ORIGINAL ARTICLE

Knowledge, attitudes, and practices of dentists about patients with HIV/AIDS: a descriptive study at the dentists

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ABSTRACT

Introduction: Human Immunodeficiency Virus (HIV) is still an alarming global public health problem. Individuals infected with HIV can develop Acquired Immune Deficiency Syndrome (AIDS) when the infection reaches an advanced stage. Dentists are a group at high risk of contracting HIV/AIDS. Therefore, dentists must have good knowledge, attitudes, and practices towards HIV/AIDS patients. The purpose of this study was to determine the knowledge level, attitudes, and practices of dentists about patients with HIV/AIDS. **Method:** This type of research was descriptive with a cross-sectional design and was carried out directly at dentists' private practices or clinics in Medan. A total of 1319 dentists in Medan included 299 dentists during 2024 using a simple random sampling method. Data collection regarding knowledge, attitudes, and practices towards patients with HIV/AIDS from dentists in Medan was carried out using questionnaires. **Results:** The majority of respondents had a better level of knowledge regarding HIV/AIDS at 51.2%, followed by 44.5% of respondents having a moderate level of knowledge and only 4.3% of respondents having a poor level of knowledge. The majority of respondents had a neutral attitude, namely 58.9% and 34.8% of respondents had a negative attitude, and only 6.4% of respondents had a positive attitude towards patients with HIV/AIDS. The majority of respondents had a good level of practice at 49.2%, 44.1% of respondents had a moderate level of practice, and only 6.7% of respondents had a poor level of practice towards patients with HIV/AIDS. **Conclusion:** Satisfactory level of knowledge, neutral attitudes, and good practices regarding patients with HIV/AIDS. To maintain a good level of knowledge and practice and establish positive attitudes towards patients with HIV/AIDS, there is a need for improvement in education and post-graduate courses, refresher courses, seminars, and training about HIV/AIDS.

KEYWORDS

knowledge, attitudes, practices, HIV/AIDS, dentists

INTRODUCTION

Human Immunodeficiency Virus (HIV) is still a global public health problem.[1] HIV is an infection that attacks the body's immune system, especially white blood cells. Acquired Immune Deficiency Syndrome (AIDS) is a disease symptom resulting from a decline in the body's immune system caused by HIV infection.[2] Individuals infected with HIV can develop AIDS when the infection reaches an advanced stage.[1]

The World Health Organization (WHO) reported that 39 million people were infected with HIV with a prevalence rate of 0.7%, and 630,000 people died.[3] According to the United Nations Program on HIV/AIDS (UNAIDS), in 2022, there

were 39 million people infected with HIV.[4] In Southeast Asia, as many as 3.9 million people are infected with HIV, and the death rate is 85,000 people.[3] Data from the Directorate General of Disease Prevention and Control (Ditjen P2P) of the Ministry of Health of the Republic of Indonesia in 2023 shows that the cumulative number of HIV cases in 2018 reached 301,959, and 104,389 with AIDS. This figure continues to increase significantly.[5] The Central Statistics Agency for North Sumatra Province stated in 2022 that there were 2,008 new cases of HIV and 4,758 cases of AIDS.[6]

Adequate knowledge about HIV/AIDS and its treatment is an important aspect for dentists in providing safe and quality care to HIV/AIDS patients.[7] In a study conducted in 2019 by Yadav et al., it was found that 18.68% of dentists were aware that antiretroviral therapy could not fully cure HIV/AIDS. Furthermore, 20.75% of the dentists were not informed about the risk of contracting HIV/AIDS following a needle prick.[8] Rostamzadeh et al. (2018) stated that dentists knew that HIV/AIDS could not be transmitted through saliva (24.5%), and could not be completely cured with antiretroviral therapy (17%).[9] Sufiawati in 2020 reported that dentists had low knowledge of treating HIV/AIDS patients (69.8%), while Sufiawati et al. in 2021 showed that dentists with proper knowledge accounted for just 44% of respondents.[10,11]

Apart from knowledge, the positive attitude of dentists also plays an important role in the quality of care. Negative attitudes, discrimination, and excessive fear can cause dentists to be reluctant to provide treatment or even refuse to serve HIV/AIDS patients.[12] In a study conducted in 2018 by Rostamzadeh et al., it was found that 66% of dentists felt they had a professional obligation to treat HIV/AIDS patients, while the risk of getting infected by patients was reported to be 80%.[9] Golkari in 2020 found that 80.6% of dentists were concerned about exposure to HIV/AIDS infection, and 29% were willing to accept HIV-positive patients into their practices.[13] Other research states 60.77% of dentists are not willing to provide treatment, and 60.76% are afraid of contracting HIV.[14] According to Kadeh et al. (2014), 40–70% of dentists refused to treat HIV patients.[15]

