Pre-Exposure Prophylaxis for Human Immunodeficiency Virus in the Medical Curricula in Portugal: A Cross-Sectional Analysis

Profilaxia Pré-Exposição para o Vírus da Imunodeficiência Humana no Currículo Médico em Portugal: Uma Análise Transversal

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ABSTRACT

Introduction: Pre-exposure prophylaxis (PrEP) has gained relevance as a method of prevention for HIV in certain people and settings. Following the publication of the guideline on PrEP prescribing in Portugal, we aimed to assess the knowledge of Portuguese Medical Students about PrEP.

Material and Methods: An online survey was sent to Medical students of Portuguese Medical Schools. We conducted a descriptive analysis of the results and an analytic cross-sectional study to identify factors associated with "knowing about PrEP", "having had one class about PrEP" and "identifying eligible groups correctly".

Results: Of the 796 students that responded to the survey, 64.6% were aware of what PrEP is. Of these, 34.44% acquired this knowledge during their training. Out of the total amount of respondents, 4.77% could identify correctly and completely the eligible groups for PrEP. As the training years went by, the probability of being aware of PrEP, having had one class about PrEP, and identifying the eligible groups correctly, increased. Of the sixth-year students, 43.48% had had one class about PrEP and among the students that were aware of PrEP, 28% identified what the eligible groups were. After adjusting for the school year, we found differences between Medical Schools regarding the outcomes. The association between the different ways of knowing about PrEP and the ability to correctly identify eligible groups for PrEP was not statistically significant.

Conclusion: The differences between Medical Schools could be harmonized through changes in the medical curricula that would allow for this topic to be addressed more often.

Keywords: HIV Infections/prevention & control; Pre-Exposure Prophylaxis; Students, Medical; Surveys and Questionnaires

RESUMO

Introdução: A profilaxia pré-exposição (PrEP) ganhou relevância como método de prevenção do VIH em determinados indivíduos e contextos. Após a entrada em vigor das normas para prescrição em Portugal, pretendemos aferir o conhecimento em relação à PrEP entre os estudantes de Medicina em Portugal.

Material e Métodos: Foi enviado um questionário *online* aos estudantes de Medicina das escolas médicas portuguesas. Foi feita uma análise descritiva dos resultados e um estudo transversal analítico para identificar fatores associados a "conhecer a PrEP", "ter tido uma aula de PrEP", e "identificar grupos elegíveis corretamente".

Resultados: Dos 796 estudantes que responderam, 64,6% sabiam o que era a PrEP. Destes, 34,44% obtiveram conhecimento sobre a mesma durante a sua formação. Entre os respondentes, 4,77% identificaram correta e completamente os grupos elegíveis. Com o avançar do ano letivo, a probabilidade de conhecer a PrEP, ter tido uma aula de PrEP e identificar os grupos corretamente aumentava. No sexto ano, 43,48% tinham tido uma aula sobre PrEP e entre os que conheciam a PrEP, 28% identificaram os grupos elegíveis. Existem diferenças entre as escolas médicas após ajustamento para o ano letivo em relação aos resultados obtidos. A forma como se tomou conhecimento da PrEP não alterou de forma estatisticamente significativa a capacidade de identificar corretamente grupos elegíveis.

Conclusão: As diferenças entre as escolas médicas poderão ser harmonizadas. Esta temática poderá ser reforçada nos respetivos currículos.

Palavras-chave: Estudantes de Medicina; Infecções por HIV/prevenção e controlo; Inquéritos e Questionários; Profilaxia Pré-Exposição

INTRODUCTION

A Human immunodeficiency virus (HIV) pre-exposure prophylaxis (PrEP) is a medicine therapy regimen involving the use of a combination of two antiretroviral drugs, tenofovir and emtricitabine, aimed at reducing the risk of HIV permanent infection in individuals exposed to the virus.[1]

The Portuguese authorities' guidelines on PrEP were

1. Grupo de Trabalho em Saúde Sexual e Reprodutiva 2020. Associação Nacional de Estudantes de Medicina. Porto. Portugal.
2. Grupo de Trabalho em Saúde Sexual e Reprodutiva 2019. Associação Nacional de Estudantes de Medicina. Porto. Portugal.
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described in Order no. 4835/2017 of June 2, 2017, presenting this as a safe and effective way to reduce HIV transmission up to 90% in vulnerable population groups, namely in the population of men who have sex with men (MSM), in heterosexual serodiscordant couples and in injecting drug users (IDU).[2]

