Prevalence of Tobacco Smoking and Stages of Behavior Change in People Living with HIV: A Descriptive Cross-Sectional Study in Indonesia

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Abstract: The interaction of smoking and HIV has a substantially negative impact on multiple comorbidities, disease prognosis, and impaired adherence to HIV drugs. The health benefits of smoking cessation are well documented among HIV-positive individuals. However, there are no clinical practice guidelines to guide tobacco smoking cessation treatment in people living with HIV. Addressing the current stage of change for smokers may help provide appropriate and effective advice on smoking cessation. This cross-sectional study explored the prevalence of smoking and the stage of change in people living with HIV at an AIDS non-governmental organization in West Java, Indonesia. Convenience sampling was used to recruit 150 participants aged over 20 years old. Data were collected on demographic and clinical information, smoking status, willingness to quit smoking and using the instrument of stage of change based on the Transtheoretical Model.

Results indicated that most respondents were males, 30 to 40 years old. More than half (53%) were currently smoking more than ten cigarettes per day (55%). Among smokers, 80% were willing to quit smoking, and more than half were in the preparation stage. The majority of respondents (65%) had never heard about a smoking cessation program, and 91% had never joined this program. We concluded that more than half of people living with HIV were currently smoking, and most smokers were only at the pre-contemplation stage. Systematic screening for smoking during routine HIV care using the Transtheoretical Model "stage of change" model may help to reduce the heavy burden of smoking and smoking-related morbidity and mortality within HIV populations. In addition, smoking cessation training for nurses or case managers who care for people living with HIV is required to help, assist, and support HIV smokers in quitting.

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Introduction

The dangers of tobacco smoking are well documented around the world. Smoking has a significant modifiable cardiovascular disease (CVD) risk factor that has a more significant effect than other traditional risk factors such as hyperlipidemia or higher blood pressure. A previous study reported that people living with HIV (PLWH) who smoked have an increased

risk of a CVD event and double the higher risk of hypertension than PLWH-nonsmokers.[1] It was also reported that males who had sex with males (MSM), 9.9% developed anal high-grade intraepithelial lesions, and three smokers developed anal cancer.[2] A meta-analysis reported that the prevalence of smoking in PLWH was 46.5%, with the highest prevalence was in European countries (46.4%), males (75.9%), and MSM (52.1%).[3] In the United States, an estimated 40% to 76% of adults with HIV are currently smoking, which is higher than the general population at 20%.[4,5] In Indonesia, among the general population, the prevalence of smokers aged over 15 years reached 33.8% in 2018.[6] There is little information reported on smoking prevalence among the HIV population.

Indonesia is the third-highest prevalence of HIV in the Asia-Pacific region.[6] In Indonesia, the estimated number of PLWH increased dramatically from 5,846 in 2004 to 388,724 in 2020; the number of AIDS diagnoses risen from 4,973 in 2004 to 123,231 in 2020, and the estimated number of AIDS-related deaths increased from 3,586 in 2009 to 17,210 in 2020.[6] The highest age groups of HIV prevalence were at those aged 25-49 years (70.4%), 20-24 years (15.3%), 15-19 years (3.3%), and 14 years (2.7%).[6]

The health benefits of quitting smoking have been demonstrated among PLWH.[7-9] One study showed that smoking cessation reduces bacterial pneumonia risk.[8] Another found that HIV individuals who quit smoking have a much lower incidence of cardiovascular disease (including myocardial infarction and coronary heart disease) than current smokers.[9-12] However, there are currently no clinical practice guidelines for providing smoking cessation therapy to the HIV population.[13] Tobacco use can often go undetected and untreated in many health-care systems.[14] Only about 20% of people try to quit smoking using established methods, resulting in lower cessation rates and increased recurrence rates.[16,17]

The Transtheoretical Model (TTM) is a well-known model used for describing smoking behavior change and developing effective smoking cessation intervention programs in the general population.[17] Briefly, the model proposes that behavioral change can be conceptualized into five stages: pre-contemplation, contemplation, preparation, action, and maintenance.[18] According to TTM,[18] smokers often progress through a series of stages before achieving successful and lasting smoking cessation. While this information has been well-described in the general population,[19] it has been less well studied for HIV populations, and more research is needed. Addressing a smoker›s current stage of change may help in providing appropriate and effective counselling regarding smoking cessation.[20,22]