Dentists must have good practices for carrying out work safety procedures and be able to understand the principles of sterilization, disinfection, and asepsis. When carrying out treatment, dentists cannot avoid contact with saliva and blood as intermediaries for transmitting HIV infection.[16] HIV can also be transmitted through sharing contaminated needles.[17] Koseoglu et al.(2018) reported that 95% of dentists always use masks and gloves when carrying out treatment.[18]

The impact of opportunistic infections shows the important role and responsibility of dentists in providing comprehensive and quality care for HIV/AIDS patients.[19] Dentists must have good knowledge, attitudes, and practices for early detection of signs and symptoms of HIV/AIDS through regular dental and oral examinations and advise the patient to carry out further examinations.[19,20] Oral lesions are often an early sign of HIV infection. Approximately 70-90% of oral lesions are seen in HIV patients.[21]

Although treating HIV/AIDS patients in dental health facilities is important, dentists also face a number of risks and challenges. One of them is the potential for HIV transmission from patients to dentists. This causes concern and anxiety among dentists, especially those who do not yet have adequate knowledge, attitudes, and practices regarding the prevention and control of HIV/AIDS infections.[22] Agarwal et al. in 2015 reported that the most common concern reported was fear of occupational contagion is 60.76%.[14] Therefore, the purpose of this study was to determine the knowledge level, attitudes, and practices of dentists about patients with HIV/AIDS at the dentist in Medan which has never been reported before. Since there is no prior research on this topic in Medan, the researcher is interested in conducting this study.

METHODS

This study adopts a descriptive research approach with a cross-sectional design carried out directly in private practices or dental clinics in Medan. The research population was 1319 dentists in Medan in 2024. The sampling technique used was simple random sampling which had been selected from PDGI (Persatuan Dokter Gigi Indonesia) in Medan. Sample size was calculated to estimate the proportion formula and 299 people were obtained. A questionnaire was used for data collection. The questionnaire consisted of four major parts: demographic information (age, sex, work experience, and educational level) and knowledge, attitudes, and practices regarding HIV/AIDS infections. Previously, the questionnaire had been tested for reliability with 30 dentists and obtained a Cronbach alpha value > 0.7. It is known that the questionnaire is reliable because all Cronbach's Alpha values > 0.6. Univariate analysis was used for data analysis to describe each variable in the study by describing the frequency distribution.

The number of questions related to knowledge, attitude, and practice was 10, 13, and 17, respectively. The knowledge questions consisted of Transmission, pathogenesis, risk factors and treatment. The attitude questions consisted of discrimination, fear and worry, professional obligations and principles of control infection. The practice questions consisted of universal precaution, sterilization, integration with health service centers, fear and worry. Ten questions had three possible responses: yes, no, and do not know (each correct answer received three points, two points for "do not know" answers, and one point for incorrect answers). Thirteen items on the attitude toward these infections were assessed using a three-point Likert scale (3 = agree, 2 = uncertain, 1 = disagree), and 17 items on practice were scored with 4 responses (always, often, sometimes, and never). Descriptive statistics, including percentage, mean, and SD of scores, were used, and standardized scores (score percentages of maximum possible scores) were calculated in each category. The scores were stratified into poor, moderate, and good categories. Good knowledge was defined as correct answers with scores 23-30 (value 76%-100), moderate knowledge with scores 15-22 (value 50%-75%), and poor knowledge with scores <15 (value < 50%). The attitude was categorized into negative attitude with scores 13-21 (value 33%-56%), neutral attitude with scores 22-30 (value 57%-79%) and positive attitude with scores 31-39 (value 80%-100%). The practice was also categorized into poor with scores 17-35 (value < 52%), moderate with scores 36-51 (value 52%-75%) and good practice with scores 52-68 (value 76%-100%).[9]

RESULTS

The results of research on 299 dentists obtained data on the characteristics of respondents based on gender, namely, females were 86.3% and males were 13.7%. Respondents aged 23-30 years were 88%, followed by respondents aged 31-40 years at 5.7%, 41-50 years at 4%, and >50 years at 2.3%. Respondents with the most years of work (0-10 years) were 93.6%, followed by 11-20 years (5.7%). According to the respondent's place of practice, dental offices accounted for 40.5%, followed by public clinics at 41.8% and private clinics at 17.7% (Table 1).

