

Assessment of Knowledge Levels of Family Medicine Residents About HIV/AIDS

Memet Taşkın Egici¹ , Güzin Zerenöztürk² , Seçil Günher Arıca³ , Güven Bektemur⁴ 

¹Department of Family Medicine, Health Sciences University, Haydarpaşa Numune Training and Research Hospital, İstanbul, Turkey

²Department of Family Medicine, Health Sciences University, Şişli Hamidiye Etfal Training and Research Hospital, İstanbul, Turkey

³Department of Family Medicine, Health Sciences University, Okmeydanı Training and Research Hospital, İstanbul, Turkey

⁴Department of Health Administration, Health Sciences University School of Health Sciences, İstanbul, Turkey

Abstract

Objective: The incidence of human immunodeficiency virus (HIV)/Acquired immunodeficiency syndrome (AIDS) is increasing in Turkey. As the first admission point, the level of knowledge of family physicians is important in screening, diagnosis, and early treatment of this disease. We aimed to determine the areas that need to be improved by evaluating the knowledge level of family medicine residents about this topic.

Methods: This cross-sectional study carried out on family medicine residents who were trained in Training and Education Hospital of Health Sciences University, in İstanbul, Turkey. A 23-item questionnaire included questions about HIV/AIDS and demographics, and 12 questions were 3-point Likert-type questions. Points were collected, and the median value was taken; above-median values were evaluated as knowledge sufficiency (Cronbach's alfa, 0.72). The statistical significance level of alpha was accepted as $p < 0.05$.

Results: In the study including a total of 253 participants, 65.6% were female, and the average age was 31.5%. When the HIV/AIDS risk groups were examined, they considered the unprotected sexual intercourse as the riskiest groups (99.6%), and the least known were 33.6% of patients with tuberculosis. The most common known route of transmission was through blood and blood products (100%) and sexual transmission route was known also in high rates (98%). There were no participants who thought that infection could be transmitted by the handshaking. A total of 2% of participants believed that transmission was possible via eating utensils (forks, knives); 3.3% via personal items; 3.7% via commonly used items, while 0.8% thought it was possible via toilet. There were no participants who thought that infection could be transmitted by the handshaking. In the total score, 2 points were taken as a minimum, 12 points were taken as the maximum and 8 points were taken as the mean. The percentage of those who scored 8 or more and had sufficient knowledge was 65.2%.

Conclusion: Family medicine residents have some training needs in the context of prevention, diagnosis, and treatment of HIV/AIDS. Studies on the elimination of an inadequate level of knowledge about it during specialty training and in-service training practices will not only increase the quality of service but also positively affect their approach to individuals with HIV/AIDS and help solving stigma problem.

Keywords: HIV/AIDS, family medicine, knowledge level, stigma, screening

ORCID IDs of the authors:

M.T.E. 0000-0003-2319-5739;
G.Z. 0000-0001-7730-2929;
S.G.A. 0000-0003-0135-6909;
G.B. 0000-0001-5899-566X

Cite this article as:

Egici MT, Zerenöztürk G, Günher Arıca S, Bektemur G. Assessment of Knowledge Levels of Family Medicine Residents About HIV/AIDS. Eur Arch Med Res 2018; 34 (4): 267-72.

Corresponding Author:

Memet Taşkın Egici

E-mail:

megici@gmail.com

Received: 10.08.2018

Accepted: 03.09.2018

DOI: 10.5152/eamr.2018.03511

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) was first clinically described in 1981 in USA. and Human Immunodeficiency Virus (HIV) was isolated as etiologic agent of AIDS in 1983. Acquired (1).