The Standard 025/2017 was published by the *Direção Geral da Saúde* - Directorate-General of Health (DGS) in 11/28/2017, on the use of PrEP in adults, aimed at people at higher risk. This standard provided the required criteria for referral to a hospital specialty consultation, data on clinical assessment and other preventative measures underlying the decision to prescribe PrEP.[3]

The access to PrEP is exclusively made available to patients through a hospital consultation, upon medical referral. People within one of the following categories should be referred to this consultation: (i) sexual intercourse without the use of condoms within the past six months with people with unknown HIV serological status or diagnosed with sexually transmitted infections (STI); (ii) sexual intercourse with an HIV-infected partner with no medical follow-up or without antiretroviral therapy or without virological suppression and without regular condom use; (iii) sexual intercourse under the effect of psychoactive substances; (iv) IDUs sharing needles, syringes or material to prepare them; (v) serodiscordant couples within preconception stages or during pregnancy; (vi) sexual intercourse to obtain money, goods or illicit substances without the use of a condom; (vii) social vulnerability with exposure to unprotected sex with individuals at high risk of HIV infection; (viii) previous use of post-exposure prophylaxis (PEP).[3]

With the efforts developed by the DGS, through the National Program for HIV Infection and Acquired Immunodeficiency Syndrome (AIDS) and by different non-governmental organizations (NGOs), the incidence rate of HIV infection was reduced by 46% and the number of AIDS cases by 67% between 2008 and 2017. However, a high rate of new cases of HIV infection and AIDS still exist in Portugal, when compared to other Western European countries. Still, when it comes to the 90-90-90 Targets, a favourable outlook remains in Portugal. The commitment made for 2020 was reached in Portugal in 2017, including the three targets defined by the Joint United Nations Programme on HIV/AIDS (UNAIDS): people living with HIV (PLHIV) were diagnosed - 92.2%; PLHIV who were diagnosed were on treatment - 90.2%; PLHIV who were diagnosed, were on treatment and showing virological suppression - 93.0%.[4]

An adequate training of medical students on this subject is a very relevant aim.[3] After a literature review, the studies on training in this subject in medical students were considered insufficient by the *Associação Nacional de Estudantes de Medicina* - National Association of Medical Students (ANEM) in 2018, after the publication of DGS Standard number 025/2017. The integration of the PrEP approach in the standard curriculum of the different medical schools (MS) was not universally adopted.

An American study published in February 2020 has shown an 83.4% rate of awareness of PrEP in 1,859 medical students, even though only 62.2% of final-year students have described that the subject had been addressed during their training.[5] However, the international literature regarding medical students' training in PrEP is quite scarce, preventing from making any accurate comparison with other realities.

This study was aimed at (i) assessing the awareness of HIV PrEP of Portuguese medical students, (ii) assessing the opinion of Portuguese medical students regarding the integration of HIV PrEP in the curricula of medical schools and the activities developed on this subject in a non-formal way (iii) assessing the factors (medical school, academic year) associated with the awareness of PrEP and having attended a class on PrEP and (iv) the factors (school, academic year, source of information) associated with a correct identification of the current eligibility criteria.

MATERIAL AND METHODS

An online questionnaire was sent to medical students attending all Portuguese medical schools. The questionnaires were sent through the student associations/nuclei to all students within the mailing lists regarding all the academic years. In addition, a link allowing direct access to the questionnaire was published on Facebook by the ANEM. The questionnaire was available for completion from 20 May 2019 until 16 December 2019. At the beginning of the questionnaire, an introductory section described the terms of informed consent, which was agreed to by simply answering to it.

All responses were considered eligible for analysis. The study was approved by the Ethics Committees of the Portuguese MS.