Table 1. Data on respondent characteristics (n=299)

Respondent characteristics	n	%
Gender		
Male	41	13,7
Female	258	86,3
Age		
23-30 year old	263	88
31-40 year old	17	5,7
41-50 year old	12	4
> 50 year old	7	2,3
Length of Work/Practice		
0 – 10 year	280	93,6
11 – 20 year	17	5,7
21 – 30 year	2	0,7
Practice Place		
Private Clinics	53	17,7
Dental Offices	121	40,5
Public Clinics	125	41,8

Table 2. Percentage distribution of knowledge about HIV/AIDS among dentists (n=299)

Knowledge	n	%
HIV/AIDS is transmitted from mother to child.		
Yes	283	94,6
Don't know	2	0,7
No	14	4,7
HIV/AIDS is transmitted through air or water.		
Yes	41	13,7
Don't know	6	2,0
No	252	84,3
HIV/AIDS is transmitted through social contact (shaking hands, kissing, sharing glasses, clothes, etc.).		
Yes	72	24,1
Don't know	8	2,7
No	219	73,2
HIV/AIDS is transmitted through saliva.		
Yes	155	51,8
Don't know	7	2,3
No	37	45,8
HIV/AIDS is completely cured using antiretroviral therapy.		
Yes	146	48,8
Don't know	11	3,7
No	142	47,5
Antiviral drugs (such as acyclovir, amantadine) are used for the treatment of HIV/AIDS.		
Yes	178	59,5
Don't know	5	1,7
No	111	38,8
HIV/AIDS patients donate blood.		
Yes	32	10,7
Don't know	13	4,3
No	254	84,9
Recommendations for carrying out prophylaxis after experiencing a needle stick injury and exposure to HIV/AIDS		
Yes	232	77,6
Don't know	23	7,7
No	44	14,7
HIV infection progresses to AIDS within one year.		
Yes	172	57,5
Don't know	23	7,7
No	104	34,8
The risk of contracting HIV/AIDS infection after being pricked by an injection needle is around 50-70%.		
Yes	160	53,5
Don't know	27	9,0
No	112	37,5

The knowledge questionnaire consists of 10 questions. Respondents who did not know that HIV/AIDS cannot be transmitted through saliva were 51.8%, and

47.5% were unaware that HIV/AIDS cannot be completely cured using antiretroviral therapy. Antiviral drugs (such as acyclovir and amantadine) cannot be used to treat HIV/AIDS (59.5%); HIV infection cannot progress to AIDS within one year (57.5%).

The results showed that respondents knew that HIV/AIDS could be transmitted from mother to child were 94.6%, HIV/AIDS could not be transmitted through air or water were 84.3%, HIV/AIDS could not be transmitted through social contact were 73,2%, HIV/AIDS patients cannot donate blood were 84.9%, those exposed to HIV/AIDS are advised to take prophylaxis were 77.6%, and the risk of contracting HIV/AIDS infection after being pricked by a syringe is around 50-70% were 53.5% (Table 2).

Table 3. Level of knowledge about HIV/AIDS among dentists (n=299)

Level of knowledge category	n	%
Good (76 – 100%)	153	51,2
Moderate (50 – 75%)	133	44
Poor (< 50%)	13	4,3

The research results showed that the majority of respondents had a good level of knowledge about HIV/AIDS, which amounted to 51.2%, followed by a moderate level of knowledge at 44.5%, and a poor level of knowledge at 4.3% (Table 3).

Table 4. Percentage distribution of attitudes towards patients with HIV/AIDS at dentists (n=299)

Attitudes	n	%
I prefer not to treat HIV/AIDS positive patients.		
Agree	108	36,1
Uncertain	89	29,8
Don't agree	102	34,1
Dentists have the opportunity to refuse treatment to HIV/AIDS patients.	148	49,5
Agree	68	22,7
Uncertain	83	27,8
Don't agree		
Patients with HIV/AIDS must undergo dental treatment in special clinics.	190	63,5
Agree	57	19,1
Uncertain	52	17,4
Don't agree		
If I found out my old patient had HIV/AIDS, I would stop treating him.	80	26,8
Agree	102	34,1
Uncertain	117	39,1
Don't agree		
Fear and worry about contracting HIV/AIDS are two of the reasons for rejecting infected patients.		
Agree	184	61,5
Uncertain	51	17,1
Don't agree	64	21,4
Dentists are concerned about the increased risk of HIV/AIDS transmission when treating them.		
Agree	228	76,3
Uncertain	36	12
Don't agree	35	11,7
Despite clinical precautions, there is a risk of transmission of HIV/AIDS from patient to dentist.		
Agree	264	88,3
Uncertain	18	6
Don't agree	17	5,7
Despite clinical precautions, there is a risk of transmission of HIV/AIDS from dentist to patient.		
Agree	265	88,6
Uncertain	16	5,4
Don't agree	18	6

