually active students. No statistically significant differences were found between an early start of sexual relations and the socio-demographic characteristics of the enquired students.

Sexual relations with multiple partners was the risky sexual behavior with the lesser prevalence among sexually active students, even though 18.7% of university students had 2 or more sexual partners in the last 12 months. The students who were not in a romantic relationship (31.1%) and those who had changed residence after entering higher education (25.7%) were the ones who presented a higher proportion of multiple partners in comparison with the students who were in a romantic relationship ($\chi2$ (1) = 38.265, p = .000) and were physically dislocated ($\chi2$ (1) = 10.623, p = .001)., respectively.

The unprotected sexual relations were carried out by the majority of sexually active students (60.1%). This unprotected practice was more relevant among working-students (76.3%) than among full-time students (57.5%) (χ^2 (1) = 10.025, p = .002).

About a third of the sexually active students revealed having already had sexual relations after the consumption of alcohol in the last 12 months (32.3%). The observation of table 1 showed that older students (36%) and those frequenting the 3rd year (37.8%) acknowledged this type of practice more frequently when compared with the students belonging to a younger age group (χ^2 (1) = 6.749, p = .009) and those attending 1st year (χ^2 (1) = 7.689, p = .006), respectively. Similarly, statistically significant differences were identified between sexual relations under the effect of alcohol and the variables sex, romantic partnership and residence. Therefore, boys (36.7%), those who were in a romantic relationship (37.2%) and the ones who were dislocated from their usual residence (43.3%) showed a higher percentage of this type of risky sexual behavior when compared to girls (χ^2 (1) = 4.291, p = .038), students not in a romantic relationship (χ^2 (1) = 4.115, p = .042) and students who did not change their residence after entering higher education (χ^2 (1) = 17.102, p = .000), respectively.

Calculating the bi-varied correlation between the different risky sexual behaviors demonstrated the following: early sexual relations with multiple partners (r_{sp} = .111, p < .01), unprotected sexual relations (r_{sp} = .103, p < .05) and sexual relations under the effect of alcohol (r_{sp} = .124, p < .01). Moreover, sexual relations with multiple partners are positively correlated with sexual relations under the effect of alcohol (r_{sp} = .307, p < .01). Generally, university students displayed, on average, 1.50 ± 1.071 risky sexual behaviors, with 57.1% of sexually active students referring 2 or more behaviors of this type and 17.8% of students referring engaging in no risky sexual behavior.

The level of knowledge about sexuality was of 3.99 ± 1.194 correct answers, varying between 0 and 6 correct answers, allowing us to conclude that university students display a moderate level of knowledge.

An analysis of table 2 indicated the existence of statistically significant difference between the level of knowledge and the scientific area of study, the professional situation and the practice of sexual relations under the effect of alcohol. In this sense, students attending courses in the area of exact and natural sciences possess a level of knowledge higher than that of students belonging to engineering sciences courses (Z (3,824) = 3.590, p = .013). Working-students responded, on average, correctly to more questions than full-time students (t (818) = -2.046, p = .041). Finally, students who had sexual relations after ingesting alcohol displayed more knowledge than those who reported not having engaged in that type of behavior (t (539) = -2.159, p = .031).

