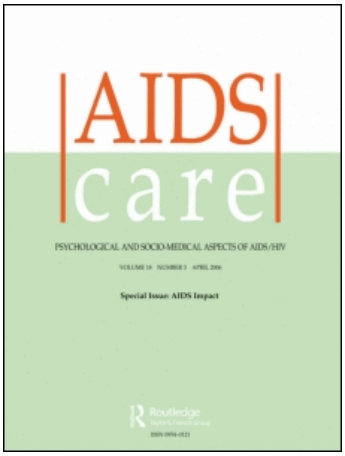

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Suicidal ideation among HIV+ former blood and/or plasma donors in rural China

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Suicidal ideation among HIV+ former blood and/or plasma donors in rural China

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Suicidal ideation is life-threatening and is prevalent among people living with HIV (PLWH). A dearth of such studies was conducted in China. This study investigated the prevalence of suicidal ideation and associated factors among PLWH who were former blood and/or plasma donors (FBPD) in a rural county in central China. Prospective respondents were randomly selected from a local registry; 176 PLWH who were FBPD joined the study. With informed consent, these PLWH and their spouse were interviewed separately and anonymously. Respectively, 34 and 8% of the sampled (index) PLWH self-reported having suicidal ideation and making a suicidal attempt in the last year. The multivariate analyses results showed that the index PLWH's Physical Function subscale score of the Medical Outcomes Study HIV Health Survey scale (Odds ratio (OR) = 6.67, 95% CI = 1.69–26.27, ≤25 percentiles against >75 percentiles), the Depression subscale score of the Depression, Anxiety, and Stress Scales (DASS; OR = 9.26, 95% CI = 1.32–64.77), and the spouse's Depression subscale score of the DASS (OR = 7.64, 95% CI = 1.37–42.77) were independently associated with the index PLWH's suicidal ideation. HIV-related variables (e.g., duration of diagnosis, treatment and side effects) and perceived discrimination of the index PLWH, and HIV status of the PLWH's spouse, were not significant factors. Depression is a risk factor for suicides. Moreover, depression may be contagious and the depression status of the spouse also matters. Treatments for depression and prevention intervention for suicides targeting PLWH in rural China are not readily available. Such services are greatly warranted and need to be provided to both the PLWH and his/her spouse.

Keywords: suicidal ideation; HIV; former blood donors; rural China

Introduction

Suicidal ideation refers to the thoughts about practicing behaviors to endanger or threaten one's life (Valente & Saunders, 1998), whilst attempted suicide refers to deliberate, self-injurious behaviors ending up with non-fatal outcome (Moscicki, 1997). Suicidal ideation and suicidal attempts are associated with completed suicide (Links, Heisel, & Quastel, 2005), though many people with suicidal thoughts would not make any suicidal attempts (Kessler, Borges, & Walters, 1999). The reported prevalence of suicidal ideation and attempted suicide among people living with HIV (PLWH), respectively, ranged from 14 to 59% (Chandra, Ravi, Desai, & Subbakrishna, 1998; Shelton et al., 2006) and from 16 to 50% (Gielen, McDonnell, O'Campo, & Burke, 2005; Shelton et al., 2006). Mixed results have been reported with regard to whether HIV-positive participants have higher risk of suicidal ideation than HIV-negative people (Alfonso et al., 1994; Gielen et al., 2005; Malbergier & de Andrade, 2001; Rosengard & Folkman, 1997; Schneider, Taylor, Hammen, Kemeny, & Dudley, 1991).

Factors in association with suicidal ideation among PLWH include unemployment (Sherr et al., 2008), financial difficulty (Preau, Bouhnik, Peretti-Watel, Obadia, & Spire, 2008; Vance, Moneyham, Fordham, & Struzick, 2008), presence of physical symptoms (Kelly et al., 1998; Sherr et al., 2008), poor family relationship (Chandra et al., 1998), poor quality of life (QOL; Haller & Miles, 2003; Sherr et al., 2008), perceived discrimination (Preau et al., 2008), lack of social support (Kalichman, Heckman, Kochman, Sikkema, & Bergholte, 2000; Preau et al., 2008), escape or avoidance coping style (Kalichman et al., 2000), psychological problems such as depression (Haller & Miles, 2003; Schneider et al., 1991; Sherr et al., 2008), physical or sexual abuse (Cooperman & Simoni, 2005), and drug dependence (Chandra et al., 1998; Haller & Miles, 2003). Only

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one study reported prevalence of suicidal ideation among Chinese PLWH (Jin et al., 2006). It only had a sample size of 28 and did not examine associated factors.