Despite clinical precautions, there is a risk of patient-to-patient transmission of HIV/AIDS.		
Agree	269	90,0
Uncertain	19	6,4
Don't agree	11	3,7
Professional dentists have an obligation to treat HIV/AIDS-positive patients.		
Agree	253	84,6
Uncertain	26	8,7
Don't agree	20	6,7
Infection control efforts to prevent HIV/AIDS transmission must go beyond preventing HBV and HCV transmission.		
Agree	231	77,3
Uncertain	19	6,4
Don't agree	49	16,4
Infection control principles must be adequate to prevent the transmission of HIV/AIDS.		
Agree	288	96,3
Uncertain	4	1,3
Don't agree	7	2,3
All patients should be considered potentially infectious.		
Agree	285	95,3
Uncertain	10	3,3
Don't agree	4	1,3

The attitude questionnaire consists of 13 questions. Respondents who agreed that dentists who have the opportunity to refuse treatment to HIV/AIDS patients were 49.5% and patients with HIV/AIDS who must undergo dental treatment in special clinics were 63.5%. Respondents who agreed that fear and worry about contracting HIV/AIDS was one of the reasons for rejecting infected patients were 61.5%, worrying about the increased risk of HIV/AIDS transmission during treatment were 76.3%, infection control efforts to prevent HIV transmission/ AIDS must be more than prevention of HBV and HCV transmission infections were 77.3% (Table 4).

Table 5. Level of attitudes towards patients with HIV/AIDS at dentists in Medan (n=229)

Level of attitudes category	n	%
Positive (80 – 100%)	19	6,4
Neutral (57 – 79%)	176	58,9
Negative (33 – 56%)	104	34,8

Based on the research results, it shows that the majority of respondents had a neutral level of attitude, standing at 58.9%, a negative level of attitude, constituting 34.8%, and a positive level of attitude at 6.4% towards patients with HIV/AIDS (Table 5).

Table 6. Percentage distribution of practices towards patients with HIV/AIDS at dentists in Medan (n=299)

Practices	n	%
Use gloves		
Always	298	99,7
Often	1	0,3
Sometimes	0	0,0
Never	0	0,0
Change gloves for each patient		
Always	294	98,3
Often	4	1,3
Sometimes	1	0,3
Never	0	0,0
Using a mask		
Always	271	90,6
Often	16	5,4
Sometimes	11	3,7
Never	1	0,3

Change masks for each patient		
Always	204	68,3
Often	39	13
Sometimes	53	17,7
Never	3	1
Wearing a dress		
Always	216	72,2
Often	33	11
Sometimes	50	16,7
Never	0	0,0
Wash hands before treatment		
lways	243	81,3
ften	21	7
ometimes	33	11
Never	2	0,7
Wash hands after treatment		
Always	271	91,0
Often	12	4,0
Sometimes	15	5,0
Never	0	0
Replace the dental unit protector every day		
Always	159	53,2
Often	58	19,4
Sometimes	77	25,8
Never	5	1,7
Use protective glasses		
Always	169	56,5
Often	45	15,1
Sometimes	82	27,4
Never	3	1,0
Washing protective glasses		
Always	181	60,5
Often	46	15,4
Sometimes	70	23,4
Never	2	0,7
Wrap all instruments to prevent contamination		
Always	216	72,2
Often	43	14,4
Sometimes	36	12,0
Never	4	1,3
Close the cap back on the needle		
Always	262	87,6
Often	17	5,7
Sometimes	9	3,0
Never	11	3,7
Use gowns for patients		
Always	127	42,5
Often	37	12,4
Sometimes	88	29,4
Never	47	15,7
Sterilize your instruments using a hot or dry autoclave		
Always	228	76,2
Often	25	8,4
Sometimes	26	8,7
Never	20	6,7
Accepting patients with HIV/AIDS infection		
Always	124	41,5
Often	11	3,7
Sometimes	69	23,1
Never	95	31,8
Willing to collaborate with service centers that serve patients infected with HIV/AIDS		
Always	152	50,6
Often	30	10,0
Sometimes	40	13,4
Never	77	25,8
There is fear and worry during treatment for HIV/AIDS.		
Always	198	66,2
Often	57	19,1
Sometimes	24	8,0
Never	20	6,7