According to the 2016 World Health Organization (WHO) data, 36.7 million people in the world have HIV; the number of newly infected individuals in 2016 was 1.8 million, and the number of people who have died is 1 million (2). Today, the incidence of HIV is decreasing in Europe and Africa. According to the WHO data, there has been a 35% decrease in the incidence of HIV in the world since 2000 (3). The first HIV-positive case was reported in 1985 in our country, the number of new cases increased, and the total number of cases identified between October 1, 1985, and December 01, 2017, was reported to be 16,644 (4, 5). Since 1996, AIDS has been treated with antiretroviral drugs, and this treatment resulted in a reduction of AIDS-related deaths (6). However, it is thought that there are still 55% of people who have not been diagnosed (7). The diagnosis of these patients is important in terms of the epidemic and treatment of the disease. As in all patients, since the first admission point is the primary care health service, the knowledge level of family physicians about HIV/AIDS is important for the screening, diagnosis, and early treatment of the disease.

In our study, we aimed to evaluate the knowledge levels of family medicine residents about HIV/AIDS expected to take place in primary health care services and to identify the issues that need to be improved in the training processes.

METHODS

The study was a cross-sectional descriptive study conducted in July 2018 for contracted and full-time family medicine specialty students who were trained in family medicine education clinics at the Training and Research Hospitals (TRH) -affiliated University of Health Sciences, in Istanbul. Informed consent was obtained before study and verbal information was given to every consent. Ethic approval was obtained from University of Health Sciences Okmeydanı Health Practice and Research Centers (HPRC) Clinical Researches Ethics Committee; Approval Date and Number: June 19, 2018/936. A 23-item questionnaire included three questions on demographic data (age, gender, and length of occupation) of the participants; eight multiple-choice and multiple-selection questions (Table 1) aimed at the frequency, risk groups, mode of transmission, educational status of the participants, and approaches to HIV-infected patients; and twelve 3-point Likert-type questions (Agree, Disagree, No Idea) aimed to measure the knowledge and attitudes about HIV/AIDS.

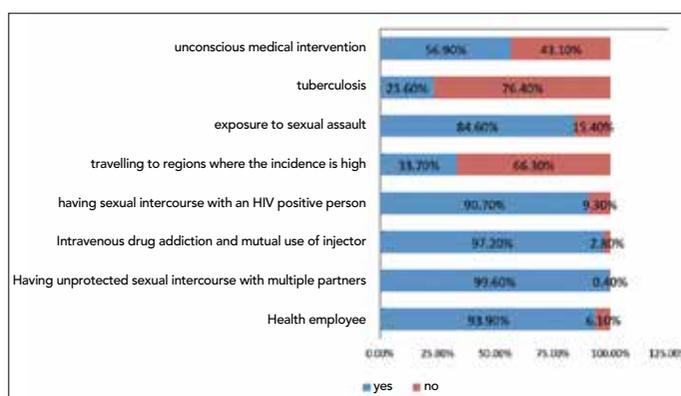


Figure 1. Questioning of the risk groups for HIV / AIDS

Scoring was done according to the accuracy of the sentences. Correct answers were scored with 1 point; "I have no idea," and the wrong answers were scored with 0 points. The median value was found by calculating the total scores, and the level below the median value was accepted as insufficient, and the level above the median value was accepted as the sufficient level of knowledge (Cronbach's alpha, 0.72).

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences, version 21.0 (IBM SPSS Corp.; Armonk, NY, USA) program at the 95% confidence interval. Descriptive statistics were given as the number and percentage for categorical variables, and as the mean, standard deviation, minimum, and maximum for numerical variables. The independent two group comparisons of the numerical variable were performed by Mann-Whitney U test since the normal distribution condition was not provided. The ratios of categorical variables between the groups were compared with the chi-squared analysis. The alpha significance level was statistically accepted as $p < 0.05$.

RESULTS

Two hundred and fifty-three family physician residents participated in our study; 166 (65.6%) of them were female, and the mean age was 31.5 ± 5.4 years. The average number of years in profession was 10.4 ± 7.98 , and 33.2% ($n=84$) of participants were in the first 5 years of their professional life; 30.4% ($n=77$) were between 5 and 10 years; and 36.4% ($n=92$) were over 10 years. Of the participants, 52.2% ($n=132$) had not encountered any individuals with HIV/AIDS.