Literature review and conceptual framework

According to the World Health Organization,[23] smoking is defined as consuming one cigarette per day for at least one year, making people habitual smokers. Some studies characterized current smokers as those who had smoked when asked (yes/no), independent of the number of cigarettes or period.[14,16,25]

Tobacco use in people with HIV was two to three times greater than in the general population, with the highest rates in developed countries.[25] The prevalence of smoking among PLWH also varies by country. In the United States, an estimated 40% to 76% of HIV-positive adults smoke, which is higher than the general population at 20%.[4,6,14] Studies conducted in European countries indicate that between 25% and 67% of PLWH are current smokers.[23,25] Only one study reported a smoking prevalence of 27% in Africa with a sample size >1000.[26] The prevalence in Asia ranges between 23%-51%.[12,27] Cultural traditions or various tobacco control tactics, such as taxation, mass media campaigns, and quitting programs, can all impact tobacco use.[28]

The TTM assesses intention and behavior through five stages of change: (1) pre-contemplation (do not intend to change behavior within the next six months), (2) contemplation (intend to act within 6 months), (3) preparation (intended to change compliance

within 1 month), (4) actions (having adopted new comfortability and continued compliance for less than 6 months) and (5) maintenance (had maintained compatibility).[18] Change processes include covert and overt activities that people engage in as they proceed through the stages. The TTM model was developed by identifying ten processes of change and categorizing them as follows: (1) experiential, which includes awareness raising, significant recovery, self-reevaluation, environmental-climate change, reevaluation, and sociocultural empowerment; and (2) behavioral, which includes information on customer needs, emphasis made, stimulation maintenance, behavior modification, and consciousness.[18] TTM has been used to characterize cigarette consumption and to design suitable smoking cessation interventions in the general population.[17]

Motivation and readiness to stop smoking are important since the more people are prepared, the more likely they will succeed. Studies show that most HIV-smokers (n = 1,545) are prepared to quit, 72% in preparation phases, 24% in the contemplation phase, and only 4% in pre-contemplation phases.[15] Degen and colleagues found that 15.4% of HIV smokers were in pre-contemplation, 48.8% in contemplation, and 15.4% in preparation.[29] Additional studies also found that between 40% and 63% of HIV smokers plan to quit or stop smoking.[8] Approximately 70% of people HIV-positive have attempted to quit smoking and had an average of 2.8 attempts since their HIV diagnosis.[8]

Aim of study: To explore the prevalence of smoking status and stage of change in people living with HIV in Indonesia

Methods

Study design and setting: This study was conducted using a cross-sectional design at a non-government AIDS organization (NGO) in West Java, Indonesia, one of the most prominent NGOs focused on helping and supporting PLWH. The STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies was used to guide reporting of this study.

Sample: The inclusion criteria were people diagnosed with HIV and aged over 20 years. Exclusion criteria were people with AIDS, pregnant women with HIV, and mental or cognitive disorders. The sample size was estimated using G-Power Software Version 3.0.10, and the minimum sample was estimated to be 150. Convenience sampling was used to recruit participants.

Ethical considerations: Approval for the study was obtained from the Institutional Review Board of the STIKep PPNI Jawa Barat III/0.045/KEPK/STIKep/PPNI/Jabar/2019). The managers of the NGO introduced qualified participants to the researcher and invited them to take part in the study during their weekly or monthly social group meeting hosted at the NGO where the study was explained to them. Those who expressed an interest were asked to give written informed consent, and we notified them that they had the right to withdraw from the research at any time without any reason. Participants filled in the questionnaire in a private area. They were informed that all information would be completely anonymous and displayed as group rather than individual data.

Instruments: There were 3 instruments used in this study: demographics and clinical variables, smoking status and history, and the Transtheoretical Model (TTM) Questionnaire for Smoking Cessation.

Demographics and clinical variables: including age, gender, level of education, and employment and clinical variables including alcohol use, years living with HIV, and duration of taking HIV medication. Height and weight were used to measure body mass index (BMI).

Smoking status and history: This was measured using yes or no answers to the questions: "Do you currently smoke?" and "Did you previously smoke?" The frequency of smoking was categorized into never, more than once, once a month or less, 2-4 times a month, 2-3 times a week, and 4 times or more a week.

