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Original Article

The implementation and evaluation of HIV symptom management guidelines: A preliminary study in China

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ABSTRACT

Objective: The overarching objective of this study was to examine the effectiveness of HIV symptom management guidelines in China in reducing the incidence and severity of symptoms and improving patients' quality of life.
Methods: We conducted a controlled, pre- and post-implementation design in the HIV/AIDS inpatient unit in Shanghai. Patients recruited from November 2014 to February 2015 were in the intervention group and those from October 2013 to February 2014 were in the control group. There were 74 patients in each group. Participants in the intervention group received interventions based on the HIV symptom management guidelines. Overall symptom severity, depression, and quality of life were measured in two groups at baseline, week 4, and week 8.
Results: Totally 126 patients completed the research, 65 in the intervention group and 61 in the control group. The total symptom severity scores showed a statistically significant difference between groups across time ($P < 0.05$). It showed that frequencies of fatigue (36.9% vs. 44.3%), fever (6.2% vs. 11.5%), loss in weight (9.2% vs. 16.4%), mouth ulcers (12.3% vs. 16.4%), headaches (9.2% vs. 19.7%) and depression ($F = 1.09$, $P > 0.05$) in the intervention group were lower than those in the control group in week 8 without statistical significance. The multilevel growth mixture model indicated a greater increase in the total score of quality of life for the group treated according to the symptom management guidelines ($P = 0.04$).
Conclusion: The evidence-based HIV symptom management guidelines can improve a patient's quality of life and relieve negative symptoms. The guidelines can be applied in a similar context to other HIV/AIDS units or clinics.
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1. Background

Over the past two decades, due to the development of antiretroviral therapy (ART), the life expectancy of persons living with HIV (PLWHs) has been increasing. Today, HIV/AIDS has evolved from an acute illness to a chronic disease [1]. However, HIV/AIDS is still accompanied by severe physical and mental symptoms caused by HIV infection, opportunistic infections, and comorbidities [2,3]. Using ART may also lead PLWHs to experience insomnia, lipodystrophy, and skin rash [4,5]. Previous studies showed that most patients experienced more than one symptom at the same time. Negative symptoms among PLWHs have a strong relationship with lower quality of life and poorer prognosis [6,7]. The findings from these studies are consistent; as the incidence and severity of the symptoms increased, the quality of life decreased. Therefore, there is a strong urgency for PLWHs to control HIV symptoms in order to achieve an optimal quality of life.

Implementing effective symptom management strategies can alleviate the burden of care [8,9]. It is a great challenge for both patients and health care providers to manage the symptoms of HIV/AIDS, particularly in resource-limited countries. When healthcare resources are deficient, HIV symptom management strategies can

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be regarded as more helpful. Challenges for implementing strategies include the following: the complexity of the myriad physical, psychological and social problems [2]; social discrimination and stigma among PLWHs [10]; and a lack of adequate manpower [11]. Previous studies found that different social contexts also have an impact on the content and procedure of symptom management [12,13]. PLWHs in different countries may use symptom management strategies differently. It is essential to develop, facilitate, and evaluate an evidence-based symptom management strategy based on race/ethnicity and culture.

The number of surviving PLWHs in China was over 747,000 in 2017 (Internal Report). Epidemiology experts have stated that the number of PLWHs will continue to increase in the near future [14,15]. Reducing the incidence and severity of the symptoms is a challenge for all health care providers in China. In previous studies, we identified and validated HIV symptom management guidelines used by health care providers, which were developed based on the current best available evidence [16]. However, the effectiveness, feasibility, and appropriateness of the evidence in a different context have not been evaluated. Therefore, the overarching objective of this study was to examine the effectiveness of HIV symptom management guidelines in China in order to reduce the incidence and severity of symptoms and improve the patients' quality of life.

2. Methods

We conducted a 2-year, controlled, pre- and post-implementation design in the HIV/AIDS inpatient unit and outpatient clinic in Shanghai, China between 2013 and 2015. The study proposal was reviewed and accepted by the Human Research Ethics Committees in the Shanghai Public Health Clinical Center, China.

2.1. Research setting

The Shanghai Public Health Clinical Center is the only hospital authorized for the treatment of HIV/AIDS in Shanghai. The hospital has a 40-bed inpatient unit with multidisciplinary teams providing antiretroviral therapy and holistic care. The hospital provides tertiary services for patients from all over China. Nursing care is provided by a registered (qualified) nursing workforce. At the time of this study, there were between 14 and 18 full-time registered nurses employed.

