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Psychological Distress and Associated Factors among Patients with Hemophilia Living with HIV: The Japan Cohort Study of HIV-Infected Patients through Blood Products

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Abstract:

Introduction: Although treatment for people infected with Human Immunodeficiency Virus (HIV) has progressed, and mortality rates are decreasing, the psychological condition of patients with hemophilia living with HIV remains poorly understood. This study aimed to investigate the association between factors related to psychological distress using cross-sectional survey data in Japan.

Methods: A total of 437 male patients with hemophilia living with HIV were selected from a cohort study of participants infected with HIV through blood products. Psychological distress was assessed using the Kessler 6-Item Psychological Distress Scale (K6), with severe distress defined as a K6 score of 13 or higher. Data on the causes of worries and stress, as well as the availability of consultations, were collected.

Results: Sixty-eight (15.6%) participants experienced severe psychological distress. Almost all participants with severe psychological distress experienced worries and stress. Among 334 participants with worries and stress, several factors were found to be significantly associated with severe psychological distress in multivariate logistic regression adjusted for subjective health status. These factors included the causes of interpersonal problems (OR 2.7, 95% CI 1.4–5.1), economic circumstances (OR 2.4, 95% CI 1.3–4.2), purpose in life (OR 1.8, 95% CI 1.0–3.4), and living environment (OR 2.5, 95% CI 1.2–5.2). Additionally, having no one to consult was significantly associated with severe psychological distress (OR 2.3, 95% CI 1.2–4.6).

Conclusion: Patients with hemophilia living with HIV have a high prevalence of severe psychological distress. Their psychological distress is associated with various stressors and the lack of available consultation resources.

Keywords: HIV, AIDS, Hemophilia, Psychological distress, K6, Worries and stress.

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1. INTRODUCTION

Remarkable progress has been made in the treatment of people infected with HIV, and the mortality rate has decreased [1-5]. However, long-term medical treatment and mental and psychological conditions are becoming increasingly important issues.

Several studies have reported on the severity of psychological distress and its associated factors among people living with HIV. In Ethiopia, Tesfaye *et al.* (2020) found that generalized psychological distress was independently associated with moderate stress, low social support, multiple negative life events, non-disclosure of HIV status, and low CD4 cell count [6]. In a much earlier study, Blomkvist *et al.* (1994) showed that psychosocial self-prognosis, measured by a Coping Wheel psychosocial tool, was related to mortality and morbidity in patients with hemophilia and HIV infection [7]. In Canada, Choi *et al.* (2015) validated three screening instruments, including the Kessler Psychological Distress Scale, for identifying depression in HIV specialty care settings [8]. Across studies, between 5% and 39% of participants with HIV infection have been classified as experiencing mild to severe anxiety or depression [9-14]. Moreover, a recent meta-analysis reported that nearly one quarter of younger people living with HIV experience depression, with substantial proportions also reporting anxiety and suicidal ideation (Zhan *et al.*, 2024) [15].

In Japan, there have been 1,432 cases of HIV infection through blood products (AIDS Surveillance Committee, & Ministry of Health, Labour and Welfare of Japan 2001) [16]. A research program for people with HIV infection has been carried out since fiscal year 1993, with support from the Ministry of Health and Welfare (currently the Ministry of Health, Labour and Welfare) [17] and the Japan Cohort Study of HIV Patients Infected through Blood Products. The Japan cohort study, based on this program, was started at the same time. In Japan, Kawado *et al.* (2023) recently reported that after the introduction of combination anti-HIV therapy over 24 years in patients with hemophilia living with HIV, HIV RNA levels decreased, resulting in decreased mortality, and HCV RNA levels decreased, resulting in decreased mortality [4]. These findings indicate that clinical outcomes in this population have markedly improved. However, despite these advances in survival and virological control, less is known about their psychological well-being, which is the focus of the present study. Limited studies have focused on the psychological status of patients with hemophilia living with HIV. Drotar *et al.* (1997) reported that total mood disturbance was observed in 39% of patients with hemophilia living with HIV, but aged 8-17 [18]. Brown *et al.* (1995) investigated how adolescents with hemophilia living with HIV cope with reminders of their HIV status, and about one-third of these reported experiencing intense nervousness and sadness [19]. However, there are few recent reports on psychological distress or its associated factors in patients with hemophilia living with HIV. The available studies have generally been based on small sample sizes, often limited to single-center experiences or qualitative case reports, and therefore provide only fragmentary evidence [20-23]. As a result, the psychological burden and related factors in this population remain insufficiently characterized, underscoring the need for large-scale, quantitative analyses such as the present study.

Thus, this study aimed to investigate the status of severe psychological distress in patients with hemophilia living with HIV and examine the associated factors, including worries and stress.