Following data collection, a descriptive analysis of the responses was carried out, followed by a cross-sectional analytical study. Bivariate analysis was carried out and prevalence ratios in different categories, prevalence ratios, adjusted prevalence ratios and 95% confidence intervals (95% CI) were obtained for different outcomes (Tables 1, 2 and 3): PrEP awareness, having attended a class on PrEP, correct identification of the groups of patients eligible for PrEP. Chi-square test *p*-values are shown for each prevalence ratio (PR) and adjusted prevalence ratios (aPR) regarding the reference categories. A $p < 0.05$ level of statistical significance was considered. Relevant variables potentially associated with the different outcomes were selected. Only those referring to "PrEP awareness" were analysed for "having attended a class on PrEP" and "correct identification of the eligible groups" outcomes. Gender, academic year and medical school variables were analysed as explanatory variables for "PrEP awareness" and "having attended a class on PrEP" outcomes, while gender, medical school, academic year and the way students have learned about PrEP were analysed for "correct identification of the eligible groups" outcome.

RESULTS

A similar distribution of responses regarding gender, academic year and medical school to the distribution in the medical student population has been found.

The distribution of responses by categories for the questionnaire variables is shown in Appendix 1 (https://www.actamedicaportuguesa.com/revista/index.php/amp/article/view/15446/6519). A total of 796 respondents (525 female, 18.22% aged 17-20, 14.95% aged 20-21, 35.05% 21-23 and 31.78% >23) were included in the study (37.56% obtained through Facebook page of the student association or nucleus (EA/Core), 29.40% through the ANEM's Facebook page, 13.19% through email, 13.19% through the EA/Core's website or email sent to them and 6.53% through colleagues). The response rate was unavailable as the number of students who had access to the questionnaire was unknown.

As regards the distribution of responses by different MS, 223 responses (28.02%) were received through the Faculty of Medicine of the University of Lisbon (FMUL), 135 responses (16.96%) through the Faculty of Medicine of the University of Porto (FMUP), 124 responses (15.58%) through the Institute of Biomedical Sciences Abel Salazar (ICBAS), 99 responses (12.44%) through the Faculty of Health Sciences of the *Universidade da Beira Interior* (FCS-UBI), 80 responses (10.05%) through the Faculty of Medicine of the *Universidade de Coimbra* (FMUC), 66 responses (8.29%) through the Faculty of Medical Sciences of the *Universidade Nova de Lisboa* (FCM-UNL), 39 responses (4.90%) through the *Universidade do Algarve* (UAlg) and 30 responses (3.77%) through the Medical School of the *Universidade do Minho* (EM-UM).

As regards the distribution by academic year, 97 first-year students (12.19%), 126 second-year students (15.83%), 173 third-year students (21.73%), 158 fourth-year students (19.85%), 127 fifth-year students (15.95%) and 115 sixth-year students (14.45%) have completed the questionnaire.

A total of 581 respondents have described that they had not attended another course (72.99%), while 215 had attended another course (27.01%) before Medicine; 707 of the respondents were full-time students (88.82%); 64.6% (514) of the respondents were aware of PrEP, while 34.44% found out about it while attending a class at college/university, 25.88% from an internet search and 14.79% through friends, parents or relatives.

As regards the inclusion of PrEP in the MS curricula, it was considered as a relevant subject by 99.22% of the 514 respondents who were aware of PrEP.

The categories with the highest number of positive responses to the question "Who should deal with the subject" (non-exclusive categories) among the students who were aware of PrEP included curricular units (83.3%), government campaigns (72.9%), EA/Core (39.0%) and NGOs (36.6%).

As regards the academic approach, 31.91% of the respondents who were aware of PrEP have considered that it should be dealt with throughout third year, followed by fifth year (25.29%) and fourth year (20.04%); 47.27% of the respondents who were aware of PrEP considered that

Table 1 – Bivariate and multivariate analysis of "PrEP awareness" outcome, prevalence ratios in different categories of exposure (PR), adjusted PR, 95% CI and *p*-values