2.2. Implementation process

To ensure effective dissemination and implementation, we adapted the best evidence recommendations from the HIV/AIDS symptom management guidelines [16]. Based on the *Fudan Pathway for Evidence-based Nursing Practice* [17], the whole implementation process can be divided into three steps: 1) identification of the current status of symptom management; 2) development of the best practice protocol; and 3) implementation of the guidelines.

2.2.1. Identification of the current status of symptom management

Step 1 was to identify the current status of symptom management among PLWHs in the unit. An implementation group was established, which included hospital managers, HIV specialty physicians, nurses, social workers, psychologist, and patients. During this phase, field investigations, individual in-depth interviews, and cross-sectional studies were used to assess the current status of symptom management [18]. The result of this stage was to ensure that the practice of symptom assessment, prevention, and management among PLWHs was performed according to the needs of clinical practitioners and patients.

2.2.2. Development of the best practice protocol

Step 2 was to develop an HIV symptom management protocol. In previous studies, evidence-based HIV symptom management guidelines were developed by using the current best available evidence [19]. Based on the results of Step 1, we selected and tailored the intervention fitting the context and population. Barriers to the implementation process were also identified by the whole group. We transferred the evidence-based recommendations into the practical workflow, procedure, evaluation chart, and audit criteria. Close collaboration with stakeholders including hospital managers, HIV specialty physicians, nurses, social workers, psychologist, and patient engagement ensured that the HIV symptoms management protocol was multidisciplinary and had been adequately adapted in this study. The HIV symptom management protocol involved a multidisciplinary team of physicians, nurses, physical therapists, health care workers, and patients. The content of the protocol included assessment of the pre-intervention and post-intervention symptoms, symptomatic treatments, health education, and psychological counseling. The protocol was validated by patients, caregivers and health professionals based on 9 commonly occurring HIV symptoms (fever, diarrhea, fatigue, pain, skin lesion, oral mucosal lesion, cognitive disorder, anxiety, depression, and consumptive symptoms). The HIV symptom management protocol was reviewed and approved by an external HIV group of experts.

2.2.3. Implementation of the guidelines

In step 3, implementation of the HIV symptom management guidelines was undertaken in 4 ways: 1) intensive and ongoing education workshops were conducted for the unit administrators and practitioners prior to and during the implementation phase. Topics covered included information regarding current symptom management for the HIV/AIDS population, assessment tools and procedures, intervention strategies for the 9 commonly occurring symptoms, and health education. All nurses working in the units attended the education workshops and were asked to sign the attendance form; 2) to provide further support, learning materials and education manual were provided for each staff member. 3) A pre-audit was undertaken during March 2014: three auditors were involved in this stage, and a sample of 60 patients was observed. The results of the pre-audit were collected and discussed with the members of the implementation group; the results were also disseminated to the staff. 4) The 2nd round and the 3rd round audit were conducted 1 month after the entire education program was completed using the same methods. Two-round audits were conducted in the same clinical units by the same staff who conducted the pre-audit during September 2014 and October 2015. The two-round audit ensured the high quality of the interventions.

2.3. Data collection

2.3.1. Participants and settings

HIV-positive participants were recruited from the Shanghai Public Health Clinical Center (Shanghai, China) during the duration of their ART in the inpatient unit. The inclusion criteria included the following: (1) patients diagnosed with HIV infection; (2) patients receiving ART; (3) patients who were adults over 18 years old; (4) patients self-reporting at least one symptom during the past four weeks; and (5) patients receiving informed consent. The exclusion criteria included the following: (1) patients with a clinical diagnosis of dementia; (2) patients unable to listen and understand; and (3) patients having no symptoms within the past four weeks. Recruitment occurred from October 2013 to February 2014 for the control group and November 2014 to February 2015 for the

intervention group.

2.3.2. Design and procedures

A pre-test-post-test quasi-experimental design trial was conducted to evaluate the effectiveness of the HIV/AIDS symptom management guidelines. Data from the control care group were collected from October 2013 to February 2014, while those from the intervention group were collected from November 2014 to February 2015. After giving informed consent, participants who met the inclusion criteria were included in this study. Demographic characteristics, symptom incidence and severity, and quality of life were measured at baseline. Those in the intervention group received a newly developed evidence-based symptom management program conducted by a multidisciplinary team of physicians, nurses, physical therapists, health care workers during their antiretroviral therapy, and those in the control group received standard care. Both groups received a 2-month follow-up (at week 4 and week 8).