The Transtheoretical Model (TTM) Questionnaire for Smoking Cessation: This instrument was developed originally in English language by Prochaska,[18] based on the TTM model and was forward translation by two

translators (one with a PhD in nursing from a foreign university (T1) and one English language expert (T2)) to produce two the Indonesian version. The next step was recombining the translations (T1 and T2) and resolving any discrepancies with the translators› results. Then, the questionnaire was translated backwards by native speaker. Final step was an experts panel, consisting one with a PhD in nursing, one PhD in research methodology, one specialist in community health nursing, and one English language expert, discussion to determine equivalence between the English and Indonesian versions in terms of semantic, language, experiential, and conceptual equivalence.

The TTM employs five stages of change to assess intention and behavior. Smokers who currently or previously smoked are classified into five categories: pre-contemplation, contemplation, preparation, action, and maintenance. Pre-contemplation: *"1. Do you currently smoke cigarettes? (Yes); 2. Are you seriously considering quitting smoking within the next six months? (No). Contemplation: 1. Do you currently smoke cigarettes?" (Yes); 2. Are you planning to quit in the next 30 days? (No). Preparation: 1. Do you currently smoke cigarettes? (Yes); 2. Are you planning to quit in now? (Yes). Action: 1. Do you currently smoke cigarettes? (No); 2. Have you smoked any cigarettes in the past six months? (Yes). Maintenance: 1. Do you currently smoke cigarettes? (No); 2. Have you smoked any cigarettes in the past six months? (No).*" The content validity index (CVI) was evaluated by three experts (two nursing academics and one public health nurses), and the CVI score was calculated using Aiken′s value formula, yield a score of 0.84.

The following information was also assessed, namely exposure to information regarding smoking cessation and willingness to join the smoking cessation program. There were three questions added with yes or no answers*: Have you ever joined a smoking cessation program?*; *Have you ever heard about a smoking cessation program?*; and *Are you willing to be referred to a smoking cessation program now?* These questions were developed in Indonesian by the research team and reviewed by three experts (two nursing academics and a public health nurse). The CVI score calculated using Aiken′s formula yielded a score of 0.88.

Data collection: This was undertaken from December 2019-March 2020. The manager assisted in identifying possible individuals who fitted the eligibility requirements. PLWH were identified and referred to the researchers by the manager. The questionnaire and written consent form were delivered back to the researcher in different sealed boxes to guarantee the confidentiality of the information.

Data analysis: SPSS Version 22.00 for Windows was used to analyze the data. Descriptive statistics included means, standard deviation, or frequency to describe characteristics of participants and key variables.

Results

Of the 150 participants, most were males aged from 30 to 40 years old. The prevalence of smoking was higher among males than females, 85% and 15%, respectively (**Table 1**). Almost 80% had been living with HIV >5 years, and all had been taking antiretroviral therapy (ART) (**Table 2**). About half of participants reported having a CD4 count >500 cells/ml. Those who reported drinking alcohol had a higher proportion of current smoking than those who did not drink.

About 53.2% of participants were currently smoking. More than half (53%) were currently smoking >10 cigarettes per day (55%), and the majority (55%) smoked very often (>3 times a day). More than half of the participants were in the preparation stage, which meant that they were willing to quit smoking within a short period (such as next week). Also, 28% were in the contemplation stage, and 21% at the pre-contemplation stage (**Figure 1**). The majority of respondents (65%) had never heard about the smoking cessation program, and 91% had never joined a smoking cessation program. Among smokers, the majority (80%) were willing to quit smoking and be referred to a smoking cessation program.

Table 1 Smoking status comparison based on demographic information among people living with HIV (n = 150)

Variable	Smoking Status		p-value
	Yes (n=80)	No (n=60)	
Age (mean ± SD)	37.90 ± 3970	38.30 ± 4.030	0.557
18–30	4 (5.0)	2 (2.9)	0.765
30–40	53 (73.8)	59 (75.7)	
40–50	17 (21.4)	15 (21.4)	
Gender			
Male	68 (85.0)	43 (61.4)	0.001
Female	12 (15.0)	27 (38.6)	
Education Degree			
Uneducated	1 (1.3)	1 (1.4)	0.356
Primary School	1 (1.3)	1 (1.4)	
Junior School	3 (3.8)	1 (1.4)	
High School	60 (75.0)	61 (87.1)	
College	15 (18.8)	6 (8.6)	
Job Status			
Employed	67 (83.8)	63 (90.0)	0.258
Unemployed	13 (16.3)	7 (10.0)	
Marriage Status			
Single	22 (27.5)	13 (18.6)	0.196
Married	58 (52	57 (81.4)	