SEXUAL KNOWLEDGE AND ATTITUDES AND SEXUAL RISK BEHAVIOURS AMONG COLLEGE STUDENTS

		LEVEL OF KNOWLEDGE ABOUT STIS			PERCEPTION OF STIS			PERCEPTION OF THE USAGE OF CONDOM		
		M	DP	p	M	DP	p	M	DP	p
Academic Year	1st year	4.03	.056	ns	6.53	2.119	ns	5.28	1.767	**
	3rd year	3.94	.061		6.55	2.216		5.64	1.823	
Scientific Area	Engineering Sciences	3.82	.076	*	6.59	2.237	ns	5.75	1.672	***
	Exact and Natural Sciences	4.18	.089		6.27	1.989		5.23	1.710	
	Jurisdictional and Economic Sciences	4.07	.102		6.57	2.165		5.44	1.930	
	Social and Human Sciences	4.04	.070		6.60	2.159		5.19	1.871	
Sex	Male	3.91	.065	ns	6.72	2.268	*	5.76	1.721	***
	Female	4.05	.053		6.39	2.062		5.18	1.822	
Age	< 20	4.01	.063	ns	6.52	2.063	ns	5.13	1.752	***
	>= 20	3.97	.055		6.56	2.234		5.67	1.802	
Romantic Relationship	Yes	4.09	.062	ns	6.49	2.214	ns	5.72	1.939	***
	No	3.93	.055		6.57	2.138		5.23	1.675	
Residence	Dislocated	3.98	.069	ns	6.43	2.067	ns	5.45	1.770	ns
	Not dislocated	4.01	.052		6.57	2.190		5.42	1.824	
BMI	Low weight	4.10	.147	ns	6.23	1.832	ns	5.53	1.670	ns
	Normal weight	3.98	.048		6.53	2.112		5.43	1.818	
	Excessive weigt	4.01	.099		6.76	2.418		5.56	1.769	
Professional situation	Full/time student	3.96	.045	*	6.54	2.140	ns	5.41	1.781	ns
	Working student	4.23	.105		6.57	2.312		5.73	1.973	
Being sexually active	Yes	4.04	.051	ns	6.53	2.203	ns	5.75	1.892	***
	No	3.89	.071		6.56	2.085		4.84	1.432	
Early sexual relations	No	4.05	.063	ns	6.55	2.084	ns	5.62	1.787	ns
	Yes	4.02	.089		6.55	2.381		5.94	2.000	
Sexual relations with multiple partners	No	4.04	.055	ns	6.44	2.204	ns	5.69	1.871	ns
	Yes	4.08	.124		6.90	2.182		6.04	1.970	
Unprotected sexual relations	No	4.12	.076	ns	6.55	1.997	ns	5.11	1.657	***
	Yes	4.00	.068		6.54	2.329		6.19	1.917	
Sexual relations under the effect of alcohol	No	3.97	.065	*	6.54	2.321	ns	5.63	1.806	*
	Yes	4.21	.079		6.49	1.936		6.01	2.050	
	Total	3.99	1.194		6.54	2.162		5.44	1.800	

* p < .05; ** p < .01; *** p < .001; ns − not significant

TABLE 2- AVERAGE, PATTERN DEVIATION AND INDEPENDENCE TESTS (ANOVA AND T-STUDENT) FOR THE SOCIO-DEMOGRAPHIC CHARACTERISTICS AND THE RISKY SEXUAL BEHAVIORS DEPENDING ON THE KNOWLEDGE ABOUT STIS AND THE PERCEPTION OF STIS AND CONDOM USAGE

The perceptions of university students regarding STIs and the usage of condom showed themselves to be moderate, with the average of scales being 6.54 ± 2.162 and 5.44 ± 1.800, respectively. However, we did not identify any statistically significant correlation between the variables previously referred to.

Regarding the perceptions of STIs, we verified the existence of differences in the perception of boys and girls. Which means, boys displayed a more negative level of perception regarding STIs when compared to girls $(t (823) = 2.156, p = .031)$ (Table 2).

In what concerns the scale of perceptions towards usage of condom, we identified differences depending on certain socio-demographic characteristics. The students who were attending the 3rd academic year and older students displayed a higher average when compared to students in the 1st year $(t (829) = -2.844, p = .005)$ and younger students $(t (829) = -4.280, p = .000)$, respectively. This means that the first possess more unfavorable perceptions towards the usage of condom. In the same sense, students attending courses in the area of scientific sciences present more negative attitudes regarding condom usage, when compared to students of the social and human sciences and exact and natural sciences areas $(Z (3,827) = 5.454, p = .001)$. Regarding boys and students who were in a romantic partnership, a higher average is shown in the scale of perceptions of when compared to girls $(t (829) = 4.676, p = .000)$ and to the students who were not in a romantic partnership $(t (822) = 3.850, p = .000)$.

Regarding sexual behaviors, sexually active students who, in the last 12 months, had unprotected sexual relations and engaged in sex after consuming alcoholic beverages displayed more unfavorable perceptions towards the usage of condom when compared to students who never had sexual relations $(t (829) = 7.171, p = .000)$, those who did not have unprotected sexual relations $(t (539) = -6.767, p = .000)$ nor under the effect of alcohol $(t (540) = -2.203, p = .028)$.

In the model, the variables which had a statistically significant effect in the model were: Perceptions regarding the usage of condom $(G2 (1) = 30.541, p = .000)$; being in a romantic partnership $(G2 (1) = 6.135, p = .013)$ and current residence $(G2 (1) = 7.102, p = .008)$ (Table 3).