There was no statistically significant relationship between encountering the individuals with HIV/AIDS and the gender and the years spent in profession ($p > 0.05$). When their educational status about HIV/AIDS was questioned, 177 people (70%) stated that they received education; 76.3% ($n=135$) of them stated that they received this education during the university studies, 11.3% ($n=20$) during specialty training, 7.3% ($n=13$) during in-service training, and 5.1% ($n=9$) in a congress.

Of the participants, 70.8% ($n=179$) knew that the incidence of HIV/AIDS in Turkey was between 0% and 10%. There was no statistically significant relationship found between knowing the incidence of HIV/AIDS in Turkey and the age and years spent in the profession; the rate of knowing this situation was statistically significantly higher in men than in women ($p=0.001$). When the risk groups were questioned, the participants expressed the unprotected sexual intercourse as a risk group with the highest rate of 99.6% ($n=252$) (Figure 1). The least known risk group were tuberculosis patients with a rate of 33.6% ($n=85$).

When the HIV/AIDS infection route were questioned, infection with blood and blood products was found to be the most common infection route with a rate of 100%. Infection via sexual contact was known at a rate of 98%. Whereas 2% of the participants thought that infection could occur through items such as forks and knives, 3.3% thought that it would occur through personal items, 3.7% thought that it would occur through common use areas, and 0.8% thought that it would occur through the toilet use. There were no participants who thought that the infection was possible through handshake (Figure 2).

Table 1. Multiple choice questions about HIV/AIDS and demographic data

Demographic Data of the Participants		
1) Age	2) Gender	3) Years spent in the profession
Multiple Choice and Multiple Selection Questions on HIV / AIDS		
1. How many HIV / AIDS patients were admitted to you?		
a) None		
b) 1-4		
c) 5-10		
d) > 10		
2. Have you received education about HIV / AIDS, where?		
a) University		
b) Specialty training		
c) Congress		
d) Ministry of Health		
e) I've never received education		
3. What do you think the prevalence rate of HIV/AIDS is in Turkey?		
a) 0-10		
b) 10-20		
c) 20-30		
d) 30-60		
e) 60-100		
4. Which of these are in the risk group for HIV? (You can choose more than one item) *		
a) Health worker		
b) Having an unprotected sexual intercourse and being with more than one partner		
c) Intravenous drug dependence and mutual use of injector		
d) Having a sexual intercourse with an HIV-positive person		
e) Travelling to or living in places with high incidence		
f) exposure to sexual assault		
g) Tuberculosis disease		
h) Unconscious medical intervention		
5. How high is the probability to be infected when the needle of a patient infected with HIV/AIDS accidentally pricks?		
a) 0,3		
b) 3		
c) 30		
d) 0		
e) 100		
6. Do you think individuals should be screened for HIV / AIDS?		
a. Yes		
b. No		
7. How is HIV / AIDS transmitted? (you can choose more than one item) *		
a) Blood		
b) Drug use		
c) Sexual intercourse		
d) Body fluids (sweat, tears)		
e) Personal belongings (clothes, towels)		
f) Air		
g) Skin contact (handshake)		
h) Household goods (forks, knives)		
i) Common area (pool, gym)		
j) Toilet		
k) Mosquito/fly bites		
l) From mother to baby		
m) Organ, tissue, and blood transplantation		
8. What do you do if a patient stating that he / she has HIV / AIDS should be examined with a simple complaint of upper respiratory tract infection?		
a) I examine but not give treatment		
b) I feel scared and anxious, and I don't even examine		
c) I examine and treat if it is a simple upper respiratory tract infection.		
d) Others.		
* The answers to the questions related to the risk groups and mode of transmission of HIV / AIDS are given in Figure 1 and Figure 2		

The percentage of the possibility of HIV/AIDS infection after injection accidents in the health personnel was questioned, and 63.2% (n=160) of the participants responded that it was 0.3%; 25.7% (n=65) as 3%; 8.3% (n=21) as 30%; and 2.8% (n=7) as 100%. Although the percentage of the infection routes was known correctly at a rate of 63.2%, only 25.30% of the participants were familiar with post-exposure prophylaxis. While there was no relationship between gender and knowing the percentage of HIV/AIDS infection after an injection accident in the health personnel, there was a statistically significant correlation between age ($p=0.006$) and the years in occupation ($p=0.001$). Accordingly, young and new physicians were more aware of the percentage of infection. Of the participants, 66% (n=167) stated that all patients should be screened.