Table 2 Smoking status comparison based on clinical information among people living with HIV (n=150)

Variable	Smoking Status		p-value
	Yes (n=80)	No (n=60)	
Stage			
Asymptomatic	2 (2.5)	3 (4.3)	0.561
Symptomatic	27 (33.8)	28 (40.0)	
AIDS	51 (63.7)	39 (55.7)	
Years living with HIV (Mean ± SD)	9.23 ± 3.871	9.74 ± 3.829	0.413
< 5 years	16 (20.0)	10 (14.3)	0.394
>5 years	64 (77.5)	60 (85.7)	
ART consumption	80 (100.0)	70 (100.0)	0.354
Duration of ART consumption (Mean ± SD)	8.90 ± 3.662	9.70 ± 3.850	0.195
<5 years	18 (22.5)	10 (14.3)	0.215
>5 years	62 (77.5)	60 (85.7)	
CD4 cell counts (mean ± SD)	498.53 ± 152.704	487.50 ± 124.413	0.627
<200	3 (3.8)	0 (0.0)	0.670
200–500	37 (46.3)	35 (50.0)	
500–1200	40 (50.0)	35 (50.0)	
Body Mass Index (BMI) (mean ± SD)	21.58 ± 2451	21.43 ± 2.030	0.683
Less	8 (10.0)	5 (7.1)	0.531
Normal	46 (57.5)	47 (67.1)	
Overweight	20 (25.0)	15 (21.4)	
Obesity 1	6 (7.5)	3 (4.3)	
Alcohol use			
No	60 (75.0)	67 (95.7)	0.000
Yes	20 (25.0)	3 (4.3)	0.000

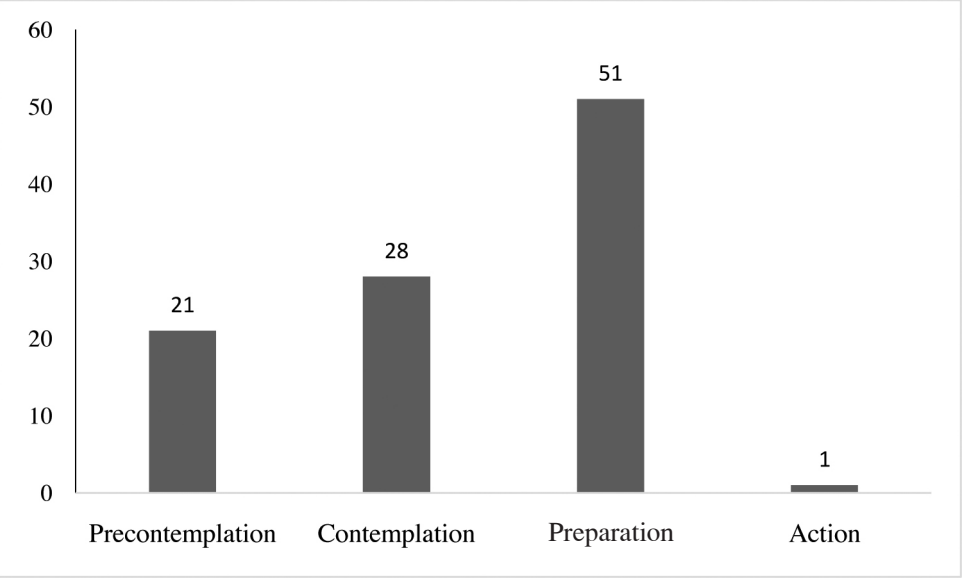

Figure 1 Stage of change of smoking behavior among people living with HIV based on Transtheoretical Model (TTM) (n = 150)

Discussion

More than half of the Indonesian participants were currently smoking. This finding contradicts other studies stating that smoking prevalence is higher in developed countries [24] and higher than the estimated prevalence in a meta-analysis.[3] This might due to the majority of previous studies being undertaking in developed countries with less information coming from developing countries like Indonesia. However, in the Asian region, the prevalence of smoking ranges from 20%-51%.[27,31] Smoking in Indonesia is becoming extremely controversial because the country has high cigarette production, and many people are employed in this industry. Controversy about cigarette smoking cessation is affected by cultural practices, different tobacco control policies such as taxation and mass media campaigns, and smoking cessation programs. Although the government in Indonesia has implemented different anti-smoking services and policies, including cessation programs and quitting smoking promotions,[5] the availability and accessibility of smoking cessation in many health institutions is limited. In addition, the reimbursement to individuals for smoking cessation is not covered under health insurance policies with the average cost of a packet of cigarettes ranging from 10 to 35 USD. Therefore, it is vital to provide equity in supporting smokers who want to quit and have a structured strategy at the societal level, with smoking cessation initiatives aimed towards PLWH.