2. METHODS

2.1. The Japan Cohort Study of HIV Patients Infected through Blood Products

In Japan, a research program for people infected with HIV *via* contaminated blood coagulation factor products has been underway since 1993 to prevent the onset of AIDS by providing healthcare management expenses. The participants were monitored until they developed AIDS or died. As of 1 April 2020, 483 participants in Japan accounted for approximately 91% of HIV infections through blood products. The program required the participants to submit a report to their doctor and complete a questionnaire. The reports included age, CD4 cell count, HIV RNA level, and anti-HIV regimen use. The questionnaire included items on living arrangements, subjective health status, worries and stress, and Kessler's six-item Psychological Distress Scale (K6), which measures severe psychological distress. The Japan Cohort Study of HIV Patients Infected through Blood Products, which was based on this program, was initiated simultaneously. Details of the cohort study have been described elsewhere [16, 24-26].

2.2. Participants

Of the 483 patients enrolled in the cohort as of April 1, 2020, 437 patients with hemophilia living with HIV were included in the study. Patients with non-hemophilia bleeding disorders (n = 33; *e.g.*, von Willebrand disease, secondary infection) and those with missing K6 scores (n = 13) were excluded. All participants were males aged 37–71 years, and the study was cross-sectional, with no follow-up.

2.3. Severe Psychological Distress, Worries, and Stress

In this study, questions regarding worries and stress were the same as those in the Comprehensive Survey of Living Conditions in Japan (Ministry of Health, Labour and Welfare, 2019) [27]. The Kessler six-item Psychological Distress Scale (K6) was used as an indicator of severe psychological distress. The K6 is used to assess depression and anxiety disorders [28-30]. The total scores range from 0 to 24, with a score of 13 or above indicating the existence of severe psychological distress [28-31]. The K6 was translated into Japanese, demonstrating sufficient validity and reliability [32] and is widely used in epidemiological studies [31, 33, 34]. In this study, subjects with a K6 score of 13 points or higher were considered to have severe psychological distress, as in previous studies.

The presence of worries and stress was also investigated by asking, “Are you currently experiencing any worries and stress in your daily life?” Those who answered “Yes” were asked the following questions: “What is the cause of that? Please select all that apply.”, and “How do you consult about worries and stress? Please select all that apply.” Questions regarding the causes of worries and stress (21 items) included relationships with family and non-family members, income, illness, work, and housing. The latter included questions about a consultation for worries and stress (15 items), including family members, superiors, consultation centers (public institutions, patient organizations), doctors, nurses, medical social workers, counselors, and media consultation corners. Items, such as wanting to seek consultation but not being able to consult anyone, or not knowing where to go for consultation, were also included. The detailed survey items regarding worries and stress (21 items) and possible sources of consultation (15 items) are shown in Table **S1**.

2.4. Data Analysis

We used data from the cohort study mentioned above. No personal identifiers, such as names or addresses, were included. Informed consent was obtained from all participants included in the study.

We compared the proportion of patients with severe psychological distress across categories of each factor. For these comparisons, Fisher’s exact test was applied. In addition, 95% confidence intervals for the proportions were calculated using the exact Clopper–Pearson method. The factors examined were age, CD4 cell count, HIV RNA level, anti-HIV regimen use, living arrangements, subjective health status, and worries and stress.

Among participants who reported worries and stress, we examined the association of each potential cause with severe psychological distress. In addition, we assessed the association of each consultation source with severe psychological distress. Both univariate and multivariate logistic regression models were applied. The questionnaire included 21 items on causes of worries and stress, and 15 items on consultation sources. We selected items that were endorsed by at least 10% of participants. As a result, eight causes and nine consultation sources were included in the models. In the multivariate models, the significant factors in the above analysis of proportion comparisons were added as explanatory variables. We performed Hosmer-Lemeshow lack-of-fit tests and checked the fit of the model. Multicollinearity among explanatory variables was assessed by examining pairwise correlations.

All the analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC, USA), while forest plots were generated with R version 4.5.1 (R Foundation for Statistical Computing, Vienna, Austria).

3. RESULTS

Table **1** shows the participant characteristics and prevalence of severe psychological distress. Of 437 participants, 68 (15.6%) experienced severe psychological distress. The proportions of severe psychological distress among respondents with a subjective health status of “Bad” and “Moderate” to “Fair” were 31.9% and 6.5%, respectively, which is a significant difference. In the same way, the proportions of severe psychological distress among worries and stress of “Yes” and “No” were 19.8% and 1.0%, respectively, which was a significant difference. Only one person who answered “No” for “worries and stress” was classified as having severe psychological distress, but his K6 score was 13 points, which was the threshold value. There were no significant differences in the proportion of patients with severe psychological distress according to age group, CD4 cell count, HIV RNA level, anti-HIV regimen use, or living arrangements.

