

# ปัจจัยทำนายพฤติกรรมสร้างเสริมสุขภาพของผู้ต้องขังชายที่ติดเชื้อเอชไอวี ในเรือนจำเขตกรุงเทพมหานคร

## Factors Predicting Health Promoting Behaviors of Male Prisoners Living with HIV in Prisons, Bangkok, Thailand

นิพนธ์ต้นฉบับ

Original Article

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### บทคัดย่อ

**วัตถุประสงค์:** เพื่อศึกษาพฤติกรรมสร้างเสริมสุขภาพของผู้ต้องขังชายที่ติดเชื้อเอชไอวีและปัจจัยทำนายพฤติกรรมสร้างเสริมสุขภาพดังกล่าว **วิธีการศึกษา:** การศึกษานี้เป็นการวิจัยแบบหาความสัมพันธ์เชิงทำนายมีกลุ่มตัวอย่างเป็นผู้ต้องขังชายที่ติดเชื้อเอชไอวี ในเรือนจำเขตกรุงเทพมหานคร จำนวน 200 ราย ที่ได้มาจากการสุ่มแบบหลายขั้นตอน เก็บข้อมูลระหว่างเดือนกรกฎาคม ถึงเดือนกันยายน พ.ศ. 2564 โดยใช้แบบสอบถามที่กลุ่มตัวอย่างตอบเองครอบคลุมข้อมูลความมีคุณค่าในตนเอง การรับรู้ประโยชน์ของการปฏิบัติพฤติกรรม การรับรู้อุปสรรคของการปฏิบัติพฤติกรรม การรับรู้ความสามารถของตนเอง การสนับสนุนทางสังคม และพฤติกรรมสร้างเสริมสุขภาพ **ผลการศึกษา:** พฤติกรรมสร้างเสริมสุขภาพของผู้ต้องขังชายที่ติดเชื้อเอชไอวีโดยรวมอยู่ในระดับสูง เมื่อพิจารณารายด้าน พบว่า พฤติกรรมสร้างเสริมสุขภาพด้านความรับผิดชอบต่อสุขภาพ ด้านสัมพันธ์ทางพระหว่างบุคคล และด้านการพัฒนาทางจิตวิญญาณอยู่ในระดับสูง ส่วนด้านกิจกรรมทางกายและด้านการจัดการความเครียดอยู่ในระดับปานกลาง โดยปัจจัยการรับรู้ความสามารถของตนเอง ( $b = 0.409$ ) การรับรู้อุปสรรค ( $b = -0.170$ ) การรับรู้ประโยชน์ ( $b = 0.374$ ) และการสนับสนุนทางสังคม ( $b = 0.248$ ) สามารถทำนายพฤติกรรมสร้างเสริมสุขภาพได้ร้อยละ 47.1 ( $R^2 = 0.482$ ,  $R^2_{adj} = 0.471$ ,  $P\text{-value} = < 0.001$ ) **สรุป:** ผู้บริหาร พยาบาล และบุคลากรที่ปฏิบัติงานในเรือนจำ สามารถส่งเสริมพฤติกรรมสร้างเสริมสุขภาพในกลุ่มผู้ต้องขังชายที่ติดเชื้อเอชไอวี โดยพัฒนาโปรแกรมที่เพิ่มการรับรู้ความสามารถของตนเองและการรับรู้ประโยชน์ของการปฏิบัติพฤติกรรม ลดการรับรู้อุปสรรคในการปฏิบัติพฤติกรรม ร่วมกับการส่งเสริมเครือข่ายที่เพิ่มการสนับสนุนพฤติกรรมสุขภาพ