		B	ERROR	X2 WALD	DF	P	EXP(B)	95% CI	
Intercept		.795	.1592	24.936	1	.000	2.214	1.621	3.024
Romantic relationship	Yes	-.229	.0924	6.135	1	.013	.795	.664	.953
	No	0a					1		
Current residence	Yes	.251	.0941	7.102	1	.008	1.285	1.069	1.545
	Not dislocated	0a	.	.		.	1	.	.
Perception of Condom Usage		.132	.0239	30.541	1	.000	1.141	1.089	1.196

ᵃ Reference category

OR: odds ratio; 95 CI: 95 confidence interval

TABLE 3 - ADJUSTED ODDS RATIO (OR) AND CONFIDENCE INTERVALS OF 95 (CI) OF THE LINEAR GENERALIZED MODEL FOR PREDICTING RISKY SEXUAL BEHAVIORS

The model accurately predicted that university students who had a romantic partnership and had changed their residence after entering higher education had a lesser propensity towards engaging in risky sexual behaviors. Moreover, the more negative the perceptions regarding condom usage, the greater the probability will be of students engaging in risky sexual behaviors.

4. DISCUSSION

This study evaluated the knowledge, perceptions and risky sexual behaviors of students attending a university in Northern Portugal, demonstrating, based on the results and the discussion presented later on, the need for higher education institutions to develop socio-educational programs with education in sexuality content.

The results of this study corroborate the results of the national study done about the same topic (Santos et al., 2016) and, in the same way as in international studies, the majority of university students was sexually active (Fernández-Silva & Sánchez-Martínez, 2018; Kebede et al., 2018; Leon-Larios & Macías-Seda, 2017; Mavhandu-Mudzusi & Asgedom, 2016; Shapiro et al., 1999; Spindola et al., 2019; Villafañe-Ferrer & González-Navarro, 2017)

Generally, potentially risky sexual behaviors were reported by 82.2% of sexually active university students. This high level of prevalence of risky sexual behaviors is corroborated by the findings of recent studies carried out with students of Higher Education (Sherab et al., 2019; Yang et al., 2019), although a systematic review of the literature with Ethiopian university students estimates a prevalence ranged from 23.3% to 60.9% (Amare et al., 2019). However, this review only considered risky sexual behavior the unprotected vaginal, oral, or anal intercourse.

The inconsistent usage of condom during sexual relations was the analyzed risky behavior with the highest prevalence among university students. The ones enquired in this study, just like the university students recently enquired in the context and scope of studies carried out by others, reported an inconsistent usage of condom in the majority of sexual relations (Castro, 2016; Dolphin et al., 2018; Fairfortune et al., 2020; Folasayo et al., 2017; Golbasi & Kelleci, 2011; Hoffman et al., 2017; Kebede et al., 2018; Magalhães, 2016; Makgale & Plattner, 2017; Mavhandu-Mudzusi & Asgedom, 2016; Pastor & Rojas-Murcia, 2019; Perera & Abeysena, 2018; Santos et al., 2016; SaraçoĞlu et al., 2014; Shapiro et al., 1999; Xu et al., 2019).

Factors increasing young people's vulnerability to infection include poverty (Amare et al., 2019), characteristic of developing countries. However, the practice of unprotected sexual relations seems to be transverse to all university students, regardless of the country and its culture.

The majority of enquired individuals had started their sexual lives at 17 years of age or less, as in other investigations (Shapiro et al., 1999; Spindola et al., 2019; Villafañe-Ferrer & González-Navarro, 2017), showing that entering higher education tends to co-occur with the age of the first sexual experience or occurs during the academic path (Ma et al., 2009; Mavhandu-Mudzusi & Asgedom, 2016). On another note, it is necessary to point out that a minimum of about 40% university students reported already having had sexual relations before enrolling in university (Magalhães, 2016; Rodríguez Carrión & Isabel Traverso Blanco, 2012).

Although some studies (Askun & Ataca, 2007; Mukherjee et al., 2019) demonstrate a tendency for boys to become sexually active at an earlier age than girls, the results obtained did not produce evidence of these differences (Mavhandu-Mudzusi & Asgedom, 2016; SaraçoĞlu et al., 2014).