Table 1. Participant characteristics and prevalence of severe psychological distress.

	n	Severe Psychological Distress (%) [95%CI]	*p*-value[#2]
Total	437	15.6 [12.3-19.3]	-
Age (Years)	-	-	-
37-49	231	16.0 [11.5-21.4]	0.815
50-59	156	16.0 [10.6-22.7]	-
60-71	50	12.0 [4.5-24.3]	-
CD4 cell count (cells/μL)	-	-	-
<200	25	24.0 [9.5-45.1]	0.214
200-349	66	19.7 [10.9-31.3]	-
350-	346	14.2 [10.7-18.3]	-
HIV RNA level (copies/mL)[#1]	-	-	-
<50	421	15.7 [12.3-19.5]	0.786
50-999	12	8.3 [0.2-38.5]	-
1000-	2	0.0 [0.0-84.2]	-
Unknown	2	-	-
Anti-HIV regimen use[#3]	-	-	-
No regimen	12	8.3 [0.2-38.5]	0.121
Two NRTIs+PI	17	5.9 [0.1-28.7]	-

(Table 1) contd.....

	n	Severe Psychological Distress (%) [95%CI]	*p*-value[#2]
Two NRTIs+NNRTI	32	28.1 [13.7-46.7]	-
Two NRTIs+INSTI	286	13.6 [9.9-18.2]	-
Other regimens	90	20.0 [12.3-29.8]	-
Living Arrangement	-	-	-
Living alone	87	18.4 [10.9-28.1]	0.265
Living with partner	181	12.2 [7.8-17.8]	-
Living with others	167	17.4 [11.9-24.0]	-
Unknown	2	-	-
Subjective Health status[#1]	-	-	-
Moderate to fair	276	6.5 [3.9-10.1]	<0.0001
Bad	157	31.9 [24.6-39.7]	-
Unknown	4	-	-
Worries and Stress[#1]	-	-	-
Yes	334	19.8 [15.6-24.4]	<0.0001
No	102	1.0 [0.0-5.3]	-
Unknown	1	-	-

Notes:[#1] Unknown data were excluded from percentage calculations.
[#2] Fisher's exact test.
[#3] Two NRTIs+PI: regimens including two NRTIs and one or two protease inhibitors.
Two NRTIs+NNRTI: regimens including two NRTIs and one non-nucleoside reverse transcriptase inhibitor.
Two NRTIs+INSTI: regimens including two NRTIs and one integrase strand transfer inhibitor.

Table 2 shows the association between the causes of worries and stress and severe psychological distress among participants with worries and stress. The odds ratios for each of the eight causes of worry and stress for severe psychological distress were adjusted for subjective health status. The adjusted odds ratios of five items ("Relationships with family," "Relationships with people other than family," "Purpose in life," "Income, household finances, and debt *etc*.," and "Housing and living environment (including pollution, safety, and traffic conditions)") ranged from 1.84 to 2.67, all of which were significant.

Table 2. Univariate and multivariate logistic regression analyses of causes of worries and stress associated with severe psychological distress.

Causes of Worries and Stress		n	Severe Psychological Distress (%)	Crude OR	95% CI	*p*-value	Adjusted OR[#1]	95% CI	*p*-value
Relationships with family	Yes	64	34.4	**2.69**	**1.46 - 4.95**	**0.001**	**2.21**	**1.16 - 4.18**	**0.016**
	No	270	16.3						
Relationships with people other than family	Yes	59	37.3	**3.12**	**1.68 - 5.79**	**<0.001**	**2.67**	**1.39 - 5.14**	**0.003**
	No	275	16.0						
Purpose in life	Yes	83	30.1	**2.21**	**1.24 - 3.93**	**0.007**	**1.84**	**1.00 - 3.37**	**0.049**
	No	251	16.3						
Income, household finances, and debt, *etc*	Yes	141	29.1	**2.76**	**1.58 - 4.80**	**<0.001**	**2.35**	**1.32 - 4.21**	**0.004**
	No	193	13.0						
One's own illness or nursing care	Yes	207	22.2	1.53	0.86 - 2.73	0.151	1.10	0.59 - 2.05	0.757
	No	127	15.8						
Family member's illness or nursing care	Yes	102	22.6	1.28	0.72 - 2.26	0.397	1.02	0.55 - 1.86	0.949
	No	232	18.5						
One's own work	Yes	156	18.6	0.87	0.51 - 1.50	0.615	0.90	0.51 - 1.59	0.720
	No	178	20.8						
Housing and living environment (including pollution, safety, and traffic conditions)	Yes	43	39.5	**3.23**	**1.63 - 6.40**	**<0.001**	**2.50**	**1.21 - 5.17**	**0.013**
	No	291	16.8						

Note:[#1] Odds ratios (ORs) were adjusted by subjective health status.