This study also highlights that PLHIV who smoked were also alcohol users. A previous study indicates that substance use such as crack or cocaine and drinking alcohol was associated with current smoking.[25] Moreover, a previous study concluded that PLWH experienced anxiety and depression significantly associated with current smoking.[31] Their HIV status may impact their overall health condition, especially those with chronic inflammation and long-term use of ART.[18] Another study found that PLWH who smoke have a higher level of immunological activation, particularly CD4, and severe fatigue than HIV-non-smokers.[18] Evidence also indicates that smoking impairs adherence to HIV drugs among HIV-positive persons.[27] Therefore, it is

very important for healthcare professionals, including nurses, to pay more attention to how to help HIV-smoker quit smoking and improve their health status.

Unfortunately, two-thirds of our participants had never heard about smoking cessation programs, despite more than 80% being willing to quit smoking. The use of various smoking cessation therapies in the general population has been supported by clinical evidence.[20] In Indonesia, smoking cessation clinics are very rare, about one in every big hospital. A study utilizing pharmacotherapy for tobacco dependence reported that 83% of participants were non-adherent to cessation treatment on at least one or more follow-up visits.[15] Another 12-week pharmacological treatment utilizing varenicline 1.0 mg twice daily indicated that 47% of participants never quit while 53% stopped smoking, with the abstinence rate dropping from 42% to 28% at the end of the research.[13] Campaigns of smoking cessation need to be conducted systematically and widely across Indonesia. Innovative and effective interventions tailored to the HIV population will ultimately result in lower smoking prevalence and improved overall health.

Our study found that about half of HIV-smokers were in the preparation stage according to the TTM model, which was corroborated by previous studies.[8,32] Preparation refers to the stage during which individuals intend to act shortly, typically within the next month. These people have a strategy in place, such as attending a health education class, contacting a counselor, speaking with their doctor, purchasing a self-help book, or using a self-change technique.[18] These are the types of people who need to be targeted for participation in action-oriented smoking cessation programs. According to Prochaska and DiClemente, emphasis should be paid to processes within treatment sessions and procedures to be employed between sessions, resulting in a holistic, integrated strategy that clinicians can readily employ.[18]

Limitations

There are several limitations to our study that should be acknowledged. First, this study was only conducted in one province of Indonesia with a relatively small sample size, so the generalization of the findings might be limited. Second, convenience sampling causes less representativeness of the study population, although the characteristics of studied participants were similar to the national characteristics. However, there were fewer female participants, which could lead to an underestimation of the real smoking prevalence in PLWH. Third, smoking data is based on self-reported, which may be biased. Future research must assess nicotine dependence in order to provide an objective measure of smoking status, and include larger sample sizes.

Conclusions and Implications for Nursing Practice

In conclusion, this study showed a higher prevalence of current smoking, especially among males with HIV. The majority of current smokers were at the pre-contemplation stage. Despite 80% of HIV-smokers being willing to quit smoking, about two-thirds of them had never heard of or were exposed to smoking cessation program. This finding could be used as important data for public health nurses and other health professionals to take quick action in approaching those ready to quit smoking in the next month and facilitate them to join in the smoking cessation program. Moreover, education and campaign about smoking cessation comprehensively, especially for smokers with HIV are urgently needed. Systematic screening for smoking during routine HIV care using the TTM "stage of change" model may help to reduce the heavy burden of smoking and smoking-related morbidity and mortality within HIV populations. In addition, smoking cessation training for nurses or case managers who care for PLWH is required to help,

assist, and support HIV-smokers in quitting. Future studies need to investigate various aspects of smoking, including government tobacco and smoking policies and cultural aspects, to provide a more comprehensive picture of the current situation of smoking in the HIV population in Indonesia.