In our study, participants were asked about their attitudes toward HIV/AIDS patients when they were admitted due to a simple upper respiratory tract infection; 48.2 (n=122) of them stated that they would try to treat if it was a simple upper respiratory tract infection, and 5.5% (n=14) stated that they would abstain even from examining. In this regard, the age, gender, and the length of employment were not correlated with giving treatment.

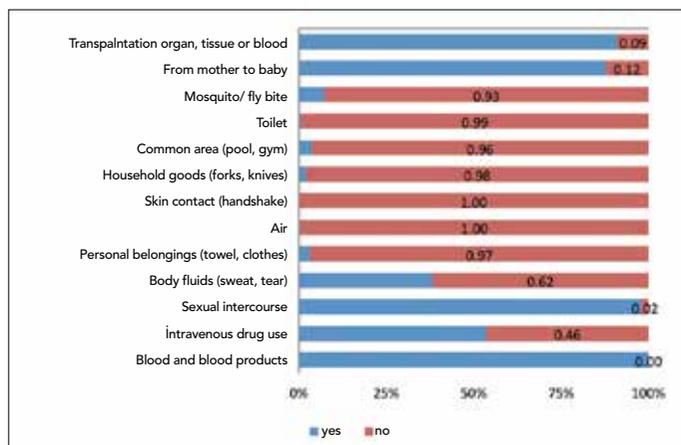


Figure 2. Questioning of HIV / AIDS transmission modes

The answers given to the questions in the form of a 3-point Likert-scale (“I agree,” “I don’t agree,” “I have no idea”) are given in Table 2. While 31.2% of the participants thought that they had sufficient knowledge about HIV/AIDS, 50.60% of them stated that they knew how to approach an HIV-positive patient. After scoring, a minimum score of 2 and a maximum score of 12 were obtained; the median value was found as 8. Four participants had 2 points, 3 participants had 12 points, and 60 participants had 8 points. The rate of those who had 8 points and above and who had sufficient knowledge was 65.20% (n=165). Adequate knowledge was not statistically significantly correlated with age, gender, and the years spent in the occupation ($p>0.05$). A significant relationship was found between having received education and having sufficient knowledge ($p=0.000$).

DISCUSSION

According to the 2003 National Burden of Disease study, the rate of HIV/AIDS prevalence is 0.1 in 1.000 (8). The majority of the respondents knew the prevalence of HIV/AIDS in Turkey. However, it was concluded that the number of cases reported in a previous study was significantly lower than the actual number of cases, and the number declared as 14,695 was actually estimated to be 75.255 (9). More than half of the physicians who participated in our study had not encountered any HIV/AIDS patients. This may be due to the fact that individuals who know that they are HIV/AIDS patients hide their diagnosis for fear of being stigmatized.

When an individual or community confronts a situation that causes annoyance and fear, they are often excluded, and thus, stigmatization occurs (10). Cancer, tuberculosis, leprosy, sexually transmitted diseases, epilepsy, psychiatric disorders, and alcohol and substance abuse are other stigmatization causes (11). Because of stigmatization, individuals are isolated from the society. The fact that the disease is contagious and that the knowledge level is insufficient is the most important reason for the fear of individuals. In our study, only 1.2% of the physicians thought that HIV/AIDS patients should be isolated, and 4.5% of them stated that they had no idea. In a similar study, Hatipoğlu et al. (12) found these rates to be 19% and 8%, respectively. In our study, the reason why

Table 2. Likert-type questions for assessing the knowledge level and attitudes about HIV/AIDS