2.4. Measurement

A repeated measures design was conducted in the 2 groups: baseline (week 0, Time 1), 1-month follow-up (week 4, Time 2), and 2-month follow-up (week 8, Time 3), which demonstrated the changes in symptom severity and quality of life. Eligible participants were invited to complete the questionnaire on paper, a process that took approximately 10–15 min to complete. The questionnaire included the following sections:

2.4.1. Demographic and clinical characteristics

Demographic and clinical characteristics were collected by a standard demographic questionnaire. Demographic variables included age, gender (male or female), education level (<middle school, high school or equivalent, or college and above), and smoking habit (never, sometimes, often, or always). Clinical variables included the years of HIV diagnosis, years on ART medication, current ART regimen (PI-based regimen or NNRTIs-based regimen), and latest CD4 count. Clinical variables were verified by clinical nurses based on the patients' medical records.

2.4.2. Overall symptoms

Symptom incidence and severity was assessed by *the Sign and Symptom Checklist for Persons with HIV Diseases (SSC-HIV)* [19]. This checklist consists of 72 common HIV symptoms that are highly related to HIV (including fatigue, diarrhea, depression, and fever) in this questionnaire. Participants were asked the following question: During the last four weeks, did you have the symptom (fatigue, diarrhea, etc.)? The answers ranged from not detected (0) to severe (3). The response ranges from 0 to 216, with a higher score indicating a worse health condition. Cronbach's α coefficient for this scale in our sample was 0.92.

2.4.3. Depression

We used *the Center for Epidemiological Studies-Depression (CES-D)* to assess depression [20]. Twenty items are included in the scale. Participants were asked to rate the depression-associated symptoms that they experienced in the past week. The items are scored on an ordinal scale ranging from "*none of the time*" (0) to "*all of the time*" (3). The total scores range from 0 to 60. Previous studies report a Cronbach's α coefficient for this scale ranging from 0.85 to 0.90 [21,22]. Cronbach's α coefficient for this scale in our sample was 0.91.

2.4.4. Quality of life

Quality of life was measured by the *Simplified Chinese Version of HIV Adaptation of the Medical Outcomes Questionnaire (MOS-HIV)*. The 35-item questionnaire includes eleven dimensions including quality of life, overall health, physical function, role function, social function, cognitive function, pain, mental health, energy, health distress, and health transition. Responses range from 0 to 100, with a higher score indicating a better quality of life. Cronbach's α coefficients range from 0.67 to 0.86 for each factor and 0.81 for the overall scale [23].

2.5. Data analysis

SPSS 19.0 (IBM) was used for data analysis. Frequencies, percentages, means, and standard deviations were used to describe demographic variables, and incidence and severity of symptoms. Student's t-test, Fisher's exact test, and Pearson's chi-square test were used to compare the demographic characteristics between the intervention and control groups. Our study used the analysis of variance (ANOVA) and multilevel growth mixture models to describe the changes over time in the score of symptom severity and quality of life in the two groups.

We used HLM 7.0 to conduct the multilevel growth mixture models to investigate the changes over time in the score of quality of life and the relationships between independent variables and HIV education. HLM accommodates the variance among migrants in the same region, capturing the mathematical difference among regions as well as between migrants. Model 1 is the unconditional model, which determines the relationship between the MOS-HIV score and time in the full sample. Model 2 is the growth model, which separates the full sample into the intervention group and control group and determines the effectiveness of intervention. Model 3 is the growth model with characteristics and includes all the covariates with a random effect. We considered a two-tailed P-value less than 0.05 for statistical significance in all analyses.

3. Results

3.1. Participants

This study included 148 HIV-positive participants at baseline. Twenty-two participants dropped out of the study before the final survey (Fig. 1). Therefore, 126 participants were included in the longitudinal data analysis. Demographic and clinical characteristics for intervention and control groups are displayed in Table 1. There were no statistically significant differences in the demographic and clinical variables between the two groups at baseline.

3.2. Impact on symptom severity

The SSC-HIV and CES-D mean total scores at baseline, weeks 4 and week 8 are displayed in Table 2. The analysis of variance (ANOVA) showed a significant difference between the groups over time in the SSC-HIV score ($P < 0.05$). Although the test reached statistical significance, further analysis using a Student's t-test indicated that the difference was not a result of the intervention. Therefore, there were no significant differences in the changes in the SSC-HIV score. However, both SSC-HIV and CES-D scores demonstrated a larger decline at the 2-month follow-up in the intervention group.