Table 3. Univariate and multivariate logistic regression analyses of consultation sources about worries and stress associated with severe psychological distress

Consult About Worries and Stress		n	Severe Psychological Distress (%)	crude OR	95% CI	*p*-value	Adjusted OR[#1]	95% CI	*p*-value
Family	Yes	134	16.4	1.07	0.62 - 1.86	0.811	0.65	0.36 - 1.18	0.158
	No	200	22.0						
Friends or acquaintance	Yes	56	16.4	1.00	0.46 - 2.14	0.992	0.83	0.37 - 1.85	0.641
	No	278	20.5						
Consultation desk of patient organization (including telephone consultation, *etc*)	Yes	40	27.5	**2.26**	**1.07 - 4.78**	**0.033**	1.44	0.65 - 3.19	0.366
	No	294	18.7						
Physician at a medical institution	Yes	95	17.9	1.22	0.67 - 2.24	0.512	0.67	0.35 - 1.27	0.219
	No	239	20.5						
Nurse at a medical institution	Yes	62	19.4	1.34	0.67 - 2.66	0.410	0.92	0.45 -1.92	0.832
	No	272	19.9						
Medical social worker at a medical institution	Yes	69	23.2	1.84	0.98 - 3.45	0.060	1.01	0.52 - 1.99	0.968
	No	265	18.9						
Clinical psychologist or counselor at a medical institution	Yes	56	23.2	1.79	0.91 - 3.55	0.094	1.06	0.52 - 2.18	0.874
	No	278	19.1						
Cannot consult anyone	Yes	57	33.3	**3.38**	**1.80 - 6.32**	**<0.001**	**2.32**	**1.18 - 4.55**	**0.014**
	No	277	17.0						
Haven't consulted anyone because there's no need to consult	Yes	75	16.0	1.04	0.53 - 2.06	0.907	0.78	0.38 - 1.60	0.500
	No	259	20.9						

Note:[#1] Odds ratios (ORs) were adjusted by subjective health status.

Table **3** shows the association between consultations on worries and stress and severe psychological distress. The odds ratio of each of the nine items of consultation about worries and stress for severe psychological distress was adjusted for subjective health status. The adjusted odds ratio of one item ("Cannot consult anyone") was 2.32, which was significant. To further illustrate these findings, we created a forest plot of the significant factors identified in Tables **2** and **3**, depicting odds ratios with 95% confidence intervals (Fig. **S1**).

The Hosmer–Lemeshow goodness-of-fit test showed $p > 0.05$ for all logistic regression models, suggesting that the models adequately fit the data. All pairwise correlations between explanatory variables were within ±0.3, indicating no serious multicollinearity.

4. DISCUSSION

This study investigated psychological distress and its related factors among patients with hemophilia living with HIV in Japan. Of 437 participants, 68 (15.6%) experienced severe psychological distress. In the general Japanese population, previous studies showed that the prevalence of a K6 score of 13 points or higher was 2% to 6% [34-36], which suggests a considerably higher prevalence of severe psychological distress among the participants in this study. For hemophilia patients, not limited to HIV-infected, Kempton *et al.* (2021) reported that 8% of the study participants showed severe psychological distress (K6 score of 13 points or higher) [37, 38]. Thus, our study participants were more likely to have severe psychological distress than those with hemophilia alone. The prevalence of severe psychological distress in this study was approximately twice that of the hemophilia population. Given the high capture rate of this study population, we concluded that a high proportion of patients with hemophilia living with HIV had severe psychological distress.

A highly significant association between severe psychological distress and subjective health status was found in all participants. Health conditions are considered primary and underlying causes of psychological distress. These results are consistent with previous research showing that poor self-rated health increases psychological distress [13]. CD4 cell count, HIV RNA level, and use of anti-HIV regimens, which are objective indicators of health status, were not related to the presence of severe psychological distress. This may reflect the characteristics of our stabilized cohort, in which all participants were HIV-infected but pre-AIDS and most were receiving effective antiretroviral therapy, resulting in relatively limited variability in these clinical parameters. In addition, neither age nor living arrangements were associated with severe psychological distress. This may be because the age distribution in this study was relatively narrow, ranging from 37 to 71 years, and there were only a few young or elderly individuals. Regarding the living arrangements, Garriga *et al.* (2020) reported that the prevalence of severe psychological distress was higher among men with HIV infection when they lived alone, but there was no difference at all among women with HIV infection [11]. In this study, no significant differences were found, and the details are unclear.