	I agree	I have no idea	I do not agree
HIV/AIDS is decreasing in our country	4.70%	11.90%	83.40%
All HIV/AIDS patients should be isolated	2.00%	4.30%	93.7%
I think I have sufficient knowledge about HIV/AIDS	31.20%	34.8%	34%
AIDS can be completely cured	10.70%	21.70%	71.10%
AIDS does not interfere with marriage	21.70%	10.70%	67.60%
I know how to approach the patient I've identified as HIV positive (+)	50.60%	28.5%	20.90%
There is no problem in breastfeeding of HIV (+) mothers	22.10%	17%	60.90%
The baby of an HIV (+) mother is definitely HIV +	15.00%	16.20%	68.80%
If the examination is negative in the individuals who have sexual intercourse with HIV (+) people in the first week, it means there is no infection	2.80%	7.10%	90.10%
The laboratory results of an HIV (+) individual can be declared to the spouse / family	15.40%	18.20%	66.40%
There is a prophylactic method after contact with an HIV (+) person	25.30%	49.40%	25.30%
HIV (+) individuals should be screened also for other infectious diseases	94.10%	1.20%	4.70%

these rates were found to be lower may be due to the fact that our study was performed with a group of physicians, unlike the other study. A study published in 2018 showed that clinicians were more knowledgeable than other health professionals (13).

When we examined the routes of HIV/AIDS transmission, the rate of the correct knowledge that it could transmit through blood and blood products was 100% in this study. Nowadays, the rate of such infections has been reduced thanks to the examinations performed before the use of blood and blood products. According to the 2010 data, the most frequent mode of transmission in Turkey is sexual contact (14). In our study, the percentage of participants who knew this was 98%.

While 2% of the participants thought that the infection was possible through items such as forks and knives, 3.3% thought that it would occur through personal items, 3.7% thought that it would occur through common use areas, and 0.8% thought that it would occur through toilet use; there were no participants who thought that the infection is possible through handshake. In one study, the rate of those who thought that the infection would be transmitted through handshake was 15.7% (15). In another study, the rate of those who thought that the infection was possible through the use of a common pool and toilet was found to be 15% (16). In our study, the rates of knowing the mode of transmission were higher than the other studies. This may be due to the involvement of the physicians from different branches and non-physicians in other studies. It has also been reported in the book by the Association for Clinical Microbiology and Infectious Diseases that HIV/AIDS is not transmitted through these ways (common pool, toilet, handshake etc.) (17).

In line with the 90-90-90 global HIV targets determined by the Joint United Nations Program on HIV/AIDS organization for the termination of the AIDS epidemics, as of 2020, it has been aimed to detect 90% of HIV-infected persons, to treat 90% of them, and to provide viral suppression with treatment in 90% of them (18). Screening, diagnosis, and treatment guidelines were established with this regard. A diagnosis and treatment guide that the Ministry of Health published in 2018 is also available. According to this guide, rapid testing and screening that can be applied in primary care by trained practitioners are mentioned (7). The majority of our participants state that individuals should be screened for HIV/AIDS, but half of them state that they know what to do if laboratory positivity is detected in the patient and the majority still feels inadequate about HIV/AIDS. This is a finding that shows that there is an information gap.

When the risk groups for HIV/AIDS were questioned in our study, it was determined that the majority of the participants knew what were the risk groups. The rate of the risk group that was least known was 33.6% and the most was 99.6%. Here we can conclude that there is a basic knowledge about HIV/AIDS risk groups, but it should be supported. In a study conducted in China in 2016, a total of 249 physicians found that the education in terms of HIV/AIDS and sexually transmitted diseases reduced the epidemic and risk of the disease (19). We think that the community-targeted education screening programs should be planned after the planning of in-service trainings for HIV/AIDS.

While the correct answer rate about of transmission through injection accidents in the health personnel was 63% in our study, it was noteworthy that the level of knowledge decreased as the age and

the years spent in the occupation increased. This may be due to the fact that the treatment and its outcomes are very up-to-date, because 76.3% of the participants stated that they had received education from the university. However, 25.30% of the participants responded that there was a post-exposure prophylaxis method. In a study conducted in the United Kingdom, 58% of the participating doctors stated that they could provide information about post-exposure prophylaxis to their patients (20). In our study, in addition to lack of experience and lack of knowledge, the low rate may be due to the fact that the patients encountered in the TRHs, where the study was conducted, were immediately consulted to the relevant branch, and the treatment continued in that clinic.