3.3. Impact on symptom incidence

The Pearson chi-square test was used to analyze the six symptoms with the highest incidence rates. At baseline, there was no significant difference in the incidence rate between the intervention and control group (Table 3). It showed that frequencies of

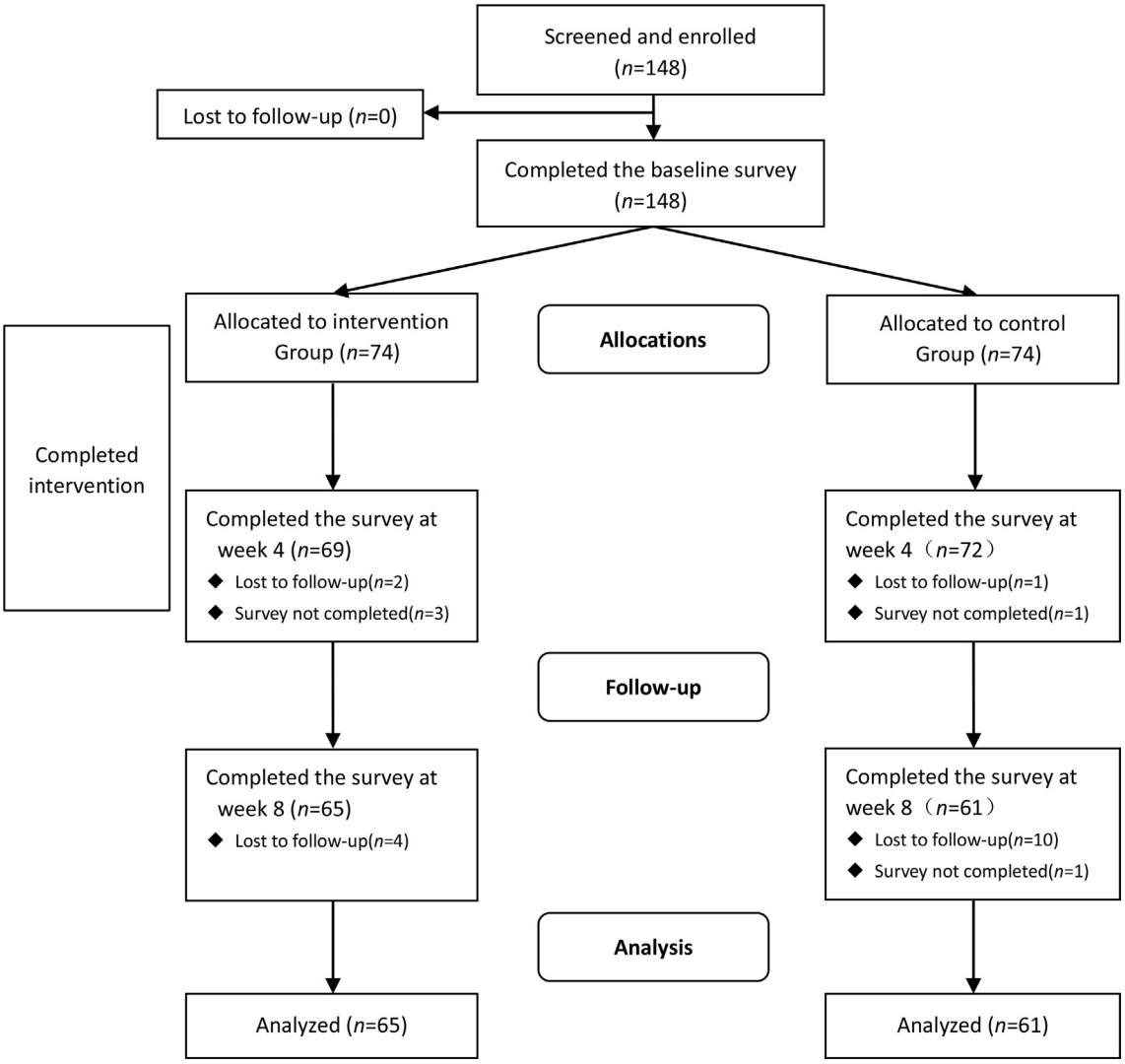

Fig. 1. Flowchart of participants.

fatigue (36.9% vs. 44.3%), fever (6.2% vs. 11.5%), loss in weight (9.2% vs. 16.4%), mouth ulcers (12.3% vs. 16.4%), headaches (9.2% vs. 19.7%) and depression ($F = 1.09$, $P > 0.05$) in the intervention group were lower than those in the control group in week 8. The relief of the symptoms favored the intervention groups at week 4 and week 8 but did not reach statistical significance.