Variables	Total	PrEP awareness	%	PR	95% CI	*p*-value	aPR	95% CI	95% CI	*p*-value
Gender										
Female	525	311	59.24							**Ref**
Male	271	203	74.91	1.26	[1.15 - 1.40]	0.000	1.271646	1.064303	1.519383	0.008
Medical School										
FMUL	223	152	68.16							**Ref**
FMUP	135	80	59.26	0.87	[0.74 - 1.03]	0.087	0.825864	0.629287	1.083849	0.168
ICBAS	99	62	62.63	0.92	[0.77 - 1.10]	0.332	0.859738	0.638461	1.157703	0.32
FCS-UBI	66	47	71.21	1.04	[0.87 - 1.25]	0.638	0.971762	0.698746	1.351451	0.865
FMUC	124	65	52.42	0.77	[0.64 - 0.93]	0.004	0.724484	0.541241	0.969765	0.03
FCM-UNL	80	62	77.50	1.14	[0.98 - 1.32]	0.116	0.993541	0.736587	1.340133	0.966
UAlg	30	21	70.00	1.03	[0.80 - 1.32]	0.839	0.933664	0.585321	1.489315	0.773
EM-UM	39	25	64.10	0.94	[0.73 - 1.21]	0.617	0.844037	0.550636	1.293775	0.437
Academic year										
1st	97	32	32.99							**Ref**
2nd	126	55	43.65	1.32	[0.94 - 1.87]	0.106	1.319619	0.852169	2.043487	0.214
3rd	173	112	64.74	1.96	[1.45 - 2.66]	0.000	1.986923	1.333098	2.96142	0.001
4th	158	113	71.52	2.17	[1.61 - 2.93]	0.000	2.183292	1.469746	3.243256	0
5th	127	102	80.31	2.43	[1.81 - 3.27]	0.000	2.468263	1.65331	3.684925	0
6th	115	100	86.96	2.64	[1.97 - 3.53]	0.000	2..67163	1.788513	3.990807	0

it should be addressed within the curriculum unit (CU) of infectious diseases while 11.72% within pharmacology CU.

As regards the "Would you feel comfortable to prescribe PrEP" question, most respondents have replied negatively, either because they did not know enough on the subject (50.58%) or because they did not know the contraindications and therapy regimen (13.42%). However, 29.38% of respondents who were aware of PrEP have described that they would be comfortable with its prescription.

Among those who were aware of PrEP, 75.49% have given incorrect/incomplete responses to the question about eligible groups. Among those who responded that they felt comfortable with prescribing it, a 74.83% rate of incorrect/incomplete responses was found.

Male respondents and those attending the third or subsequent academic years were significantly associated with awareness of PrEP, considering the first year as the reference category.

As shown in Table 1, attending the FMUC was negatively associated with the awareness of PrEP, considering FMUL as the reference category, as the lowest rate of respondents who were aware of PrEP was found in this category.

As the academic years progressed, the probability of awareness of PrEP while attending class increased, with a statistically significant difference from third year onwards, considering the first year as the reference category, as shown in Fig. 1.

FCS-UBI stands out as the MS with the highest rate of respondents who were aware of PrEP.

These associations remained statistically significant after adjustment to the academic year.

With the progression in the course and stratifying by medical school, there is an increase in the number of students who learned about PrEP while attending class.

The percentage of those who were aware of PrEP while attending class has increased over the years, showing a statistically significant difference from the fourth year onwards, with the association remaining unchanged after adjustment. FCS-UBI showed higher prevalence of awareness while attending class and a statistically significant association remained unchanged after adjustment for academic years.

Attending the sixth year and having learned about PrEP through the internet were the categories most strongly associated with having answered correctly to all the questions. After adjusting the variables, only "having learned about PrEP through the Internet" maintained a stronger association, assuming "having learned about PrEP through friends" as the reference, which was the category with the lowest rate of correct answers.

As the academic years progressed, there is also an increase in the number of respondents who are aware of the groups eligible for PrEP, as shown in Table 2. There is an increasing number of respondents who attended class in which this topic was addressed, as the academic life progresses, as shown in Table 3 (aimed at the universe of respondents who were aware of PrEP. In addition, FCS-UBI was the medical school with the highest rate of respondents who have attended at least one class on PrEP, while UAlg was the school with the lowest rate.

DISCUSSION

This study was primarily aimed at assessing the awareness of PrEP in medical students. The results of the questionnaire have shown a 64.6% awareness rate in students attending Portuguese medical schools. However, this was only obtained by 34.44% while attending class.