There are many studies in the literature showing the attitude of health workers toward individuals with HIV/AIDS (16, 21). According to a study conducted with nurses in 2009, it was found that those with a good knowledge level had a better attitude toward individuals with HIV/AIDS (21). The attitudes of health workers are important in the treatment, prevention, and in the quality of life of the people with AIDS. Of our respondents, 5.5% stated that they would be reluctant to even examine an individual with HIV/AIDS who had a simple urinary infection RI. In a study published in 2015, this rate was 6.2% (22). We also think that this situation can be overcome through education. It was found in a study conducted in 2012 that knowledge and attitude scores increased after training (23).

In terms of knowledge adequacy, 34.80% of the participants were found not to have sufficient knowledge. A relation has been determined between having sufficient knowledge and education; lack of in-service training is noteworthy. In-service training is important for updating information and making it adequate.

CONCLUSION

Approximately one-third of the family medicine specialty students in our study were found to have insufficient knowledge about HIV/AIDS. Since family physicians serve as the first point of contact, their role in screening, diagnosis and follow-up of treatments is important. Studies on the elimination of an inadequate level of knowledge about HIV/AIDS in specialty training and in-service training practices will not only increase the quality of service provided by family physicians, but also positively affect their approach to individuals with HIV/AIDS.

It is thought that the course of patient-physician communication will have a positive effect on the follow-up and treatment processes of the patients and will eliminate the fear of stigmatization of individuals due to behavior change.

Ethics Committee Approval: Ethics committee approval was received for this study from the local ethics committee of Health Science University, Okmeydanı HPRH Clinical Researches (Decision Date: 19.06.2018/ Decision No: 936).

Informed Consent: Informed consent was obtained from the participants before the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - M.T.E., G.Z.Ö., S.A.; Design - M.T.E., G.Z.Ö., S.G.A., G.B.; Supervision - M.T.E., G.Z.Ö., S.G.A., G.B.; Data Collection and/or Processing - M.T.E., G.Z.Ö., S.G.A.; Analysis and/or Interpretation - M.T.E., G.Z.Ö., S.G.A., G.B.; Literature Search - M.T.E., G.Z.Ö.,

S.G.A., G.B.; Writing Manuscript - M.T.E., G.Z.Ö., S.G.A.; Critical Review - M.T.E., G.Z.Ö., S.G.A., G.B.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