3.4. Impact on QOL

The first model (Table 4, Unconditional Growth Model) estimated the mean individual initial MOS-HIV score at baseline. In this model, the mean individual mean MOS-HIV score was 53.29, with both groups showing an increase in MOS-HIV scores (59.35 week 4–65.41 week 8). The second model (Table 4, Growth Model I/C) displayed the differences in the baseline MOS-HIV scores and the change over time due to the intervention. The difference between the two groups at baseline was 3.60. The score of the intervention group was lower than that in the control group. However, the group receiving treatment according to the symptom management guidelines showed a significantly greater increase in MOS-HIV. The increase in the intervention group was significantly higher than that in the control group ($\alpha = 2.72$, $P = 0.04$). The final model (Table 4, Growth Model with Characteristics) identified three predictors for the decrease in quality of life score among PLWH: (1) the presence of comorbidities ($\alpha = -5.45$, $P = 0.00$); (2) depression ($t = -3.19$, $P = 0.02$); and (3) longer disease duration ($\alpha = 2.61$, $P = 0.01$).

4. Discussion

Our study showed that implementation of the HIV/AIDS symptom management guidelines conducted by a multidisciplinary health care team could improve the quality of life among PLWHs and had high potential benefits in relieving the incidence and severity of negative symptoms. The HIV symptom management guidelines are based on the current best available evidence. The guidelines can be applied in a similar context to other HIV/AIDS units or clinics in a developing country.

Our study showed that symptom incidence and severity between the two groups did not vary significantly. This result is consistent with those of many previous studies. Several studies showed that using a comprehensive means of HIV symptom management can change the incidence and severity of the symptoms. However, most of these results did not reach the statistical significance [24,25]. In this study, the small size of the sample and the short length of the intervention may contribute to the lack of

Table 1
Characteristics of patients at baseline.

Characteristics	Intervention group($n = 74$)	Control group($n = 74$)	*P* value
Gender, *n*(%)			
Male	69 (93.2)	71(95.9)	0.50[a]
Female	5(6.8)	3(4.2)	
Age, *Mean* ± *SD* (range)	38.0 ± 11.1 (18–65)	39.2 ± 12.1 (22–77)	0.53[b]
Education level, *n*(%)			
<middle school	21(28.4)	21(28.4)	0.65[a]
high school or equivalent	27(36.5)	25(33.8)	
College and above	26(35.1)	28(37.8)	
Smoking, *n*(%)			
Never	51(68.9)	48(64.9)	0.04[c]
Sometimes	10(13.5)	17(23.0)	
Often	11(14.9)	3(4.1)	
Always	2(2.7)	6(8.1)	
Current ART regimen, *n*(%)			
PI-based regimen	35(47.3)	29(39.2)	0.32[a]
NNRTIs-based regimen	39(52.7)	45(60.8)	
Years of HIV diagnosis, *M(Q)*	1.0 (3.0)	0.8 (2.8)	0.14[d]
Years on ART medications, *M(Q)*	0.8 (2.8)	0.7 (2.8)	0.55[d]
Recent CD4 count, *M(Q)*	180 (247)	138 (258)	0.68[d]

Note: Statistical tests were considered significant if $P < 0.05$ with two-tailed tests.
[a] Pearson chi-square test: Categorical variables were analyzed using Pearson chi-square test.
[b] Student's *t*-test: Continuous variables were analyzed using student's *t*-test.
[c] Fisher's exact test: Categorical variables were analyzed using Fisher's exact test, when any cells had less than five occasions.
[d] Mann Whitney *U* test: Continuous variables were analyzed using Mann Whitney *U* test.

Table 2
Effect of symptom management guideline on symptoms intensity in PLWHs (*Mean* ± *SD*).

Outcome	group	*n*	Time 1	Time 2	Time 3	*F* for time	*F* for group	*F for* time × group interaction
Symptoms	Intervention group	65	12.01 ± 10.86	6.47 ± 5.44	6.41 ± 5.36	16.43[a]	1.39	6.73[a,b]
Mean total SSC-HIV-SC score	Control group	61	10.35 ± 10.64	6.61 ± 5.66	6.65 ± 5.48			
	P-value		0.39	0.89	0.80	0.00	0.56	0.02
Depression	Intervention group	65	10.87 ± 10.67	8.23 ± 8.02	8.12 ± 7.43	7.61[a]	0.43	1.09
Mean total CES-D score	Control group	61	12.47 ± 11.07	10.15 ± 9.93	10.71 ± 9.61			
	P-value		0.41	0.23	0.09	0.05	0.29	0.14

Note: [a]Statistical tests were considered significant if $P < 0.05$ with two-tailed tests.
[b]Although the test reached statistical significance, further Student's *t*-test of the mean scores over time indicated that the difference was not a result of the intervention.

Table 3
Effect of symptom management guideline on symptoms frequency in PLWHs [*n*(%)].