The overall prevalence of worries and stress was 76% (334/437), and worries and stress were strongly associated with severe psychological distress. Almost all

individuals experiencing severe psychological distress experience worries and stress. This suggests that in this population, worries and stress appear to be a key correlate of psychological distress rather than a necessary condition. A previous study also showed a similar tendency regarding these relationships, in which depression symptoms and anxiety symptoms are strong indicators of psychological distress [39]. Due to the cross-sectional design of this study, causal relationships cannot be inferred. It is also possible that psychological distress itself may heighten the perception of worries and stress, suggesting a potential bidirectional relationship between these factors.

Among those with worries and stress, various factors, such as relationships with family, relationships with people other than family, purpose in life, income, and the environment, were found to be associated with psychological distress. Health conditions (*e.g.*, "One's own illness or nursing care") were not found to be related to severe psychological distress. In a study of a general Japanese male population, there was also a strong tendency to have psychological distress when "purpose in life", "relationships with family," or "relationships with people other than family" were the causes of stress, while there was also no difference in psychological distress with respect to one's own health [40]. Thus, it is clear that a variety of factors cause worry and stress, and that a support system tailored to each individual's situation is needed after clarifying the causes of each person's worries and stress.

Regarding the association of consultation about worries and stress with severe psychological distress, only one item ("Cannot consult anyone") was significantly associated. The prevalence of severe psychological distress did not significantly differ according to the type of consultants listed in the survey questionnaire: family, friends, acquaintances, consultation desks, physicians, nurses, medical social workers, clinical psychologists, or counselors. It was confirmed that the lack of consultation is an important issue for countermeasures against psychological distress in this population. A previous study using the 2016 Comprehensive Survey of Living Conditions data to examine help-seeking behavior and psychological distress among healthy employees in Japan also reported a strong association between this item and severe psychological distress (K6 score 13 or more), with the largest effect size of all items related to consultation about worries and stress [36]. Although the previous study involved healthy participants, it suggested a specifically strong association between not being able to consult anyone about worries and stress and severe psychological distress, which is consistent with the results of our study. To cope with severe psychological distress, it is necessary to improve the situation so that individuals have someone to consult.

These findings have potential clinical implications. Brief instruments such as the K6 scale may be considered for screening psychological distress in clinics providing care for patients with HIV infection and hemophilia. Clinicians should also remain attentive to interpersonal, economic, and environmental stressors that may contribute to psychological distress. In addition, referral pathways should be strengthened so that patients consistently have someone available for consultation, including healthcare professionals, family members, or support organizations. Recent studies have also emphasized the importance of integrating mental health screening and referral into HIV care. For example, brief tools such as the PHQ-2 for depression or simple suicide risk questions have been shown to be feasible in HIV clinic settings [41], and qualitative research highlights both acceptability and barriers to help-seeking among people living with HIV [42].

STUDY LIMITATIONS

This study had several limitations. First, we used data from the Japan Cohort Study of HIV Patients Infected through Blood Products, which was based on a research project supported by the Ministry of Health, Labour, and Welfare of Japan [4, 26]. The data used in this study were limited to those collected during this research project. It would be desirable to compare these findings with a non-infected control group. Furthermore, given the purpose of this study, we wanted to include all patients with hemophilia living with HIV. However, the study population excluded those who had developed AIDS. However, this survey covered almost all patients with hemophilia living with HIV in Japan [4]. The capture rate of non-AIDS cases is quite high and is not likely to be sufficiently problematic to affect interpretation. Second, psychological distress, worries, and stress were assessed using a self-administered questionnaire, not by professional psychologists or medical doctors. Although the appropriateness of the method for measuring worries and stress is unknown, the survey questionnaire items are identical to those of the National Survey of Living Conditions, one of Japan's core statistics, and the Japanese version of the K6 has sufficient validity and reliability [32]. Data were reported by participants and included missing values owing to unreported data, which, as shown in the results, were scarce. Third, the factors addressed as causes of psychological distress were limited to survey questionnaire items. A previous study indicated that sleeping less than five hours per day was also an associated factor [36]. Although we adjusted for subjective health status, residual confounding cannot be excluded. In particular, factors such as sleep quality, substance use, comorbid pain, and experiences of stigma, which were not assessed in this survey, may also contribute to psychological distress. Furthermore, the domains of worries and stress, and consultation sources were assessed with single-item questions, which may not fully capture their complexity. These measurement limitations should be considered when interpreting the findings. Nevertheless, we believe that we were able to address and examine the most likely associated factors. Finally, this was a cross-sectional study at one point, making it difficult to discuss causality or longitudinal trends. Therefore, it is meaningful to observe these changes over time. Moreover, further insight into the support is required.