**คำสำคัญ:** ผู้ต้องขังชาย, พฤติกรรมสร้างเสริมสุขภาพ, โรคติดเชื้อเอชไอวี

### Abstract

**Objective:** To determine the health promoting behaviors of male prisoners living with HIV and to determine factors predicting those behaviors. **Method:** This study is predictive correlational research. Multi-stage random sampling was used to recruit 200 male prisoners living with HIV in prisons Bangkok. Data collection was carried out from July to September 2021 using self-administered questionnaires consisted of a self-esteem questionnaire, a perceived benefits questionnaire, a perceived barriers questionnaire, a perceived self-efficacy questionnaire, a social support questionnaire, and a health promoting behaviors questionnaire. **Results:** The results revealed that the overall of the health promoting behaviors of male prisoners living with HIV was at a high level. The health responsibility, interpersonal relation, and spiritual growth dimensions were rated at high levels. While physical activity and stress management dimensions were rated at medium level. The perceived self-efficacy ( $b = 0.409$ ), the perceived barriers ( $b = -0.170$ ), the perceived benefits ( $b = 0.374$ ), and the perceived social support ( $b = 0.248$ ), could predict 47.1% of the variance accounted for the overall of the health promoting behaviors ( $R^2 = 0.482$ ,  $R^2_{adj} = 0.471$ ,  $P\text{-value} = < 0.001$ ). **Conclusion:** The administrators, nurses, and other health personnel who work in prisons should address for enhancing the health promoting behaviors of male prisoners living with HIV through program development by focusing on improving the perceived self-efficacy and benefits of the behaviors, decreasing perceived barriers to action, and also encouraging social networks to support.

**Keywords:** Male Prisoners, Health Promoting Behaviors, HIV

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## Introduction

Thai prisons have been facing out-of-capacity challenges. The overcrowded accommodation affects the living and health of the prisoners especially those with illnesses inevitably.<sup>1</sup> With limited space and air ventilation, more complications and opportunistic illnesses could be expected.<sup>2</sup> One group of prisoners with illnesses that is at a high risk of disease progression and complications is HIV-infected individuals. The

poor living condition could further reduce the immunity of HIV-infected patients of which their immunity has been already defected by Human Immunodeficiency Virus (HIV). Worse immunity could make the HIV-infected patients much more susceptible to opportunistic infections. Such stage of HIV-infected patients is known as the acquired immunodeficiency syndrome of AIDs which allows for serious opportunistic

infections and subsequent premature death.<sup>3</sup> Despite a decreasing trend of HIV infection in general population, prevalence rate of the infection among the incarcerated has been increasing. In 2018, there was the total of 6,002 HIV-infected prisoners. With 6,419 HIV-infected prisoners in 2020, the prevalent rate was about 2.5 folds of the general population. Most of HIV-infected prisoners were in incarceration facilities in Bangkok (17%) and about three-quarters were male prisoners (78%).<sup>4</sup> The worse situation of more HIV-infected prisoners calls for understanding and urgent measures to alleviate the problems associated with out-of-capacity incarceration.

The treatment of HIV infection is based on the antiretroviral drug treatment and opportunistic infections prevention to delay the progression to AIDs and maintain life expectancy as normal people as possible.<sup>5</sup> With the Thailand national strategic plan to cease AIDs problem, effective outreach and service package known as RRTR measure (Reach, Recruit, Test, Treat, and Retain) has been established.<sup>6</sup> The RRTR measure includes service access, service rendered, screening for HIV infection, treatment, and remaining in the service system. Based on the 95-95-95 target indicators of the RRTR measure, by 2025, 95% of individuals at risk have the chance to know their HIV infection status, 95% of infected individuals have the treatment, and 95% of the treated patients have a successful viral suppression. Medical Service Division, Department of Corrections adopted the RRTR measure for the target individuals.<sup>7</sup> After implanting the RRTR measure, the Department of Corrections achieved all of the 95-95-95 target indicators in the year 2020 except for the proportion of treated patients with viral suppression which was found only in 89.11% of the target.<sup>8</sup> This could be in part because certain treated HIV-infected patients had improper self-care behaviors which could damage the immune system, and the opportunity to spread HIV was open.<sup>3</sup> The proper self-care behavior is not only adherence to antiretroviral medications, but also other behaviors to promote physical strength including immune system. The health-promoting behaviors are of great importance for HIV-infected individuals.<sup>9</sup>

Health-promoting behaviors with persistence to the level of life-long living pattern could help individuals maintain their good health and even raise their health status.<sup>10</sup> Health-promoting behaviors critical for HIV-infected individuals include 6 domains, i.e., health responsibility, activities and

exercises, nutrition, stress management, interpersonal relationship, and spiritual development.<sup>11,12</sup> Prisoners are considered a marginal group of people with difficult access from the public and with limited freedom. They live with same sex individuals, and sometimes with out-of-capacity accommodation. They live under strict rules and regulations with fixed daily schedule for their living routines such as having meals, sleep time, dressing, and occupation training.<sup>2</sup> Their health-promoting behaviors could be different from the public and need more understanding. With a concern on the crucial understanding on five health-promoting behaviors which HIV-infected prisoners are allowed to perform including health responsibility, activities and exercises, stress management, interpersonal relationship, and spiritual development. The behavior dimension of nutrition was not included in this present study because prisoners' food is mostly based on the guidance of the Department of Corrections which dictates nutritional necessity for all prisoner's regarding types of food, energy consumed, numbers of meals consumed, and foods that should be avoided.<sup>13</sup>