Outcome	time	Intervention group ($n = 65$)	Control group ($n = 65$)	*P* value
Fatigue	Time 1	41 (63.1)	36 (59.0)	0.72
	Time 2	27 (41.5)	28 (45.9)	0.72
	Time 3	24 (36.9)	27 (44.3)	0.47
Fever	Time 1	15 (23.1)	14 (23.0)	1.00
	Time 2	3 (4.6)	4 (6.6)	0.71
	Time 3	4 (6.2)	7 (11.5)	0.35
Loss in weight	Time 1	18 (27.7)	20 (32.8)	0.57
	Time 2	12 (18.5)	15 (24.6)	0.52
	Time 3	6 (9.2)	10 (16.4)	0.29
Mouth ulcers	Time 1	14 (21.5)	10 (16.4)	0.50
	Time 2	10 (15.4)	8 (13.1)	0.80
	Time 3	8 (12.3)	10 (16.4)	0.61
Rash	Time 1	11 (16.9)	12 (19.7)	0.82
	Time 2	3 (4.6)	4 (6.6)	0.71
	Time 3	3 (4.6)	3 (4.9)	1.00
Headache	Time 1	16 (24.6)	20 (32.8)	0.33
	Time 2	7 (10.8)	14 (23.0)	0.09
	Time 3	6 (9.2)	12 (19.7)	0.13

Note: All categorical variables were analyzed using Fisher's exact test.

statistical significance between the two groups. Additionally, the present subjects showed only a few symptoms at baseline. This result may have led to the manifestation of a ceiling effect, especially in the intervention group, because the patients were unable to report a lower symptom incidence and severity than the minimum score.

The multilevel linear growth model showed a significantly greater increase in HIV/AIDS-specific QOL (MOS-HIV) scores for the group treated according to the symptom management guidelines. There were three factors that were found to affect the quality of life

Table 4
Multilevel linear growth model for MOS-HIV scores by predictor variables.

Variables	Unconditional Growth Model		Growth Model I/C		Growth Model with Characteristics	
	Coefficient	*P* value	Coefficient	*P* value	Coefficient	*P* value
Fixed Effects						
Intercept	53.29	0.00[a]	53.06	0.00[a]	53.30	0.00[a]
Time	6.06	0.00[a]	4.35	0.00[a]	4.35	0.00[a]
Intervention			−3.60	0.00[a]	−3.46	0.00[a]
Time x intervention			2.72	0.04[a]	2.72	0.04[a]
Symptoms					−5.45	0.00[a]
Depression					−3.19	0.02[a]
HIV positive duration					2.61	0.01[a]
Smoking					−0.12	0.68
Random Effects						
ε_{ij}	32.16	0.00[a]	42.91	0.00[a]	42.89	0.00[a]
μ_{0j}	26.80	0.00[a]	18.44	0.00[a]	18.42	0.00[a]
μ_{1j}			1.49	0.26	1.48	0.26

Note: [a] $P < 0.05$. Statistical tests were considered significant if $P < 0.05$ with two-tailed tests.

among PLWHs including the presence of physical comorbidities, depression, and duration of HIV. Previous studies already showed that chronic and recurrent somatic symptoms have a strong potential to influence the quality of life among PLWHs [26,27]. When the CD4 count is low, PLWHs are more likely to have opportunistic infections that lead to physical symptoms including fatigue, fever, loss in weight, mouth ulcers, rash, and headache. With the poor self-evaluation and underreporting by PLWH, the illness may take a turn for the worse [28]. Therefore, detecting, assessing and relieving physical symptoms should be tremendously emphasized among the health care providers. It is also crucial to provide the evidence-based information to PLWHs to increase their abilities of self-monitoring symptoms.

Depression is associated with quality of life among PLWH. This study suggests that early professional treatment and intervention should be conducted among patients with a high CES-D score or those patients who have been HIV positive for less than six months. Depression is a very common psychological symptom among the HIV-positive population [29,30]. There are many factors that can cause depression among PLWH. Psychiatric experts concede that receiving the diagnosis of HIV infection or AIDS can make depressive symptoms even worse. Some medications such, as Efavirenz, can cause or worsen depression. Depression can also influence the progression of the disease. Therefore, assessing depression should be included in the treatment program, especially among those patients who have been diagnosed with HIV for less than 6 months. Counseling services should also be sought immediately in cases where CES-D scores are high.