CONCLUSION

Patients with hemophilia living with HIV have a high prevalence of severe psychological distress. It was suggested that their psychological distress was associated with worries and stress caused by interpersonal problems, economic circumstances, purpose in life, living environment, as well as not having anyone to consult.

AUTHORS' CONTRIBUTIONS

The authors confirm contribution to the paper as follows: M.M., M.K., and S. H.: Conceived the idea, wrote the proposal, analyzed the data, and drafted the manuscript; H.Y., K.A., and H.G.: Interpreted the analysis. T.S., S. H., M.O., and G.O.: Reviewed and edited the manuscript. All the authors have read and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

HIV = Human Immunodeficiency Virus

K6 = Kessler 6-Item Psychological Distress Scale

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethical Review Board for Clinical Studies of the National Hospital Organization of Osaka National Hospital, Osaka, Japan (No. 15026) in July 2022.

HUMAN AND ANIMAL RIGHTS

All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committee and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants included in the study.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

All data generated or analyzed during this study are included in this published article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

SUPPLEMENTARY MATERIAL

Supplementary material is available on the publisher's website along with the published article.

REFERENCES

[1] Cole SR, Hernán MA, Robins JM, *et al*. Effect of highly active antiretroviral therapy on time to acquired immunodeficiency syndrome or death using marginal structural models. Am J Epidemiol 2003; 158(7): 687-94. http://dx.doi.org/10.1093/aje/kwg206 PMID: 14507605

[2] Crane HM, Drumright L. HIV, aging, and comorbidities research in clinical cohorts: 3 lessons learned using examples from the CNICS Cohort. J Acquir Immune Defic Syndr 2022; 89(S1): S10-4. http://dx.doi.org/10.1097/QAI.0000000000002836 PMID: 35015740

[3] Govender RD, Hashim MJ, Khan MAB, Mustafa H, Khan G. Global epidemiology of HIV/AIDS: A resurgence in north america and europe. J Epidemiol Glob Health 2021; 11(3): 296-301. http://dx.doi.org/10.2991/jegh.k.210621.001 PMID: 34270183

[4] Kawado M, Mieno MN, Hashimoto S, *et al*. HIV RNA and HCV RNA levels, and mortality: The Japan cohort study of HIV patients infected through blood products. Open AIDS J 2023; 17(1): e187461362306230. http://dx.doi.org/10.2174/18746136-v17-230720-2023-4

[5] Palella FJ Jr, Delaney KM, Moorman AC, *et al*. HIV Outpatient Study Investigators. Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. N Engl J Med 1998; 338(13): 853-60. http://dx.doi.org/10.1056/NEJM199803263381301 PMID: 9516219

[6] Tesfaye SH, Bune GT. Generalized psychological distress among hiv-infected patients enrolled in antiretroviral treatment in dilla university hospital, gedeo zone, ethiopia. Glob Health Action 2014; 7(1): 23882. http://dx.doi.org/10.3402/gha.v7.23882 PMID: 24852246

[7] Blomkvist V, Theorell T, Jonsson H, Schulman S, Berntorp E, Stiegendal L. Psychosocial self-prognosis in relation to mortality and morbidity in hemophiliacs with HIV infection. Psychother Psychosom 1994; 62(3-4): 185-92. http://dx.doi.org/10.1159/000288921 PMID: 7846262

[8] Choi SKY, Boyle E, Burchell AN, *et al*. Validation of six short and ultra-short screening instruments for depression for people living with HIV in ontario: Results from the ontario hiv treatment network cohort study. PLoS One 2015; 10(11): e0142706. http://dx.doi.org/10.1371/journal.pone.0142706 PMID: 26566285

[9] Basha EA, Derseh BT, Haile YGE, Tafere G. Factors affecting psychological distress among people living with HIV/AIDS at selected hospitals of north shewa zone, amhara region, ethiopia. Aids Res Treat 2019; 2019: 1-8. http://dx.doi.org/10.1155/2019/8329483 PMID: 31428472

[10] Chan I, Au A, Li P, Chung R, Lee MP, Yu P. Illness-related factors, stress and coping strategies in relation to psychological distress in hiv-infected persons in hong kong. AIDS Care 2006; 18(8): 977-82. http://dx.doi.org/10.1080/09540120500490093 PMID: 17012088

[11] Garriga C, Gutiérrez Trujillo L, Del Romero J, *et al*. Psychological distress in women and men living with HIV in Spain: a cross-sectional telephone survey. Evid Based Ment Health 2020; 23(3): 91-9. http://dx.doi.org/10.1136/ebmental-2019-300138 PMID: 32665249