Various psychosocial health concepts and theories have been used to describe health behaviors and factors that influence the behavior. Pender's Health Promotion Model has been one of the powerful concepts.<sup>10</sup> Based on the Health Promotion Model, health-promoting behaviors are initiated and encouraged by factors stimulating and/or enforcing the individuals to carry out the behavior to improve their health and well-being. With previous research, it was found that higher age is associated with more health-promoting behavior. Being more mature with increasing age indicates more learning and subsequently better health-promoting behaviors than their younger counterparts.<sup>14,15</sup> Based on the Health Promotion Model, self-esteem is the individual's perception on self-satisfaction and self-pride. Individuals with self-esteem are more likely to perform health-promoting behaviors.<sup>16</sup> Perceived benefits of health-promoting behaviors are the belief or thought the individuals have toward things they get after performing the behaviors. More perceived benefits motivate more actual behaviors.<sup>14,17</sup> On the other hand, perceived barriers to performing the behavior are the belief or thought on difficulties or obstacles that would inhibit them from carrying out the behavior. Higher perceived barriers mean a higher likelihood of failing and/or avoiding the health-promoting behavior.<sup>17,18</sup> Perceived self-efficacy refers to the

individuals' belief in their own potential in performing the behavior. Persons with higher self-efficacy are more likely to perform the behavior than those with a lower one.<sup>19-21</sup> The last factor is social support which is defined as the individuals' perception toward the offers from others in their social network. More perceived social support is associated with a higher likelihood of performing health-promoting behavior.<sup>20-22</sup> In this present study, age, self-esteem, perceived benefits, perceived self-efficacy, and social support were conceptualized to positively associated with, and perceived barriers were negatively associated with health-promoting behaviors.

More understanding on the health-promoting behaviors and the influencing factors among male prisoners with HIV infection is of great contribution to improving their lives which are different from the public population. The study with correctional facilities in Bangkok metropolitan is of essence since it has the highest number of HIV-infected prisoners. The finding could be useful in developing programs or activities to improve their clinical status especially their immune system. Their HIV infection progress to AIDs could be delayed and their life expectancy could be maintained. This study was consistent with the project entitled "Prisons with Well-being" which focuses on preventive health measure than rehabilitative one.<sup>23</sup> Specifically, in this study, health-promoting behaviors were hypothesized that age, self-esteem, perceived benefits, perceived barriers, perceived self-efficacy, and social support could together predict health-promoting behaviors among male prisoners in correctional facilities in Bangkok metropolitan area.

## Methods

In this predictive correlational research, study population was male prisoners in five correctional facilities in Bangkok metropolitan area diagnosed with HIV infection and treated with antiretroviral medications. Study sample was those in the study population selected by multistage sampling method. Firstly, three of five facilities were selected by random sampling. Secondly, the number of participants from each of the three facilities was selected proportionally to the total number of HIV-infected male prisoners in the individual facilities. To be eligible, prospective participants had to be 20 years old or older, 2) allow for their disclosure of HIV treatment, 3) have no opportunistic infections, 4) have good

consciousness, and 5) be able to read and write in Thai language. Participants with any adverse events during the survey such as shortness of breath, chest tightness, changes in consciousness, and abnormal vital signs, were withdrawn from the study.

The sample size was estimated based on a type I error of 1%, a power of test of 95%, and an effect size of 0.16 from a study<sup>18</sup> with characteristics comparable with the present study. With six independent variables, a sample size of 175 participants was needed. To compensate for a 20% incomplete filled questionnaires, a total of 210 participants were required. Sample size calculation was performed using the power analysis provided by the software program G\* Power.

### Research instruments

The questionnaire consisted of three parts: demographic and health characteristics, predictive factors or independent variables, and health-promoting behavior or dependent variable. The first part of the questionnaire asked the participants about their demographic characteristics (4 questions) and health status (4 questions).