Sexual relations under the effect of alcohol in the last year were reported by 32.3% of university students, which, although comprising what can easily be considered a high prevalence, is lower than the majority of analyzed studies (18.9% - Makgale & Plattner, 2017; 25.20% - Mavhandu-Mudzusi & Asgedom, 2016; 27.1% - Gebresllasie et al., 2017; 39.9% - Magalhães et al., 2016; 33.0% - Santos et al., 2016; 55% - Villafañe-Ferrer & González-Navarro, 2017; 56.3% - Á. Castro, 2016; 56.8% - Leon-Larios & Macías-Seda, 2017; 64.2% - Golbasi & Kelleci, 2011).

Sexual relations with multiple partners is one of the most important factors associated to STIs (Chen et al., 2016), however, in the last 12 months, this risky behavior was reported by 18.7% of university students. Analogous results were shown in international studies (Ma et al., 2009; Mavhandu-Mudzusi & Asgedom, 2016; Peltzer et al., 2016; Yi et al., 2018), in which, for example, 12.9% of students reported having had more than one sexual partner in the last six months (Magalhães, 2016), 26.2% of the enquired ones reported having had two or more sexual partners in the three months prior to the study (Makgale & Plattner, 2017) and the majority had already had more than one sexual partner in their lives (Spindola et al., 2019). Other international studies showed higher percentages of sexual relations with multiple partners (59.3% - Golbasi & Kelleci, 2011; 64.4% - Kebede et al., 2018; 66.7 % - A. T. Folasayo et al., 2017). Although in the present study we did not specify the type of sexual partners, a national study showed that a considerable proportion of students reported having had sexual relations with occasional partners (32.0%) (Santos et al., 2016).

Although globally the gender of the enquired individuals does not predict the risky sexual behaviors (Makgale & Plattner, 2017), when they are analyzed separately, boys reported the practice of sexual relations after the ingestion of alcohol more frequently when compared to girls, and we found existing studies which provide similar data and evidence or results (Hoffman et al., 2017). In the same sense, contrary to what was to be expected, due to the fact that it was verified in various studies (Amare et al., 2019; Chi et al., 2012; Gebresllasie et al., 2017; Hoffman et al., 2017; Leon-Larios & Macías-Seda, 2017; Magalhães, 2016; Mavhandu-Mudzusi & Asgedom, 2016; Perera & Abeysena, 2018; Sherab et al., 2019; Yi et al., 2018), no statistically significant differences were identified in the usage of condom and the number of sexual partners between girls and boys.

The current scientific investigations revealed other correlations, namely between unprotected sexual relations and sexual relations under the effect of alcohol (Castro, 2016; Chanakira et al., 2014; Magalhães, 2016; Ssewanyana et al., 2015) and between unprotected sexual relations and having multiple sexual partners (Makgale & Plattner, 2017; Sherab et al., 2019), although the data arising from the present study does not corroborate these findings (Leon-Larios & Macías-Seda, 2017; Peltzer & Pengpid, 2015).

Students attending Higher Education displayed a moderate level of knowledge of STIs (Folasayo et al., 2017; Santos et al., 2016; Sohbet & Geçici, 2014; Soleymani et al., 2015; Villafañe-Ferrer & González-Navarro, 2017), showing a higher level of knowledge than the one registered in other studies (Chen et al., 2016; Dutt & Manjula, 2017; Elias et al., 2017; Evcili & Golbasi, 2017; Fernández Rouco et al., 2018; Mukherjee et al.,

2019; Olubola, 2014; Soleymani et al., 2015). Even so, the results showed that a lot of that knowledge remains superficial and full of myths (Dutt & Manjula, 2017; Spindola et al., 2019; Xu et al., 2019). Mukherjee and colleagues (2019) refer that the fact that the main source of information is the group of peers could in part account for high indexes of wrong information transmitted.

Previous studies had already demonstrated that women had better knowledge (Folasayo et al., 2017; Fonte et al., 2018; Leon-Larios & Macías-Seda, 2017; Oppong Asante, 2013; Santos et al., 2016; SaraçoǦlu et al., 2014; Shu et al., 2016; Sohbet & Geçici, 2014), however, in the present study, we did not identify those differences, with the average of correct answers given by boys and girls being identical.

Unlike what was verified in other researches in this area (Evcili & Golbasi, 2017; Folasayo et al., 2017; Fonte et al., 2018; Oppong Asante, 2013; Reis et al., 2013; Sohbet & Geçici, 2014; Soleymani et al., 2015), in which it was determined that the level of knowledge increases with age, this associated was not identified (Leon-Larios & Macías-Seda, 2017).