The Practice questionnaire consists of 17 questionnaire questions. The research results showed that respondents who always used gowns for patients were 42.5%, received patients with HIV/AIDS infection were 41.5%, had fears and concerns while providing care to HIV/AIDS patients were 66.2%, using gloves were 99.7%, always changing gloves for each patient were 98.3%, and using masks were 90.6%, respondents who always changing masks for each patient were 68.3%, using gowns were 72,2%, wash hands before treatment were 81.3%, and always wash hands after treatment were 91%, change dental unit protectors every day were 53.2%, use protective glasses were 56.5%, wash glasses protective equipment were 60.5%, dentists who always wrap all instruments to prevent contamination were 72.2%, reseal caps on needles were 87.6%, sterilize instruments using a hot or dry autoclave were 76.3%, and willing to collaborate with service centers that serve patients infected with HIV/AIDS were 50.8% Also, respondents who never fearead and worried during treatment for HIV/AIDS were 6,7% (Table 6).

Table 7. Level of practices towards patients with HIV/AIDS at dentists in Medan (n=299)

Level of practices category	n	%
Good (76 - 100%)	147	49,2
Moderate (52 - 75%)	132	44,1
Poor (< 52%)	20	6,7

The results of this study show that the majority of respondents had a good level of practice at 49.2%, a moderate level of practice at 44.1%, and a poor level of practice at 6.7% (Table 7).

DISCUSSION

The majority of dentists were shown to have good knowledge regarding HIV/AIDS. However, a high percentage of dentists not knowing that HIV/AIDS is transmitted through saliva, HIV/AIDS cannot be completely cured with antiretroviral therapy, antiviral medication can be used to treat HIV/AIDS, and HIV infection can develop into AIDS within a year were found to be less satisfactory, with a percentage below 50%. The findings are very interesting and reflect the need for improvement in education and post-graduate courses, refresher courses, seminars, and training on this topic to improve the dentist's readiness to provide dental treatment for patients with HIV/AIDS.

The research results showed that 94.6% of respondents knew that HIV/AIDS could be transmitted from mother to child, but research by Rostamzadeh et al. in 2018 and Golkari et al. in 2020 was 92.6% and 31.1%.[9,13] HIV/AIDS can be transmitted from mother to child due to the influence of long work experience. The longer a dentist's work experience, the more likely they are to have better knowledge about HIV/AIDS.[9]

As many as 84.3% of respondents to this study were aware that HIV/AIDS cannot be transmitted through air or water, while research by Yadav et al. in 2019 stated that it was 80.06%.[8] Respondents already had valid information and theories regarding the transmission of HIV/AIDS during school and working as dentists, so they had good knowledge and understanding.[17]

The research results stated that 73.2% of respondents knew that HIV/AIDS could not be transmitted through social contact such as shaking hands, kissing, sharing glasses, clothes, etc., while research by Rostamzadeh et al. in 2018 and Jain et al. in 2020 was 77.4% and 50%.[9,18] This high percentage could be caused by respondents having valid theories and information regarding the transmission of HIV/AIDS during school and work.[17]

The research results showed that 45.8% of respondents knew that HIV/AIDS could not be transmitted through saliva, while research by Cangul et al. in 2020 and Golkari et al. in 2020 amounted to 44.8% and 50.5%, respectively.[13,19] Dentists globally are only worried about patients infected with HIV/AIDS but do not want to increase their knowledge about how HIV/AIDS is transmitted.[13]

As many as 47.5% of respondents knew that HIV/AIDS could not be completely cured using antiretroviral therapy, while research by Jain et al. in 2020 and Oberoi et al. in 2014 amounted to 36.50% and 54.6%, respectively.[18,20] This lack of knowledge means that they think ART therapy can cure patients with HIV/AIDS. In theory, ART therapy can only inhibit HIV by preventing the formation of the CD4 virus in the sufferer's body.[20]

The research results showed that 38.8% of respondents knew that antiviral drugs such as acyclovir and amantadine could not be used to treat HIV/AIDS, while research by Rostamzadeh et al. in 2018 and Yadav et al. in 2019 amounted to 43.4% and 64.15%, respectively.[8.9] HIV is a retrovirus that specifically infects CD4 cells in the human body by attaching itself to the cell surface.[21] Acyclovir inhibits herpes virus DNA polymerase, and amantadine prevents influenza virus protein synthesis. These two mechanisms have no effect on HIV replication.[22]

The research results showed that 84.9% of respondents knew that HIV/AIDS patients could not donate blood, while research by Yadav et al. in 2019 and Rostamzadeh et al. in 2018 was 85.09% and 75.5%.[8.9] The high percentage of respondents was due to respondents already having valid theories and information about HIV/AIDS, and most dentists were already aware that blood donated from patients with HIV/AIDS can infect other people.[23]