The second part consisted of questions on factors based on the Health Promotion Model. The first section asked about self-esteem using the Thai version<sup>25</sup> translated from the original version of Rosenberg Self-Esteem Scale.<sup>26</sup> Of the total of 10 questions, there were five positive and negative statements equally. The response for positive statements was a 4-level rating scale ranging from 1-totally disagree to 4-totally agree, with the reverse scores for the negative statements. With the total score of 10 – 40 points, higher scores indicated higher level of self-esteem. Based on standardized scores of 1 to 4 points, levels of self-esteem were categorized as low, moderate, and high (1.00 - 2.00, 2.01 - 3.00, and 3.01 - 4.00 points, respectively).<sup>27</sup>

The second section asked about perceived benefits of performing health-promoting behaviors. The questions were developed by the researcher as guided by the literature. Sixteen perceived benefits questions covered the five dimensions of health-promoting behaviors, i.e., health responsibility (5 items), activities and exercises (2 items), interpersonal relationship (3 items), spiritual development (3 items), and stress management (3 items). Response was a 4-level rating scale ranging from 1-totally disagree to 4-totally agree. With the possible total scores of 16 – 64 points, higher

scores indicated higher level of perceived benefits. With the standardized total scores of 1 to 4 points, levels of perceived benefits were categorized as low, moderate, and high (1.00 - 2.00, 2.01 - 3.00, and 3.01 - 4.00 points, respectively).<sup>27</sup> The third section assessed perceived barriers to health-promoting behaviors. The questions were developed by the researcher as guided by the literature. Twenty perceived barriers questions covered the five dimensions of health-promoting behaviors, i.e., health responsibility (8 items), activities and exercises (3 items), interpersonal relationship (3 items), spiritual development (3 items), and stress management (3 items). Response was a 4-level rating scale ranging from 1-totally disagree to 4-totally agree. With the possible total scores of 20 – 80 points, higher scores indicated higher level of perceived barriers. With the standardized total scores of 1 to 4 points, levels of perceived benefits were categorized as low, moderate, and high (1.00 - 2.00, 2.01 - 3.00, and 3.01 - 4.00 points, respectively).<sup>27</sup>

The fourth section assessed social support to health-promoting behaviors. The questions were developed by the researcher as guided by the social support concept of House.<sup>28</sup> The questions reflected social support that the participants received from social network of male prisoners with HIV infection such as other prisoners, health volunteers in the prison, and prison officers. Twenty social support questions covered the four dimensions of social support, i.e., emotional support (3 items), informational support (3 items), instrumental support (3 items), and appraisal support (3 items). Response was a 4-level rating scale ranging from 1-never receiving the support, to 2-rarely receiving, 3-sometimes receiving, and 4-always receiving. With the possible total scores of 12– 48 points, higher scores indicated higher level of social support. With the standardized total scores of 1 to 4 points, levels of social support were categorized as low, moderate, and high (1.00 - 2.00, 2.01 - 3.00, and 3.01 - 4.00 points, respectively).<sup>27</sup>

The fifth section assessed self-efficacy of health-promoting behaviors. The questions were modified from the questions for Thais with HIV/AIDS<sup>21</sup> by the researcher. Twenty self-efficacy questions covered the five dimensions of health-promoting behaviors, i.e., health responsibility (8 items), activities and exercises (3 items), interpersonal relationship (3 items), spiritual development (3 items), and stress management (3 items). Response was a 4-level rating scale ranging from 1-totally disagree to 4-totally agree. With the

possible total scores of 20 – 80 points, higher scores indicated higher level of self-efficacy. With the standardized total scores of 1 to 4 points, levels of perceived benefits were categorized as low, moderate, and high (1.00 - 2.00, 2.01 - 3.00, and 3.01 - 4.00 points, respectively).<sup>27</sup>

The third part of the questionnaire asked about health-promoting behaviors. The researcher modified the questions for Thais with HIV/AIDS<sup>21</sup> which were based on Pender's Health Promotion Model.<sup>29</sup> Twenty-two behaviors questions covered the five dimensions of health-promoting behaviors, i.e., health responsibility (10 items), activities and exercises (3 items), interpersonal relationship (3 items), spiritual development (3 items), and stress management (3 items). Response was a 4-level rating scale ranging from 1-never perform to 4-always perform. With the possible total scores of 22 – 88 points, higher scores indicated higher level of performing behaviors. With the standardized total scores of 1 to 4 points, levels of the behaviors were categorized as low, moderate, and high (1.00 - 2.00, 2.01 - 3.00, and 3.01 - 4.00 points, respectively).<sup>27</sup>