Similarly to what was verified in the study by Santos, Ferreira and Santos (2016), the scientific area of study also influence the knowledge of students. In accordance with these authors, those who have an education in the areas of life and health sciences displayed a higher level of knowledge. In the present study, however, the students belonging to exact and natural sciences were the ones who displayed more knowledge about STIs.

The perceptions of STIs were moderate, as is consistently reported in the literature (Santos et al., 2016; Sohbet & Geçici, 2014). In this context, international scientific research and investigations reported that youngsters, in a general way, consider it unlikely to contract STIs or HIV (Amare et al., 2019; Haile et al., 2017; Olubola, 2014; Rojas-Murcia et al., 2015), which means that they indicated a low level of perception of the susceptibility to risk. Therefore, the programs for prevention of STIs in the academic context must continue to address STIs and their ways of transmission (Haile et al., 2017).

The average scores attributed to the perception of STIs among male students was higher than those attributed to female ones (Evcili & Golbasi, 2017; Fernández-Silva & Sánchez-Martínez, 2018; Leon-Larios & Macías-Seda, 2017), showing perceptions considered to be more unfavorable towards these infections.

The perceptions regarding the usage of condom, although also moderate, with an obtained average which was only slightly higher than the average point of the scale, implies unfavorable perceptions. As can be verified in the study carried out by Shapiro and colleagues (1999), university students tend to agree that the usage of condom makes sexual relations less pleasant and that those who are in a stable and long-lasting relationship does not need to use a condom. In the same sense, more recent investigations report that many university students believed that condoms reduced pleasure during the sexual relation(s) (Mukherjee et al., 2019) and that the trust put on sexual partners and the stability of romantic relationships justified the absence of the usage of condom (Pastor & Rojas-Murcia, 2019).

In accordance with a systematic review of the existing literature carried out by Kabwama and Berg-Beckhoff (2015), inconsistent results can be observed regarding the correlation between knowledge about HIV and the perception of risk among university students. And the other studies which explicit a lesser degree of knowledge concluded that this fact was directly associated to a higher prevalence of risky sexual behaviors (Li et al., 2017; Perera & Abeysena, 2018; Shapiro et al., 1999). This way, although knowledge is obviously essential for young people to make informed and responsible decisions, one cannot

ignore their inability to understand the risk even when they possess a good or fair level of knowledge. And for that reason, in a general way, this study demonstrated that the level of knowledge is not directly correlated with the perceptions and risky behaviors (Dutt & Manjula, 2017; Xu et al., 2019).

As happened in previous studies (Santos et al., 2016; Yang et al., 2019), the perceptions regarding the usage of condom were a prominent predictor of risky sexual behaviors. Moreover, it is necessary to consider and take into serious account the students who changed their residence at the time of enrolling in higher education and the students who are not in a romantic partnership or relationship, due to the fact that these groups of students have a higher probability of engaging in risky sexual behaviors.

CONCLUSIONS

This present study evaluated the knowledge and the perceptions of STIs and the risky sexual behaviors in the context of Higher Education. University students displayed a high prevalence of risky behaviors, such as unprotected sexual relations, those engaged upon under the effect of alcohol or with multiple sexual partners. The level of knowledge and the perceptions about STIs and the usage of condom was moderate, although we did not detect any correlation between these variables.

Among the predictors, or predictive factors, variables such as the perceptions regarding the usage of condom, having a romantic relationship or the current residence were statistically significant and directly correlated with the inconsistency of condom usage, multiple sexual partners, practicing sexual relations after the ingestion of alcohol and early sexual relations.

This study made it possible to further understand the factors that constitute an influence towards risky sexual behaviors among higher education students, and to conclude that understanding those factors is indeed of invaluable importance, not only for their predictive character, but also because the development of educational programs on sexuality may significantly improve when these interactions are subject to scientific study and known. In this sense, the data gathered in this investigation reinforces the need for higher education institutions — also due to the fact that the beginning of sexual activity usually occurs during the academic period — to incorporate debates on sexuality, to include in their curricular component actual educational content dealing specifically with the subject of sexuality and the prevention of STIs, in order to enable youngsters and young university students in general to make conscious and responsible decisions.

Two limitations should be taken into account. Firstly, it should be noted that the data-gathering was carried out in only one university, and for that reason transversal data make it more difficult to generalize the data provided by other Portuguese universities. And, secondly, the data-gathering was carried out by resorting to the appliance of a self-report questionnaire and taking into account the sensible character of the topic, students may have over or under-reported their sexual behaviors in their accounts or answers.

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