Conflict of Interest/Disclosure Statement

All authors declare no conflict of interest.

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ความชุกของการสูบบุหรี่และระยะของการเปลี่ยนแปลงพฤติกรรมในผู้ติดเชื้อเอชไอวี: การศึกษาแบบตัดขวางเชิงพรรณนาในอินโดนีเซีย

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บทคัดย่อ: ปฏิสัมพันธ์ของการสูบบุหรี่และเอชไอวีมีผลกระทบในทางลบอย่างมากต่อโรคร่วมหลายอย่าง การพยากรณ์โรค และการใช้ยาตามแผนการรักษาที่ไม่สม่ำเสมอ ประโยชน์ด้านสุขภาพของการเลิกสูบบุหรี่ในผู้ที่ติดเชื้อเอชไอวีเป็นที่ทราบและมีการรายงานไว้แล้ว อย่างไรก็ตาม ยังไม่มีแนวปฏิบัติทางคลินิกที่จะเป็นแนวทางในการเลิกบุหรี่ในผู้ติดเชื้อเอชไอวี การอธิบายขั้นตอนการเปลี่ยนแปลงในปัจจุบันสำหรับผู้สูบบุหรี่อาจช่วยให้คำแนะนำที่เหมาะสมและมีประสิทธิภาพในการเลิกบุหรี่ได้ การศึกษาแบบภาคตัดขวางนี้ได้สำรวจความชุกของการสูบบุหรี่และขั้นตอนของการเปลี่ยนแปลงพฤติกรรมในผู้ติดเชื้อเอชไอวีที่องค์กรเอกชนด้านโรคเอดส์แห่งหนึ่งในชวาตะวันตก ประเทศอินโดนีเซีย สุ่มตัวอย่างตามความสะดวกเพื่อรับสมัครผู้เข้าร่วมวิจัย 150 ราย ที่มีอายุ 20 ปีขึ้นไป เก็บรวบรวมข้อมูลเกี่ยวกับข้อมูลส่วนบุคคลและข้อมูลทางคลินิก สถานะการสูบบุหรี่ ความเต็มใจที่จะเลิกสูบบุหรี่ โดยใช้เครื่องมือประเมินตามแบบจำลองขั้นตอนการเปลี่ยนแปลง (Transtheoretical Model)

ผลการวิจัยพบว่าผู้ตอบแบบสอบถามส่วนใหญ่เป็นเพศชาย อายุ 30-40 ปี มากกว่าครึ่ง (ร้อยละ 53) ยังสูบบุหรี่อยู่ในปัจจุบัน ร้อยละ 55 สูบบุหรี่มากกว่า 10 มวนต่อวัน ในกลุ่มผู้ที่สูบบุหรี่ ร้อยละ 80 เต็มใจที่จะเลิกสูบบุหรี่ และมากกว่าครึ่งหนึ่งอยู่ในขั้นเตรียมการ ผู้ตอบแบบสอบถามส่วนใหญ่ (ร้อยละ 65) ไม่เคยได้ยินเกี่ยวกับโครงการเลิกบุหรี่ และร้อยละ 91 ไม่เคยเข้าร่วมโครงการนี้ ผลการวิจัยสรุปได้ว่ามากกว่าครึ่งหนึ่งของผู้ติดเชื้อเอชไอวียังคงสูบบุหรี่ในปัจจุบัน และผู้สูบบุหรี่ส่วนใหญ่อยู่ในขั้นเมินเฉยต่อการเลิกสูบบุหรี่ การตรวจคัดกรองอย่างเป็นระบบสำหรับการสูบบุหรี่ในระหว่างการดูแลผู้ที่เป็นเอชไอวีตามปกติโดยใช้แบบจำลอง “ขั้นตอนการเปลี่ยนแปลง” อาจช่วยลดภาระหนักของการสูบบุหรี่และการเจ็บป่วยและการตายที่เกี่ยวข้องกับการสูบบุหรี่ในประชากรเอชไอวี นอกจากนี้ การฝึกอบรมเกี่ยวกับการเลิกบุหรี่ให้พยาบาลหรือผู้จัดการรายกรณีที่ดูแลผู้ติดเชื้อเอชไอวี มีความจำเป็นในการช่วยเหลือและสนับสนุนผู้ติดเชื้อเอชไอวีในการเลิกสูบบุหรี่

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