#### **Quality assurance of research instruments**

The questions of perceived benefits, perceived barriers, social support, self-efficacy, and health-promoting behaviors were tested for content validity using five experts (i.e., one physician specialized in HIV infection, two nursing faculty members, one nurse specialized in community nursing, and one nurse practicing in a prison). These questions were found to have acceptable content validity with content validity indexes of 0.98, 1.00, 0.98, 1.00, and 0.98, respectively. For internal consistency reliability for all questions in the second part, 30 individuals with characteristics comparable to the participants were asked to complete the questionnaire and Cronbach's alpha coefficients were calculated. It was found that questions on self-esteem, perceived benefits, perceived barriers, social support, self-efficacy, and health-promoting behaviors had acceptable reliability with Cronbach's alpha coefficients of 0.80, 0.82, 0.94, 0.85, 0.94, and 0.89, respectively.

#### **Participants protection**

The study was approved by the Ethics Committee for Human Research of Burapha University (approval number; G-HS020/2564; approval date: June 4, 2021). With the permission from the warden of each prison, the researcher

approached the potential participants to provide information about objectives, process, and voluntary, confidentiality and anonymity nature of the study. Written informed consent was obtained. The participant's right for vulnerable individuals was protected at all steps of the survey. They were allowed to deny or withdraw from participation at any time without any undesirable consequences. With the codes used, no information put on the questionnaire could be used to identify the individual participants. All information was securely kept. Results of the study were presented as a summary not individuals' information. Data were subject to destruction after the research publication.

### Data collection procedure

After permission from the Director of the Department of Corrections and warden of each study prison, the researcher trained three research assistants, each was the nurse taking care of HIV-infected male prisoners in each study prison. Research assistants were informed about the objectives, data collection steps, sampling method, confidentiality assurance, and coordination with participants. The researcher and assistants selected the participants by simple random sampling. After all information and study procedure details were provided to the prospective participants, written informed consent was obtained. While the participants were waiting for meeting the physician or receiving their antiretroviral medications, the survey by filling the questionnaire took place and took about 30 – 45 minutes to complete. Once completed, the filled questionnaire was inspected for any missing data or mistakes. Of the 210 participants filling the questionnaire, 200 questionnaires were suitable for data analysis (95.2% completion rate). All steps of data collection were done according to the measure to prevent the contraction of Covid-19 virus issued by the Department of Corrections.

### Data analysis

Descriptive statistics including mean with standard deviation and frequency with percentage were used to summarize demographic and clinical status characteristics and study psychosocial variables. The correlations of health-promoting behavior and its predictive factors were tested using stepwise multiple regression analysis. All assumptions for multiple regression were met. Statistical significance was set at a type I error of 5%. All statistical analyses were performed using the software program SPSS version 26.

## Results

Of the 200 participants, they were  $38 \pm 8.73$  years old by average (a range of 30 – 62 years old) with the majority in their early adult age (77.0%) (Table 1). The majority had junior high school education (30.5%) and primary school education (29.0%). These male prisoners reported that they got HIV infection from their heterosexual transmission (61.0%). Time since diagnosis of HIV infection ranged from 4 months to 31 years with the majority with 1 – 5 years (48.5%). The duration of antiretroviral treatment was 3 months to 30 years with the majority with 1 – 5 years (52.0%) (Table 1).

**Table 1** Demographic and clinical characteristics of participants (N = 200).

Characteristics	N	%
Age (years) (min = 20, max = 62, Mean = 38.48, SD = 8.73)		
≤ 44	154	77.0
45-59	45	22.5
≥ 60	1	0.5
Education level		
No formal education	8	4.0
Primary school	58	29.0
Junior high school	61	30.5
Senior high school	53	26.5
Associate degree/vocational school	15	7.5
Bachelor's degree or higher	5	2.5
Cause of HIV infection*		
Sexual intercourse with woman with no protection	122	61.0
Sexual intercourse with man with no protection	66	33.0
Sharp objects (e.g., needles, tattoo needles)	46	23.0
Duration since diagnosis with HIV infection (years) (min = 6 months, max = 31 years, mean = 7.53 ± 6.66 years)		
< 1	4	2.0
1 – 5	97	48.5
6 – 10	53	26.5
11 – 15	24	12.0
16 – 20	13	6.5
> 20	9	4.5
Duration of antiretroviral medications use (years) (min = 3 months, max = 30 years, mean = 6 ± 6 years)		
< 1	17	8.5
1 – 5	104	52.0
6 – 10	50	25.0
11 – 15	14	7.0
16 – 20	8	4.0
> 20	7	3.5

\* More than one choice was applicable.