These data may show that there is room to improve the awareness of this subject in medical schools, since only 177 students in our group of respondents had some formal

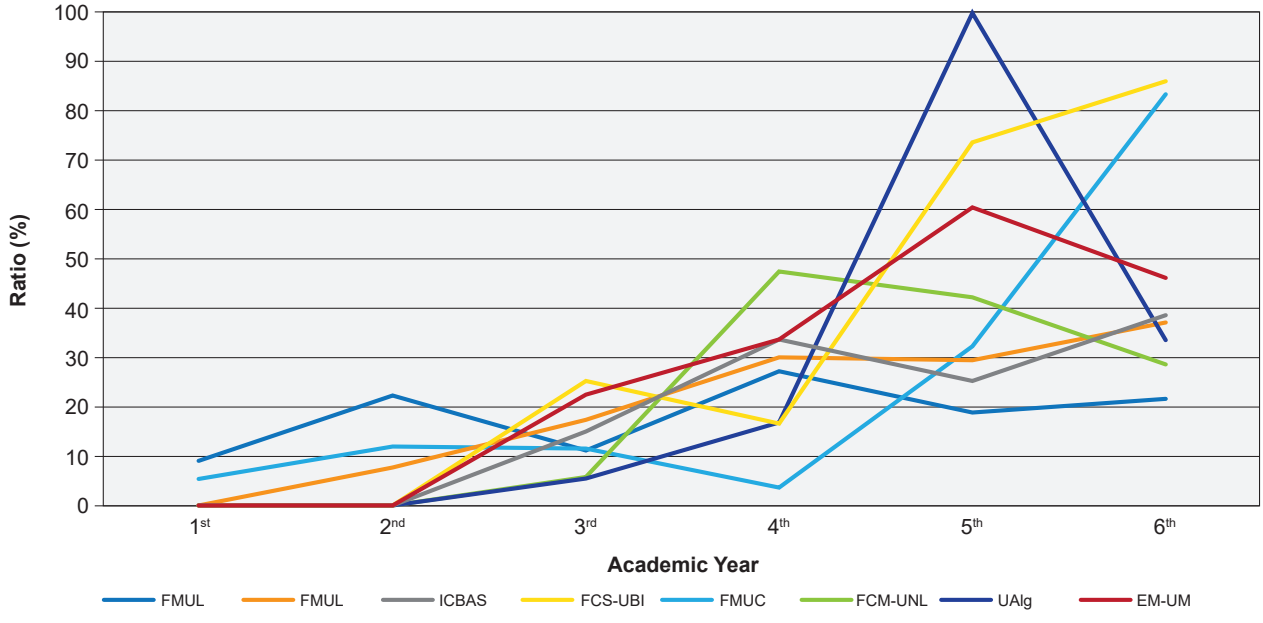

Figure 1 – Ratio of students who have attended class on PrEP per academic year and medical school

Table 2 – Bivariate and multivariate analysis of "Correct identification of the eligible groups for PrEP" outcome among those who have described PrEP awareness, prevalence ratios in different categories of exposure (PR), adjusted PR, 95% CI and *p*-values

Exposure	Total	Correct eligible group	Correct %	PR	95% CI	*p*-value	aPR	95% CI	*p*-value
Gender									
Female	311	76	24.44						**Ref**
Male	203	50	24 63	1.01	[0.74 - 1.37]	0.960	1	[0.69 - 1.45]	0.997
Medical School									
FMUL	152	36	23.68						**Ref**
FMUP	80	22	27.50	1.16	[0.74 - 1.83]	0.523	1.03	[0.60 - 1.78]	0.916
ICBAS	62	13	20.97	0.89	[0.51 - 1.55]	0.668	0.83	[0.43 - 1.59]	0.569
FCS-UBI	47	14	29.79	1.26	[0.75 - 2.12]	0.399	1.15	[0.61 - 2.16]	0.667
FMUC	65	14	21.54	0.91	[0.53 - 1.57]	0.731	0.84	[0.44 - 1.58]	0.582
FCM-UNL	62	15	24.19	1.02	[0.60 - 1.73]	0.937	0.91	[0.49 - 1.69]	0.763
UAlg	21	4	19.05	0.80	[0.32 - 2.03]	0.637	0.61	[0.21 - 1.77]	0.362
EM-UM	25	8	32.00	1.35	[0.71 - 2.56]	0.373	1.15	[0.53 - 2.52]	0.719
Year									
1st	32	3	9.38						**Ref**
2nd	55	10	18.18	1.94	[0.58 - 6.53]	0.267	1.86	[0.51 - 6.79]	0.345
3rd	112	35	31.25	3.33	[1.10 - 10.13]	0.013	3.51	[1.06 - 11.6]	0.039
4th	113	26	23.01	2.45	[0.79 - 7.59]	0.089	2.57	[0.77 - 8.62]	0.126
5th	102	24	23.53	2.51	[0.81 - 7.79]	0.082	2.63	[0.78 - 8.87]	0.119
6th	100	28	28.00	2.99	[0.97 - 9.17]	0.031	3.2	[0.96 - 10.7]	0.058
How did you learn about PrEP?									
Friends	76	13	17.11						**Ref**
Student Association/Nuclei	58	15	25.86	1.51	[0.78 - 2.92]	0.217	1.52	[0.71 - 3.27]	0.284
In class	177	42	23.73	1.39	[0.79 - 2.43]	0.242	1.37	[0.73 - 2.59]	0.33
Internet	133	37	27.82	1.63	[0.92 - 2.86]	0.081	1.74	[0.92 - 3.31]	0.09
Others	70	19	27.14	1.59	[0.85 - 2.97]	0.143	1.66	[0.82 - 3.38]	0.161