To our knowledge, this is the first program to implement the HIV symptom management guidelines in China Mainland. Despite a huge amount of evidence supporting the HIV symptom management guidelines, the strategies involved still require a systematically cross-border adaptation to target specific populations and demographic contexts [31,32]. Based on *the Fudan Pathway for Evidence-based Nursing Practice*, 3 steps were implemented. A multidisciplinary team of physicians, nurses, physical therapists, psychologist, health care workers and patients were involved in the adaptation process. Preliminary studies suggested that the cross-border adaptation was successful, thus highlighting the value of tailoring the evidence depending on the cultural setting. These guidelines can be applied in a similar context to other HIV/AIDS units or clinics in developing countries as a valuable supplement rather than as a stand-alone solution. However, further adaptation procedures should be conducted to make the guidelines more accessible to different populations and demographic contexts.

This study has several limitations. First, the trial was conducted without randomization due to practical issues and ethical considerations, and other unmeasured confounding factors might be present. Second, the follow-up period in this trial was relatively short, 2 months, which may have resulted in a decreased effectiveness of the HIV symptom management guidelines. Therefore, it remains unclear whether the results might have been significantly different had a long-term follow-up been adopted. Last, the sample population only covered a small proportion of the PLWHs in one city, and the implementation process was performed at a single hospital. Generalization of these findings to other conditions should be made with caution.

5. Conclusion

Despite these limitations, our preliminary study emphasizes the value of the HIV symptom management guidelines. The results from this trial suggest that the evidence-based HIV symptom management guidelines with a multidisciplinary implementation approach can improve a patient's quality of life and have a significant potential benefit in relieving negative symptoms. The guidelines can be applied in a similar context to other HIV/AIDS units or clinics. However, further research is warranted to assess the effectiveness of the symptom management guidelines with a longer follow-up period and larger PLWHs populations under different conditions.

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Conflicts of interest

The authors have declared that no conflicts of interest exist.

Authors' contributions

Z ZHU, Y HU and HW LI contributed to the study design, data analysis, and drafting of the paper. MJ BAO, L ZHANG, LJ ZHA, XH HOU and HZ LU were involved in the study design and data collection. All authors approved the final paper.

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Appendix A. Supplementary data