[12] Moges NA, Adesina OA, Okunlola MA, Berhane Y, Akinyemi JO. Psychological distress and its correlates among newly diagnosed people living with HIV in northwest ethiopia: Ordinal logistic regression analyses. Infect Dis 2021; 14: 1178633721994598. http://dx.doi.org/10.1177/1178633721994598 PMID: 33642865

[13] Ncitakalo N, Sigwadhi LN, Mabaso M, Joska J, Simbayi L. Exploring HIV status as a mediator in the relationship of psychological distress with socio-demographic and health related factors in South Africa: Findings from the 2012 nationally representative population-based household survey. AIDS Res Ther 2023; 20(1): 6. http://dx.doi.org/10.1186/s12981-022-00498-5 PMID: 36747255

[14] Schönnesson LN. Psychological and existential issues and quality of life in people living with HIV infection. AIDS Care 2002; 14(3):

399-404.
http://dx.doi.org/10.1080/09540120220123784 PMID: 12042085
[15] Zhan S, Ouyang F, Zhai W, Yang H. Prevalence of mental disorders among young people living with HIV: a systematic review and meta-analysis. Front Public Health 2024; 12: 1392872. http://dx.doi.org/10.3389/fpubh.2024.1392872 PMID: 39234077
[16] AIDS Surveillance Committee Ministry of Health, Labour, and Welfare of Japan.. Annual surveillance report of HIV/AIDS in Japan, 2000. 2021. Available from: https://www.jstage.jst.go.jp/article/yoken/52/2/52_52.55/_pdf
[17] Yamaguchi T, Hashimoto S, Oka S, *et al*. Physical condition and activity of daily living among HIV patients infected through blood products in Japan. J Epidemiol 2002; 12(5): 383-93. http://dx.doi.org/10.2188/jea.12.383 PMID: 12395882
[18] Drotar D, Agle DP, Eckl CL, Thompson PA. Correlates of psychological distress among mothers of children and adolescents with hemophilia and HIV infection. J Pediatr Psychol 1997; 22(1): 1-14. http://dx.doi.org/10.1093/jpepsy/22.1.1 PMID: 9019044
[19] Brown LK, Schultz JR, Gragg RA. HIV-infected adolescents with hemophilia: Adaptation and coping. The hemophilia behavioral intervention evaluation project. Pediatrics 1995; 96(3): 459-63. http://dx.doi.org/10.1542/peds.96.3.459 PMID: 7651778
[20] Dew MA, Ragni MV, Nimorwicz P. Infection with human immunodeficiency virus and vulnerability to psychiatric distress. A study of men with hemophilia. Arch Gen Psychiatry 1990; 47(8): 737-44. http://dx.doi.org/10.1001/archpsyc.1990.01810200045006 PMID: 2378544
[21] Wilkie PA, Markova I, Naji SA, Forbes CD. Daily living problems of people with haemophilia and HIV infection. Int J Rehabil Res 1990; 13(1): 15-26. http://dx.doi.org/10.1097/00004356-199003000-00002 PMID: 2394537
[22] Catalan J, Klimes I, Bond A, Day A, Garrod A, Rizza C. The psychosocial impact of HIV infection in men with haemophilia: Controlled investigation and factors associated with psychiatric morbidity. J Psychosom Res 1992; 36(5): 409-16. http://dx.doi.org/10.1016/0022-3999(92)90001-I PMID: 1619581
[23] Klimes I, Catalan J, Garrod A, Day A, Bond A, Rizza C. Partners of men with HIV infection and haemophilia: Controlled investigation of factors associated with psychological morbidity. AIDS Care 1992; 4(2): 149-56. http://dx.doi.org/10.1080/09540129208253086 PMID: 1606210
[24] Kawado M, Hashimoto S, Yamaguchi T, *et al*. Difference of progression to AIDS according to CD4 cell count, plasma HIV RNA level and the use of antiretroviral therapy among HIV patients infected through blood products in japan. J Epidemiol 2006; 16(3): 101-6. http://dx.doi.org/10.2188/jea.16.101 PMID: 16710078
[25] Kawado M, Hashimoto S, Oka S, *et al*. Clinical improvement by switching to an integrase strand transfer inhibitor in hemophiliac patients with HIV: The japan cohort study of hiv patients infected through blood products. Open AIDS J 2017; 11(1): 18-23. http://dx.doi.org/10.2174/1874613601711010018 PMID: 28553428
[26] Hashimoto S, Yamaguchi T, Oka S, Yoshizaki K, Kimura S, Fukutake K, *et al*. CD4 cell counts, plasma HIV-RNA levels and use of antiretroviral therapy among patients with HIV infection through blood products. J AIDS Res 2001; 3: 16-22. [in Japanese].