The results of this study showed that 77.6% of respondents knew that prophylaxis was recommended after experiencing a needle stick injury exposed to HIV/AIDS, while the research of Jain et al. and Oberoi et al. in 2014 was 81.50% and 43.6%, respectively.[18.20] The majority of dentists in Medan are familiar with the theory of prophylaxis. Post-exposure prophylaxis (PEP) is administered to prevent HIV infection and is followed by either PEP or antiretroviral therapy (ART). This therapy can be recommended even if the patient's HIV positive status is not known.[24]

Respondents in this study knew that HIV infection could not develop into AIDS within one year, namely 34.8%, while research by Yadav et al. in 2019 and Rostamzadeh et al. in 2018 was 31.51% and 22.6%.[8,9] As the body's immunity worsens, HIV/AIDS patients begin to show symptoms due to opportunistic infections such as weight loss, fever, weakness, among others. After around 10 to 13 years, their health progressively declines, leading to their eventual death.[25] This research found that 53.5% of respondents knew that the risk of contracting HIV/AIDS infection after being pricked by an injection needle was around 50-70%, while research by Oberoi et al. in 2014 and Rostamzadeh et al. in 2018 was 16% and 22%.[9,20] There is a lack of clear information regarding the percentage risk of HIV transmission through injection needles, so many respondents answered this question incorrectly.[2]

As many as 36.1% of respondents to this study chose to agree not to treat HIV/AIDS positive patients, while research by Oberoi et al. in 2014, Koseoglu et al. in 2018, and Kadeh et al. in 2014 was 47.2%, 17.5%, and 73%.[1,15,20] Some dentists are increasingly concerned about HIV/AIDS patients, although there are still dentists who choose not to treat them and refer patients to more competent specialists.[17,26]

The research results showed that 49.5% of respondents agreed that dentists had the opportunity to refuse treatment for HIV/AIDS patients, whereas according to research by Jain et al. in 2020, it was 43.5%.[18] Most dentists think that saliva is a medium for transmitting HIV/AIDS, which causes worry and anxiety about carrying out treatment. Transmission of HIV/AIDS can occur through blood, from mother to child, and contaminated needles.[27]

Respondents who agreed that patients with HIV/AIDS should receive dental treatment in special clinics were 63.5%, while research by Kadeh et al. in 2014 and Jain et al. in 2020 was 55.2% and 74.5%.[15.18] Many dentists are still worried about losing other patients if they accept and treat HIV/AIDS patients, and there is a feeling of being burdened by more costs. One of them is carrying out standard precautions.[28]

The results of the study showed that 26.8% of respondents agreed that if a patient suffers from HIV/AIDS for a long time, they will stop treating him, while research by Yadav et al. in 2019 found 13.96%.[8] Respondents felt they had a responsibility to the patients they had treated for a long time. So, the majority of dentists in Medan decided they would continue treatment if they knew their old patient was suffering from HIV/AIDS.

According to the results of this study, respondents agreed that fear and worry about contracting HIV/AIDS was one of the reasons for refusing infected patients, namely 61.5%, while research by Kadeh et al. in 2014 found that it was 92%.[15] HIV infection is part of a chronic disease that causes high psychological pressure and anxiety, both for HIV/AIDS patients and dentists.[17,29] In addition, a lack of knowledge and understanding about HIV/AIDS, as well as insufficient training and experience in treating it, can also increase dentists' fear and worry about providing treatment.[17,30]

This research shows that 76.3% of respondents agree that dentists are worried about the increased risk of HIV/AIDS transmission when treating them, but research by Kadeh et al. in 2014 and Golkari et al. in 2020 was 81% and 51.5%.[13.15] The amount of fear and anxiety among dentists regarding the transmission of infection during treatment can occur in the practice in several ways, including from patient to dentist, dentist to patient, patient to patient, and practice places to the community.[27,30]

As many as 88.3% of respondents chose to agree that regardless of clinical preventive measures, there is a risk of transmitting HIV/AIDS from patients to dentists, while according to research by Jain et al. in 2020, it was 75.50%.[18] Cross-infections can occur in dental practices. When carrying out their profession, dentists come into direct or indirect contact with microorganisms in the saliva and blood of patients. Dentists are also at great risk of contracting infectious diseases such as HIV/AIDS.[27]

Respondents who agreed that regardless of clinical preventive measures, there was a risk of transmitting HIV/AIDS from dentist to patient was 88.6%, while research by Rostamzadeh et al. in 2018 found it to be 80.2%.[9] The dentist's work environment is a source of infection transmission, so infection prevention and control are needed in every treatment action, including implementing universal precautions. There is a risk for the dentist to transmit infection during the procedure if something iatrogenic occurs during treatment.[27]

This research shows that as many as 90% of respondents agree that regardless of clinical preventive measures, there is a risk of transmitting HIV/AIDS from patient to patient, whereas research by Rostamzadeh et al. in 2018 found the risk to be 90.6%.[9] Inadequate sterilization protocols and the utilization of equipment previously used by patients who were not properly sterilized could be the underlying causes.