Table 3 – Bivariate and multivariate analysis of "Having attended class in which PrEP was included" outcome among those who have described PrEP awareness, prevalence ratios in different categories of exposure (PR), adjusted PR, 95% CI and *p*-values

Exposure	Total	PrEP at class	%	PR	95% CI	*p*-value	aPR	95% CI	*p*-value
Academic Year									
1st	97	5	5.15						**Ref**
2nd	126	14	11.11	2.16	[0.80 - 5.78]	0.114	2.034801	[0.73 - 5.66]	0.174
3rd	173	23	13.29	2.58	[1.01 - 6.57]	0.035	2.494608	[0.94 - 6.61]	0.066
4th	158	40	25.32	4.91	[2.01 - 12.02]	0.000	4.720721	[1.86 - 12.01]	0.001
5th	127	45	35.43	6.87	[2.84 - 16.66]	0.000	6.358906	[2.51 - 16.10]	0
6th	115	50	43.48	8.43	[3.50 - 20.31]	0.000	7.978149	[3.17 - 20.09]	0
Medical School									
FMUL	223	40	17.94						**Ref**
FMUP	135	28	20.74	1.16	[0.75 - 1.78]	0.512	1.071998	[0.66 - 1.74]	0.778
ICBAS	99	20	20.20	1.13	[0.70 - 1.82]	0.630	1.017925	[0.59 - 1.74]	0.948
FCS-UBI	66	23	34.85	1.94	[1.26 - 3.00]	0.003	1.713771	[1.02 - 2.87]	0.041
FMUC	124	28	22.58	1.26	[0.82 - 1.94]	0.296	1.108792	[0.68 - 1.79]	0.676
FCM-UNL	80	22	27.50	1.53	[0.97 - 2.41]	0.069	1.193284	[0.70 - 2.01]	0.508
UAlg	30	4	13.33	0.74	[0.29 - 1.93]	0.532	0.775036	[0.27 - 2.19]	0.631
EM-UM	39	12	30.77	1.72	[0.99 - 2.97]	0.064	1.335612	[0.69 - 2.56]	0.385

awareness of PrEP during their academic career (at survey completion).

Poorer results have been found in this study when compared to other studies on the awareness of PrEP; 84.7% and 85.2% rates have been found in two American studies carried out in 2015 – involving non-randomly selected samples and questionnaires that were sent by email. In addition, lower results regarding the awareness within the MS were obtained in this study when compared to other studies (rates between 50.4% and 50.5%).[6,7]

Considering that 83.3% of the respondents have described that PrEP should be addressed in curriculum units, it is worth mentioning the increased responsibility of MS in the inclusion and reinforcement of the subject in the medical curriculum. It was also found that 50.58% of the respondents who were aware of the PrEP did not feel comfortable with prescribing this therapy regimen in the future, considering not knowing enough about the subject. On the other hand, only 29.38% felt comfortable with its prescription.

We can also see that the annual curricula of the third, fourth and fifth year are the ones that coincide with the answers of the participants, considering their preference to include the topic of PrEP in infectious diseases and pharmacology CU.