For predictive factors, self-esteem, perceived barriers, self-efficacy, and social support were all at a moderate level (mean =  $2.95 \pm 0.45$ ,  $2.21 \pm 0.49$ ,  $3.00 \pm 0.35$ , and  $2.99 \pm 0.44$  points, respectively) (Table 2). For each dimension of perceived barriers, most of them were at a moderate level except Interpersonal relationship which was at a low level. For self-efficacy, most dimensions were at a moderate level

except Health responsibility which was at a high level. For social support, while dimensions of instrumental support and emotional support were at a high level, appraisal support and informational support were at a moderate level (Table 2). On the other hand, overall perceived benefits (mean = 3.27 ± 0.28 points) and all of its individual dimensions were at a high level (Table 2).

**Table 2** Psychosocial factors affecting health-promoting behaviors (N = 200).

Factors	mean	SD	Level
<b>Self-esteem</b>	2.95	0.45	<b>Moderate</b>
<b>Perceived benefits of the behavior</b>	3.27	0.28	<b>High</b>
Health responsibility	3.37	0.34	High
Activities and exercises	3.14	0.50	High
Interpersonal relationship	3.16	0.40	High
Spiritual development	3.38	0.39	High
Stress management	3.21	0.39	High
<b>Perceived barriers to the behavior</b>	2.21	0.49	<b>Moderate</b>
Health responsibility	2.23	0.49	Moderate
Activities and exercises	2.21	0.60	Moderate
Interpersonal relationship	1.98	0.46	Low
Spiritual development	2.25	0.52	Moderate
Stress management	2.18	0.52	Moderate
<b>Self-efficacy to perform the behavior</b>	3.00	0.35	<b>Moderate</b>
Health responsibility	3.15	0.36	High
Activities and exercises	2.88	0.50	Moderate
Interpersonal relationship	2.80	0.51	Moderate
Spiritual development	3.00	0.48	Moderate
Stress management	2.92	0.41	Moderate
<b>Social support</b>	2.99	0.44	<b>Moderate</b>
Instrumental support	3.15	0.53	High
Emotional support	3.02	0.48	High
Appraisal support	2.94	0.63	Moderate
Informational support	2.84	0.64	Moderate

For health-promoting behaviors, the overall behaviors were at a high level (mean = 3.16 ± 0.32 points). For the five individual behavior dimensions, it was found that health responsibility, spiritual development, and interpersonal relationship were at a high level (mean = 3.34 ± 0.34, 3.17 ± 0.47, 3.16 ± 0.52 points, respectively); while stress management and activities and exercises were at a moderate level (mean = 2.98 ± 0.53 and 2.79 ± 0.51, respectively) (Table 3).

Predictive correlational analysis revealed that self-efficacy, perceived barriers, perceived benefits, and social support were able to predict the overall health-promoting behaviors significantly ( $b = 0.409, -0.170, 0.374, \text{ and } 0.248$ , respectively). Together, these factors could explain 47.1% of the variance of the overall behaviors ( $R^2 = 0.482, R^2_{adj} = 0.471, P\text{-value} < 0.001$ ) (Table 4).