The results of this study showed 84.6% of respondents agreed that professional dentists have an obligation to treat HIV/AIDS-positive patients, whereas according to research by Jain et al. in 2020, it accounted for 67.5%.[18] Dentists have an ethical and professional responsibility to provide care to all patients, including HIV/AIDS patients. Dentists have an obligation to treat all patients equally and offer high-quality dental care. So, dentists need to be aware of and understand knowledge about HIV/AIDS in order to carry out effective clinical management. Understanding the pathophysiology of the disease and oral symptoms, as well as the modes of transmission, will influence their willingness

to treat HIV/AIDS patients. Dentists must have technical and interpersonal skills so that they can treat HIV/AIDS patients with professionalism and competence.[17]

This research found that 77.3% of respondents agreed that infection control efforts to prevent HIV/AIDS transmission must go beyond preventing HBV and HCV transmission; however, according to a study by Jain et al. in 2020, this percentage was slightly lower at 70.5%.[18] Many dentists assume that HBV and HCV are less dangerous than HIV/AIDS. However, in fact, the risk of transmitting hepatitis B to dentists who are not immunized is six times greater. The high number of hepatitis B virus infections and the increasing increase in HIV/AIDS, which is transmitted through the blood of patients, are signs of this disease that need to be watched out for.[5,31]

As many as 96.3% of respondents agreed that the principles of infection control must be adequate to prevent HIV/AIDS transmission; however, according to research by Rostamzadeh et al. (2018), it was 55.7%.[9] Dentists consider it important to prevent and control HIV/AIDS infection programs to protect patients, health workers, visitors, and families from the risk of contracting HIV/AIDS infection. This is caused by the HIV/AIDS epidemic as a health threat in 2030.[31]

Respondents who agreed that all patients should be considered potentially infectious were 95.3%, whereas according to Kadeh et al. in 2014, it was 75.9%.[15] HIV/AIDS cases are growing rapidly throughout the world. Initially, it was found in homosexual groups. Currently, the risk of transmission exists not just in populations with high-risk behaviors but also among housewives, children, and babies conceived or infected by HIV-positive mothers. However, the highest rate of HIV/AIDS was found in sexual relations among sex workers. In recent years, there has been a noticeable increase in AIDS cases, specifically among injecting drug users (IDUs).[15]

The research results showed that dentists in Medan had a neutral attitude towards patients with HIV/AIDS, namely 58.9%; however, Sufiawati's research in 2021 stated that dentists who had a positive attitude towards HIV/AIDS patients were 53%.[11] Attitudes tended to be doubtful, and not all professionals are affected by the HIV/AIDS epidemic and the risk of infection, which causes anxiety and worry for dentists. Dentists also worry that they will lose other patients if they accept and treat HIV/AIDS patients, and this will require them to pay more money. Stigma and discrimination against HIV/AIDS patients by dentists are also influenced by their knowledge. Training dentists about HIV/AIDS not only increases knowledge but also attitudes toward carrying out treatment. Institutions or health service institutions such as hospitals, health centers, and clinics/practices influence this stigma and discrimination.[32]

This research shows that respondents have good practices for preventing the transmission of infections in dental clinics, such as always using gloves and changing gloves for each patient, 99.7% and 98.3%, whereas a study by Rostamzadeh et al. (2018) uncovered slightly lower rates of 93.4% and 84.9%.[9] Gloves are used to anticipate direct contact with blood or body fluids, mucous membranes, and other potentially infectious materials.[33]

Respondents who consistently wore masks and replaced them for each patient represented 90.6% and 68.3%, respectively; however, studies conducted by Rostamzadeh et al. in 2018 yielded figures of 84.7% and 54.7%, while Yadav et al.'s research in 2019 showed a higher percentage at 86.98% and 55.6%.[8,9] Masks are used to control exposure of the doctor's oral cavity and nasal mucosa to infectious materials and the patient's blood and oral fluids.[30,33,34]