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References

[1] Centers for Disease Control and Prevention. Cases of HIV infection and AIDS in the United States and dependent areas, 2005. HIV/AIDS surveillance report, vol. 17; 2007. p. 1–54.
[2] Deeks SG, Lewin SR, Havlir DV. The end of AIDS: HIV infection as a chronic disease. Lancet 2013;382(9903):1525–33.
[3] Swanson B. ANAC's core curriculum for HIV/AIDS nursing. Jones & Bartlett Publishers; 2010.
[4] Harding R, Selman L, Agupio G, Dinat N, Downing J, Gwyther L, Mashao T, Mmoledi K, Moll T, Sebuyira LM, Ikin B. Prevalence, burden, and correlates of physical and psychological symptoms among HIV palliative care patients in sub-Saharan Africa: an international multicenter study. J Pain Symptom Manag 2012;44(1):1–9.
[5] Peterson K, Jallow S, Rowland-Jones SL, de Silva TI. Antiretroviral therapy for HIV-2 infection: recommendations for management in low-resource settingsvol. 2011. AIDS Res Treat; 2011.
[6] Brandt CP, Jardin C, Sharp C, Lemaire C, Zvolensky MJ. Main and interactive effects of emotion dysregulation and HIV symptom severity on quality of life among persons living with HIV/AIDS. AIDS Care 2017;29(4):498–506.
[7] Ogbuji QC, Oke AE. Quality of life among persons living with HIV infection in Ibadan, Nigeria. Afr J Med Med Sci 2010;39(2):127–35.
[8] Kemppainen JK, Wantland D, Voss J, Nicholas P, Kirksey KM, Corless IB, Willard S, Holzemer WL, Robinson L, Hamilton MJ, Sefcik E. Self-care behaviors and activities for managing HIV-related anxiety. J Assoc Nurses AIDS Care 2012;23(2):111–23.
[9] Rodriguez-Penney AT, Iudicello JE, Riggs PK, Doyle K, Ellis RJ, Letendre SL, Grant I, Woods, The HIV Neurobehavioral Research Program (HNRP) Group SP. Co-morbidities in persons infected with HIV: increased burden with older age and negative effects on health-related quality of life. AIDS Patient Care STDS 2013;27(1):5–16.
[10] Earnshaw VA, Lang SM, Lippitt M, Jin H, Chaudoir SR. HIV stigma and physical health symptoms: do social support, adaptive coping, and/or identity centrality act as resilience resources? AIDS Behav 2015;19(1):41–9.
[11] Wong SC, Huang CY. A factor– cluster approach to understanding Hong Kong hotel employees' symptom-management-related coping behavior towards job stress. J Clin Virol 2014;19(4):469–91.
[12] World Health Organization. Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations. Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations. 2014.
[13] Kay ES, Batey DS, Mugavero MJ. The HIV treatment cascade and care continuum: updates, goals, and recommendations for the future. AIDS Res Ther 2016;13(1):35.
[14] Lu L, Jia M, Ma Y, Yang L, Chen Z, Ho DD, Jiang Y, Zhang L. The changing face of HIV in China. Nature 2008;455(7213):609.
[15] Zhang KL, Detels R, Liao S, Cohen M, Yu DB. China's HIV/AIDS epidemic: continuing challenges. Lancet 2008;372(9652):1791–3.
[16] Fu L, Hu Y, Lu HZ, Zhu Z, Pan CE, Zha LJ. Guidelines adaption for symptom management in people living with HIV. Chin J Nurs 2015;9:1–5.
[17] Hu Y, Zhou YF, Zhu Z. Realization of the transformation of nursing knowledge through evidence-based nursing practice path. J Nurs Training 2015;30(11):961–3.
[18] Liang F, Yan H, Hongzhou L, Meijuan B, Lin Z, Yinzhong S. Nursing needs of antiretroviral therapy among people living with HIV/AIDS: the influencing factors. J Nurs Sci 2014;11. 010.
[19] Holzemer WL, Hudson A, Kirksey KM, Hamilton MJ, Bakken S. The revised sign and symptom check-list for HIV (SSC-HIVrev). J Assoc Nurses AIDS Care 2001;12(5):60–70.
[20] Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Meas 1977;1(3):385–401.
[21] Adams LM, Wilson TE, Merenstein D, Milam J, Cohen J, Golub ET, Adedimeji A, Cook JA. Using the Center for Epidemiologic Studies Depression Scale to assess depression in women with HIV and women at risk for HIV: are somatic items invariant? Psychol Assess 2018;30(1):97.
[22] Babowitch JD, Vanable PA, Carey MP. Gender moderates the association of depressive symptoms to sexual risk behavior among HIV-positive African-American outpatients. AIDS Behav 2017:1–5.
[23] Joyce VR, Sun H, Barnett PG, Bansback N, Griffin SC, Bayoumi AM, Anis AH, Sculpher M, Cameron W, Brown ST, Holodniy M. Mapping MOS-HIV to HUI3 and EQ-5D-3L in patients with HIV. MDM Policy & Prac 2017;2(2):1–13.
[24] Webel AR. Testing a peer-based symptom management intervention for women living with HIV/AIDS. AIDS Care 2010;22(9):1029–40.
[25] Eller LS, Kirksey KM, Nicholas PK, Corless IB, Holzemer WL, Wantland DJ, Willard SS, Robinson L, Hamilton MJ, Sefcik EF, Moezzi S. A randomized controlled trial of an HIV/AIDS Symptom Management Manual for depressive symptoms. AIDS Care 2013;25(4):391–9.
[26] Charles B, Jeyaseelan L, Pandian AK, Sam AE, Thenmozhi M, Jayaseelan V. Association between stigma, depression and quality of life of people living with HIV/AIDS (PLHA) in South India—a community based cross sectional study. BMC Publ Health 2012;12(1):463.
[27] Zimpel RR, Fleck MP. Depression as a major impact on the quality of life of HIV-positive Brazilians. Psychol Health Med 2014;19(1):47–58.
[28] Swendeman D, Ramanathan N, Baetscher L, Medich M, Scheffler A, Comulada WS, Estrin D. Smartphone self-monitoring to support self-management among people living with HIV: perceived benefits and theory of change from a mixed-methods, randomized pilot study. J Acquir Immune Defic Syndr 2015;69(0 1):S80.
[29] Benton TD. Depression and hiv/aids. Curr Psychiatr Rep 2008;10(3):280.
[30] Dal-Bó MJ, Manoel AL, Filho AO, Silva BQ, Cardoso YS, Cortez J, Tramujas L, Silva RM. Depressive symptoms and associated factors among people living with HIV/AIDS. J Int Assoc Phys AIDS Care 2015;14(2):136–40.
[31] Haslbeck J, Zanoni S, Hartung U, Klein M, Gabriel E, Eicher M, Schulz PJ. Introducing the chronic disease self-management program in Switzerland and other German-speaking countries: findings of a cross-border adaptation using a multiple-methods approach. BMC Health Serv Res 2015;15(1):576.
[32] Nilsen P. Making sense of implementation theories, models and frameworks. Implement Sci 2015;10(1):53.