- Friedman SR, Downing MJ, Smyrnov P, Nikolopoulos G, Schneider JA, Livak B, et al. Socially-integrated transdisciplinary HIV prevention. *AIDS Behav* 2014; 18: 1821-34. [CrossRef]
- Summary of Global HIV Epidemic 2016; WHO Web Site Available from: http://www.who.int/hiv/data/epi_core_2016.png?ua=1, (E.T. 01.08.2018)
- Progress Report 2016, Prevent HIV Test And Treat All; WHO 2016 <http://apps.who.int/iris/bitstream/handle/10665/251713/WHO-HIV-2016.24>
- HIV/AIDS NEDİR? Tümer A. Available from: http://www.hatam.hacettepe.edu.tr/AIDS_web-2017.pdf (E.T. 01.08.2018)
- Türkiye’de Bildirilen HIV/AIDS Vakalarının Yaş Grubu Ve Cinsiyete Göre Dağılımı: 01 Ekim 1985 - 01 Aralık 2017, Türkiye Halk Sağlığı Kurumu Bulaşıcı Hastalıklar Daire Başkanlığı Zührevi Hastalıklar Birimi. Available from: <http://www.hatam.hacettepe.edu.tr/veriler-Aralik2017.pdf> (E.T. 02.08.2018)
- Sulukan EE, Küçüköğlü K, Gül Hİ. AIDS ve Tedavisinde Kullanılan İlaçlar. *Ankara Eczacılık Fakültesi Dergisi* 2009; 38: 47-78.
- HIV/AIDS Tanı Kılavuzu, T.C. Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü Ankara.
- Yardım N, Vardar, C, Türkiye’de Sağlık Bakanlığı Kayıtlarına Göre 2-25 Yılları HIV/AIDS Durumu. *Türkiye Klinikleri J Med Sci* 2008; 28: 544-7.
- Sayan M, Hınçal E, Şanlıdağ E, Kaymakamzade B, Tijani F, Baba IA. Türkiye’de HIV/AIDS’in 1985-2016 yılları arasındaki dinamiği. Available from: <http://www.infeksiyondunyasi.org/pages/HIV-AIDS-2017>.
- Oran NT, Şenuzun F. Toplumda kırılması gereken bir zincir: HIV/AIDS stigmatı ve baş etme stratejileri. *Uluslararası İnsan Bilimleri Dergisi* 2008; 5: Available from: <https://www.j-humansciences.com/ojs/index.php/IJHS/article/viewFile/340/279>. (E.T.02.08.2018)
- Van Brakel WH. Measuring health-related stigma- A literature review. *Psychol Health Med* 2006; 11: 307-34. [CrossRef]
- Hatipoğlu AÇ, Bulut C, Çelik V, Yıldız F, Kınıklı S, Demiröz AP. Bir eğitim hastanesindeki sağlık personelinin HIV/AIDS konusundaki bilgi düzeyleri. *Türk HIV/AIDS Dergisi* 2005; 8: 56-60.
- Doda A, Negi G, Gaur DS, Harsh M. Human immunodeficiency virus/acquired immune deficiency syndrome: A survey on the knowledge, attitude, and practice among medical professionals at a tertiary health-care institution in Uttarakhand, India. *Asian J Transfus Sci* 2011;12: 21-6. [CrossRef]
- Tümer A, Ünal S. HIV/AIDS Epidemiyolojisi ve Korunma, Aile ve Toplum 2001; ISSN: 1303-0256.
- İnci A. HIV/AIDS konusunda bilgi düzeyi ve tutum. *J Clin Anal Med* 2014; 5: 394- 6.
- Bayrak B, Keten S, Fincancı M. Sağlık Çalışanlarının HIV/AIDS Olgularına Yaklaşımları. *Klimik Dergisi* 2014; 27: 103-8. [CrossRef]
- HIV Bilgilendirme Kitabı, Türkiye Klinik Mikrobiyoloji ve İnfeksiyon Hastalıkları Derneği HIV/AIDS Çalışma Grubu Yayını, 2016 <http://www.klimik.org.tr/wpcontent/uploads/2016/11/HIV.BILGILENDIRME.KITABI.pdf> (E.T. 02.08.2018)
- Available from: http://www.unaids.org/sites/default/files/media_asset/90-90-90_en.pdf (E.T. 01.08.2018)
- Operario D, Wang D, Zaller ND, Yang MF, Blaney K, Cheng J, et al. Effect of a knowledge-based and skills-based programme for physicians on risk of sexually transmitted reinfections among high-risk patients in China: a cluster randomised trial. *Lancet Glob Health* 2016; 4: 29-36. [CrossRef]
- Desai M, Gafos M, Dolling D, McCormack S, Nardone. A Healthcare providers’ knowledge of, attitudes to and practice of pre-exposure prophylaxis for HIV infection. *HIV Med* 2016;17: 133-42. [CrossRef]
- Akgün Kostak M, Ünsar S, Kurt Sadırlı S. Hemşire ve Ebelerin AIDS’e Karşı Tutumlarının Belirlenmesi. *Florence Nightingale Hemşirelik Dergisi* 2014; 17: 76-86
- Gledović Z, Rakočević B, Mugoša B, Grgurević A. HIV-related knowledge, attitudes and practice among health care workers in Montenegro. *Coll Antropol*. 2015; 39: 81-5.
- Köse Ş, Mandıracı A, Kaptan F, Özbel Y, Mermut G. Improving Knowledge and Attitudes of Health Care Providers Following Training on HIV/AIDS Related Issues: A Study in an Urban Turkish Area. *Türkiye Klinikleri J Med Sci* 2012; 32: 94-103. [CrossRef]