Regarding the source of knowledge about PrEP, 34.44% of the 514 students who were aware of PrEP have described that they learned about it while attending class at their MS. However, this is immediately followed by the awareness through internet (25.88%).

The analytical component of the study showed statistically significant differences between medical schools and academic year and “aware of PrEP” and “having attended class on PrEP” outcomes. “How we were aware of PrEP” had an influence on the ability to correctly identify eligible groups and with a higher influence for those who learned about it on the internet.

The annual curricula of the third, fourth and fifth years were those that agreed with the responses, considering their preferences towards including PrEP in infectious diseases and pharmacology curriculum units; 34.44% of the 514 respondents who were aware of PrEP have described that they have learned about it while attending class, even though this was closely followed by the awareness through Internet (25.8%).

The analytical component of the study has shown statistically significant differences between MS and academic year for “awareness of PrEP” and “having attending class on PrEP” outcomes. The way that the respondents were aware of PrEP had an influence on the ability to correctly describe the eligible groups for PrEP and was higher for those who were aware through Internet.

Limitations

The study design and its introduction were based on the publication of Standard 025/2017 of 28 November 2017. However, data collection has only started in May 2019 up to December 2019. Therefore, the responses should be considered as the respondent’s awareness of PrEP underlying the national panorama in 2019, with 18 months of evolution and familiarisation with the standard.

A selection bias may exist, considering that the sample is not probabilistic. Therefore, respondents could be those who were more aware and were more interested in PrEP, which could have overestimated the real awareness of PrEP in different years.

A long period of availability of the questionnaire - seven months, across different semesters must be considered. We were unable to validate that respondents were in fact students attending the eight Portuguese MS, nor was it possible to check whether the same student had completed the study more than once, as the questionnaire was available online on the ANEM’s social networks. In addition, respondents may have a greater interest in the subject, which may not be representative of most students.

Data interpretation should also consider the different number of students within each MS. The questionnaire was mostly responded by FMUL students, involving the MS with the highest number of students in Portugal.

The fact that few similar studies exist does not allow a correct analysis nor an accurate comparison with other studies that used similar methodologies. In addition, smaller samples (non-random samples) have been used in the few studies on the awareness of PrEP by medical students or students from other health sciences.

It is also worth mentioning that PrEP has been approved in the United States of America earlier than in Portugal;[8] therefore, their students are more familiar with it and there is also the possibility of a previous renewal of their medical curricula, which may explain a higher rate of awareness of the subject.

CONCLUSION

The awareness of PrEP and getting in touch with this subject during the medical course were analysed by this study. PrEP is a recent therapy regimen with relevant and challenging specificities that medical students and future healthcare professionals should be aware.

In addition, awareness of PrEP is crucial in allowing a safe and effective clinical approach to a prophylactic treatment for HIV and AIDS, conditions that are still stigmatised,[9] which may be difficult to achieve if much of the responsibility in training on the subject is left to the students themselves.

A deficit regarding teaching about PrEP in Portuguese MS has been found, when compared to other studies, although findings should be carefully interpreted.

Most students have considered PrEP as a relevant subject and that it should be addressed in MS and included in the medical curriculum. It is worth mentioning the significant unawareness of the eligible groups and the differences found between different MS, academic years and ways in which students became aware. A review of the curricula of medical schools, ensuring the inclusion and effective training on this subject is a relevant measure.

Considering all this, we believe that PrEP should be

included in the curricula of MS so that doctors, regardless of their specialty, could be aware of which patients may have an indication, could inform their patients in a generic way about the subject and could refer them appropriately to hospital consultation, whenever this is indicated.

AUTHOR CONTRIBUTION

FD, NR: Intellectual contribution, writing and revision.

DG: Intellectual contribution, design and revision.

VRP: Data analysis, writing and revision.

DA, DG. IT, IF, JF, MC, MR, AS, AF, AL, FV, JG, MT, VF: Intellectual contribution.

AA, BR, CO, DP, MS, RA, SR: Intellectual contribution and study design.

HUMAN AND ANIMAL PROTECTION

The authors declare that this project complied with the regulations that were established by the Ethics and Clinical Research Committee, according to the 2013 update of the Helsinki Declaration of the World Medical Association.

DATA CONFIDENTIALITY

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in writing this manuscript.

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