[27] Ministry of Health Labour and Welfare of japan.. Comprehensive Survey of Living Conditions. 2019. Available from: https://www.mhlw.go.jp/english/database/db-hss/cslc-index.html
[28] Kessler RC, Andrews G, Colpe LJ, *et al*. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychol Med 2002; 32(6): 959-76. http://dx.doi.org/10.1017/S0033291702006074 PMID: 12214795
[29] Kessler RC, Barker PR, Colpe LJ, *et al*. Screening for serious mental illness in the general population. Arch Gen Psychiatry 2003; 60(2): 184-9. http://dx.doi.org/10.1001/archpsyc.60.2.184 PMID: 12578436
[30] Kessler RC, Green JG, Gruber MJ, *et al*. Screening for serious mental illness in the general population with the K6 screening scale: Results from the who world mental health (WMH) survey initiative. Int J Methods Psychiatr Res 2010; 19(S1) (Suppl. 1): 4-22. http://dx.doi.org/10.1002/mpr.310 PMID: 20527002
[31] Kikuchi H, Machida M, Nakamura I, *et al*. Changes in psychological distress during the COVID-19 pandemic in japan: A longitudinal study. J Epidemiol 2020; 30(11): 522-8. http://dx.doi.org/10.2188/jea.JE20200271 PMID: 32963212
[32] Furukawa TA, Kawakami N, Saitoh M, *et al*. The performance of the Japanese version of the K6 and K10 in the world mental health survey japan. Int J Methods Psychiatr Res 2008; 17(3): 152-8. http://dx.doi.org/10.1002/mpr.257 PMID: 18763695
[33] Kawamura C, Iwagami M, Sun Y, *et al*. Factors associated with non-participation in breast cancer screening: Analysis of the 2016 and 2019 comprehensive survey of living conditions in Japan. Breast Cancer 2023; 30(6): 952-64. http://dx.doi.org/10.1007/s12282-023-01486-x PMID: 37488365
[34] Momose A, Yamaguchi S, Okada A, *et al*. Factors associated with long-term care certification in older adults: A cross-sectional study based on a nationally representative survey in Japan. BMC Geriatr 2021; 21(1): 374. http://dx.doi.org/10.1186/s12877-021-02308-5 PMID: 34154556
[35] Sakurai K, Nishi A, Kondo K, Yanagida K, Kawakami N. Screening performance of K6/K10 and other screening instruments for mood and anxiety disorders in Japan. Psychiatry Clin Neurosci 2011; 65(5): 434-41. http://dx.doi.org/10.1111/j.1440-1819.2011.02236.x PMID: 21851452
[36] Yamauchi T, Suka M, Yanagisawa H. Help-seeking behavior and psychological distress by age in a nationally representative sample of japanese employees. J Epidemiol 2020; 30(6): 237-43. http://dx.doi.org/10.2188/jea.JE20190042 PMID: 31105090
[37] Kempton CL, Michaels Stout M, Barry V, *et al*. Validation of a new instrument to measure disease-related distress among patients with haemophilia. Haemophilia 2021; 27(1): 60-8. http://dx.doi.org/10.1111/hae.14187 PMID: 33141984
[38] Kempton CL, Makris M, Holme PA. Management of comorbidities in haemophilia. Haemophilia 2021; 27(S3) (Suppl. 3): 37-45. http://dx.doi.org/10.1111/hae.14013 PMID: 32476243
[39] Banerjee N, Goodman ZT, McIntosh R, Ironson G. Cognition, coping, and psychological distress in HIV. AIDS Behav 2022; 26(4): 1074-83. http://dx.doi.org/10.1007/s10461-021-03462-y PMID: 34537911
[40] Wada K, Eguchi H, Yoneoka D, Okahisa J, Smith DR. Associations between psychological distress and the most concerning present personal problems among working-age men in Japan. BMC Public Health 2015; 15(1): 305. http://dx.doi.org/10.1186/s12889-015-1676-7 PMID: 25885770
[41] Madundo K, Mwobobia JM, Perry M, *et al*. HIV and mental health provider experiences of implementing brief depression and suicide screening among people living with HIV in Tanzania: A qualitative study. PLOS Mental Health 2025; 2(3): e0000268. http://dx.doi.org/10.1371/journal.pmen.0000268
[42] Parcesepe AM, Grimes KEL, Ebasone PV, *et al*. Mental health-related help-seeking and the role of hiv care providers: A qualitative study with people with hiv in cameroon. PLOS Glob Public Health 2025; 5(5): e0004597. http://dx.doi.org/10.1371/journal.pgph.0004597 PMID: 40373052