Respondents in this study always wore dresses, namely 72.2%, while in research by Rostamzadeh et al. in 2018, it was 54.7%. Only 42.5% of respondents always used gowns for patients, but according to research by Rostamzadeh et al. (2018), it was 73.8%.[9] Protective clothing, such as gowns, must be worn to prevent contamination and protect dentists from exposure to blood and body

substances. The sleeves of the dress should also be long enough to protect the arms when the dress is worn.[35,36]

Respondents always wash their hands before and after treatment, namely 81.3% and 91%, whereas research by Rostamzadeh et al. in 2018 yielded 67.9% and 82.1%, and research by Yadav et al. in 2019 recorded rates of 64.91% and 83.02%, respectively.[8.9] Washing hands with the correct and appropriate procedures must be carried out by a dentist, which is effective in reducing bacteria and can be done with a disinfectant solution, soap, or other antiseptic. Washing and maintaining hand hygiene is one form of a dentist's application of protection in an effort to prevent cross-infection.[30,34]

This research shows that as many as 53.2% of respondents always change dental unit protectors every day, while research by Yadav et al. in 2019 found that it was 58.49%.[8] Dentists use plastic wrap, which is shaped to suit the surface being covered and usually adheres well so that splashes of saliva and blood that are emitted while working do not directly hit the work surface but only hit the plastic surface, which can be replaced immediately for each new patient.[30,34]

As many as 56.5% and 60.5% of respondents always use protective glasses and wash them, while research by Rostamzadeh et al. in 2018 yielded 80.1% and 79.2%.[9] Protective glasses (goggles, polycarbonate glasses, face-shields, and prescription glasses with disposable side shields) must at least be cleaned with soap and water when finished with treatment. The purpose of these glasses is to protect the mucous membranes of the eyes, nose, and mouth during the procedure from splashes of blood or body fluids.[30,33,34]

The research results showed that 72.2%, 87.6%, and 76.3% of respondents always wrapped instruments to prevent contamination, closed the caps on needles, and sterilized instruments using hot or dry autoclaves, while research by Yadav et al. in 2019 yielded 81.5%, 84.34%, and 91.51%.[8] Sterilization and disinfection of tools are very important procedures in dental practice. Heat-resistant dental instruments are sterilized by autoclave, dry heating, or chemicals. Sterilization time, temperature, and other parameters, instructions, and packaging must comply with procedures. The storage area must be closed to sterile and disposable equipment. Storage can be wrapped, and sterile equipment should be checked before use to ensure protective integrity and dryness.[30,33,34]

Respondents to this study answered that they always accepted HIV/AIDS patients at 41.5%, whereas in research by Agarwal et al. in 2015, it was 39.23%.[14] Respondents always had fears and concerns during treatment for HIV/AIDS patients, which was 66.2%, while research by Rostamzadeh et al. in 2018 and Yadav et al. in 2019 yielded 58.5% and 56.79%, respectively.[8.9] Respondents were always willing to collaborate with service centers that serve HIV-infected patients, amounting to 50.6%, but according to research by Rostamzadeh et al. (2018), it was 38.7%.[9] Some of the reasons dentists are not willing to treat HIV patients include excessive fear of the risk of transmission during treatment, even though they already have good knowledge.[10] RI Minister of Health Regulation Number 21 of 2013 concerning HIV/AIDS Management states that every health service facility is prohibited from refusing treatment and care to HIV/AIDS patients because everyone has the right to access health services.[25]

According to research findings, the majority of dentists' practice rates for patients with HIV/AIDS in Medan are satisfactory, with a score of 49.2%. This figure surpasses that of Rostamzadeh et al. (2018), who reported a rate of 24.07% for dentists in the "good" category.[9] All health workers, including dentists, are required to follow infection control procedures (universal precautions) to protect against the transmission of good infections.[10] Technically, several dentists in Medan declined to fill out the questionnaire. The refusal to complete the questionnaire was also due to dentists having had a busy schedule with patient care, necessitating the researcher's search for additional dentists to complete the full research sample.

CONCLUSION

Dentists had a good level of knowledge about HIV/AIDS, a neutral attitude, and good practices towards patients with HIV/AIDS. To maintain a good level of knowledge and practice and establish positive attitudes towards patients with HIV/AIDS, there is a need for improvement in education and post-graduate courses, refresher courses, seminars, and trainings about HIV/AIDS to improve dentists' readiness to provide dental treatment for patients with HIV/AIDS. Implication of the results of this research are expected to be used by future researchers as a reference material and additional information to assist in the development of research.

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