**Table 3** Health-promoting behaviors of HIV-infected male prisoners (N = 200).

Health-promoting behaviors	Mean	SD	Level
<b>Overall behavior</b>	<b>3.16</b>	<b>0.32</b>	<b>High</b>
<b>Health responsibility</b>	<b>3.34</b>	<b>0.34</b>	<b>High</b>
Taking antiretroviral drugs on time	3.86	0.35	High
Taking antiretroviral drugs with prescribed doses	3.85	0.36	High
Cleaning body	3.60	0.59	High
Avoiding sharp object sharing	3.42	0.67	High
Monitoring abnormal signs and symptoms	3.32	0.59	High
Preventing infection in general surrounding	3.18	0.62	High
Avoiding being close to persons with respiratory tract infection	3.15	0.72	High
Using condom	3.05	0.93	High
Searching healthcare information	3.01	0.67	High
Avoiding sexual intercourse	2.95	0.81	Moderate
<b>Activities and exercises</b>	<b>2.79</b>	<b>0.51</b>	<b>Moderate</b>
Moving body until sweating	3.03	0.58	High
Exercising or playing sport	2.79	0.66	Moderate
Warming body before and after exercise	2.55	0.71	Moderate
<b>Interpersonal relationship</b>	<b>3.16</b>	<b>0.52</b>	<b>High</b>
Joining activities with others	3.29	0.61	High
Helping others out	3.16	0.72	High
Reconciling conflicts with others	3.02	0.64	High
<b>Spiritual development</b>	<b>3.17</b>	<b>0.47</b>	<b>High</b>
Practicing religious belief	3.34	0.65	High
Having goal in living	3.13	0.57	High
ยอมรับและเผชิญกับสิ่งต่าง ๆ ที่เกิดขึ้นกับตนเอง	3.05	0.63	High
<b>Stress management</b>	<b>2.98</b>	<b>0.53</b>	<b>Moderate</b>
Monitoring and evaluating stress	3.08	0.63	High
Managing stress properly	3.07	0.67	High
Seeking consultation when stressed	2.77	0.71	Moderate

**Table 4** Associations of health-promoting behaviors of HIV-infected male prisoners and predictive factors (N = 200).

Factors	b	Beta	t	P-value
Self-efficacy to perform the behavior	0.409	0.404	7.21	< 0.001
Perceived barriers to the behavior	-0.170	-0.209	-3.68	< 0.001
Perceived benefits of the behavior	0.374	0.235	4.34	< 0.001
Social support	0.248	0.184	3.19	0.002
Constant = 23.99, $R^2 = 0.482, R^2_{adj} = 0.471, F = 45.36, P\text{-value} < 0.001$ .				

## Discussions and Conclusion

In this correlational study, health-promoting behaviors among male prisoners in correctional facilities in Bangkok metropolitan area were at a high level. This finding is consistent with studies in HIV-infected individuals in the public.<sup>11,12,30</sup> The dimension of health responsibility was at a high level reflecting good behavior of medication compliance and access to information for self-care. This could be because the prison hospital provides adequate care before the antiretroviral treatment, continuous and uninterrupted antiretroviral treatment, and at follow-ups. The care is provided by multidisciplinary team with the provision of consultation and advice for desirable behaviors. Prisons prepared the shared space as health information corners for self-care information search. In addition, the program to cease AIDs also provided condoms and knowledge about HIV infection and sexually

transmitted diseases.<sup>7</sup> This could be result in HIV infection prevention behavior such as condom use and shared use of sharp objects. In addition, in this Covid-19 pandemic, the participants could have perceived that they were more susceptible than those not infected. As a result, they could be more likely to be concerned with protection from and avoidance of individuals with respiratory infections. In addition, since the prison provided masks<sup>31</sup>, these participants could have a heightened level of health-promoting behaviors which is consistent with previous studies.<sup>11,30,32,33</sup>

The spiritual development dimension of the health-promoting behaviors was found at a high level. Spirituality is a source of power in facing illness and living the life of HIV-infected prisoners. The participants might have accepted and handled their circumstances, had goals for their life, and adopted more religious practice. Counting on or trusting of religious belief is part of the spiritual well-being which is essential for living.<sup>10</sup> The Department of Corrections also promote the practice of religions of choices by providing space and free practice time. As a result, the participants could have had more spiritual development which is consistent with previous studies.<sup>11,30,33</sup>

The interpersonal relationship dimension of health-promoting behavior was also at a high level which is consistent with previous studies.<sup>30,32,33</sup> This could be because the participants always lived together as a one big household resulting in a well-behaved homogenous community. HIV-infected prisoners were treated without symptoms which allowed the participants to maintain their health since the start of the treatment. With such maintained health, they could feel they have a good image<sup>5</sup> which could enhance their confidence to socialize. In addition, advice from healthcare providers and experiences shared among HIV-infected prisoners could allow participants to have good interpersonal relationship.

The dimension of activities and exercises was at a moderate level which is consistent with previous studies.<sup>20,21</sup> It could be that the participants perceived physical exercises at a high level. Since they were allowed free time for exercise, they could actually exercise such as sports, jogging, running, and aerobic dancing. Other activities such as bathroom cleaning, living hall cleaning, and occupational training caused intense physical exertions. These activities could have exhausted the participants with not much pleasure as the

exercises. As a result, their dimension of activities and exercises could be at a moderate, if not high level.

The stress management dimension of the behavior was at a moderate level. As an HIV-infected prisoner, the participants might not be comfortable to reveal their information when they sought advice or consultation for their mental health problem. At present, stigma and discrimination on HIV-infected individuals are still prevalent in all parts of the society. Such challenges posed difficulties living with others, socialization denial, and shame.<sup>34</sup> The Covid-19 pandemic also added more difficulties in meeting experts for advice, seeing relatives in the limited, arranged visit, and joining activities with prisoners from other sectors.<sup>31</sup> Hence, stress management behavior of these participants could not be at the high level, but only at the moderate level.

Health-promoting behaviors among HIV-infected prisoners were significantly predicted by self-efficacy, perceived barriers, perceived benefits, and social support. This is consistent with the idea of Health Promotion Model of Pender and colleagues which states that.<sup>10</sup> Self-efficacy is a confidence in individual own capacity or skill to carry out the desirable behavior. The participants were with a moderate confidence to perform the behaviors, specifically, moderately confident to take antiretroviral drugs as prescribed and to void sexual intercourse, and highly confident to monitor their own abnormal signs or symptoms even though it was difficult and time-consuming. Based on Pender's work, once their confidence in performing the behavior under difficult situation is perceived, individuals could perform the behavior.<sup>10</sup> Previous studies also showed that HIV-infected individuals with high self-efficacy were more likely to perform health-promoting behaviors<sup>19-21</sup> and prisoners with self-efficacy had a positive association with health behavior.<sup>14,18</sup>

Perceived barriers to the behavior of the participants were at a moderate level. For the dimension of health responsibility, the barriers were also perceived at a moderate level with the behaviors. This could be because some participants might think that it was still difficult to ask for free condoms from the officers, to avoid being close other patients in the limited space, to monitor their own abnormal signs and symptoms, and to search for self-care information. This good health behavior could be due to the easy access to antiretroviral drugs, and undisrupted availability of the drugs.<sup>31</sup> Hence, the less perceived barriers to the behavior, the more the actual behavior.<sup>10</sup> This finding is consistent studies in HIV-infected

individuals revealing that perceived barriers had negative influence on health behaviors<sup>17</sup> including the prisoners.<sup>18</sup>

Perceived benefits of performing the behavior along with less perceived barriers could encouraged the actual behavior.<sup>10</sup> Participants in our study had a high level of all aspects of perceived benefits including the benefits of ARVs, infection prevention, exercise, stress relieving activities, and religious activity. This could be because every HIV-infected prisoner received individual consultation before the ARV treatment regarding treatment benefits and proper self-care.<sup>31</sup> This enhanced health behavior promotion. This is consistent with previous study showing that perceived benefits of health behaviors promoted proper self-care behavior.<sup>14,17</sup>

Social support is a crucial factor predicting health behavior promotion. We found a moderate social support in our study. For emotional support and material support were at a high level. These were from medication support, encouragement and helps from peers, and the attention from the officers. For information and evaluation support, it was at a moderate level. This was from advice from nurses, laboratory test result provision, and encouragement when practicing properly. This finding is consistent with the concept of Pender and colleagues that social support is an interpersonal influence which could encourage the individual to be more determined to practice proper health behavior.<sup>10</sup> It is also consistent with the concept of social support of House stating that social support is an enforcing factor for the actual practice.<sup>28</sup> It is also consistent with a study revealing social support is positively associated with health promoting behavior among HIV-infected persons.<sup>20-22</sup>

Factors that could not predict health promoting behavior were age and self-esteem. This could be because most participants were narrowly at their early adult age (77.0%) with a mean age of 38 years ( $SD = 8.73$ ). They were mature and experienced enough to understand the illness and treatment at a comparable level which led to comparable behavior. This is consistent with other studies in HIV-infected persons.<sup>30,33</sup> Self-esteem was a psychological factor which was quite comparable among most HIV-infected prisoners since they were all vulnerable individuals. Probably there was no adequate difference to affect the behavior.

The study had certain limitations. Since demographic characteristics of the participants were relatively homogenous, no differences on some study variables could not be found. Future studies with a broader range of demographic

characteristics could reveal more associations of the study variables. In addition, there should be more studies in different groups of prisoners to understand more and be able to help a broader group of vulnerable individuals. Studies on in-depth inappropriate behaviors among HIV-infected prisoners should also be conducted.

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