Former blood and plasma donors (FBPD) constitute about 20% of the reported HIV cases in China (State Council AIDS Working Committee Office, 2007). Most of the FBPD in China were peasants in Anhui and Henan Provinces, who sold their blood and/or plasma to some hospitals in exchange for money (Wu, Rou, & Detels, 2001). In 2005, a census was conducted in Henan Province by the Chinese Center of Disease Control and Prevention (CDC) – around 90% of the 25,036 PLWH hence identified were FBPD (25,036 HIV carriers in China's Henan, Survey, 2004, 14 September). In a certain rural village, the prevalence of HIV among FBPD was 42.3% (Cao, Sullivan, Xu, & Wu, 2006). HIV-positive FBPD in China, as well as their affected spouses and children, are eligible for free antiretroviral therapy and a modest living allowance. There is substantial discrimination toward these PLWH (Cao et al., 2006).

This study investigated the prevalence of suicidal ideation and attempted suicide among PLWH who were FBPD in a rural county in Central China. Factors which are potentially associated with suicidal ideation were investigated, including socio-demographic data, background characteristics, HIV-related information (e.g., duration of diagnosis, treatment and side effects, presence of symptoms, and whether having relatives died of HIV), perceived discrimination arising from family members, relatives, and neighbors, mental health status (levels of stress, anxiety, and depression), and QOL, as well as his/her spouse's demographic and background characteristics, HIV status and mental health status (levels of stress, anxiety, and depression). Most of these associations have not been reported for this study population in China. Most of the international studies investigating suicidal ideation among PLWH were based on data obtained from convenience sampling. Moreover, few studies investigated the impact of the spouse's mental health status onto suicidal ideation of the PLWH.

Subjects and methods

Study population and data collection

In 2005, 6663 confirmed HIV-positive cases (many of whom were FBPD) were identified in a rural county in Central China. Seven of the county's 22 villages with HIV prevalence exceeding 10% were randomly selected. A registry of all PLWH living in these villages was used as the sampling frame, from which 200 adult PLWH (91 men and 109 women) who were FBPD (index PLWH) were randomly selected; 176 of these index PLWH and their spouse gave informed consented and participated in the study. The response rate was around 83%. During July–December 2006, face-to-face interviews were administered by some well-trained field workers who were staff of the local Family Planning Station in a private setting. A structured questionnaire was used. The PLWH and the spouse were interviewed separately and confidentially. Ethics approval was obtained from the Chinese University of Hong Kong. The data collection process was described in details in another published paper (Yu et al., 2009).

Measures

Information was obtained from the index PLWH, including his/her socio-demographic data, information related to HIV (number of times of previous blood/plasma donation, duration of HIV diagnosis, utilization of highly active antiretroviral treatment (HAART), presence of side effects, presence of symptoms, and number of relatives died of AIDS), perceived discrimination (related to family members, relatives and friends, and neighbors), suicidal ideation (Have you thought about committing suicide in the past year?), and suicidal attempts (Have you attempted committing suicide in the past year?). Similar questions related to suicidal ideation and suicidal attempts were used in some previous studies (Preau et al., 2008; Sherr et al., 2008). Information about the index PLWH's spouse was collected, including age, gender, educational level, and HIV status.

QOL of the index PLWH was measured by the Medical Outcomes Study HIV Health Survey (MOS-HIV; Wu, Revicki, Jacobson, & Malitz, 1997). The Chinese version had been fully validated (Lau, Tsui, Patrick, Rita, & Molassiotis, 2006). Four subscales were used in this study (Physical Function, Energy, General QOL, and Health Transition); "General QOL" and "Health Transition" have only one item. The Cronbach's alpha values of Physical Function and Energy subscales were 0.84 and 0.79 in the validation study (Lau et al., 2006), and were 0.84 and 0.69 in this study.

Both the index PLWH and his/her spouse were assessed by the 21-item Depression, Anxiety, and Stress Scales (DASS; Lovibond & Lovibond, 1995), which has three subscales (Stress, Anxiety, and Depression). The Cronbach's alpha values of the English version ranged from 0.87 to 0.94 (Lovibond & Lovibond, 1995) and corresponding subscales alpha values of this study ranged from 0.80 to 0.83.

The Chinese version of the DASS was fully validated (Taouk, Lovibond, & Laube, 2001).

Statistical analyses

The prevalence of suicidal ideation and attempted suicide was reported. Univariate odds ratios (OR) and their respective 95% CI were used to assess the magnitudes of associations between suicidal ideation and the factors under investigation – including those related to both the index PLWH and his/her spouse. Adjusting for significant background information of the index PLWH and their spouse, associations between various independent variables and suicidal ideation were assessed by using multiple logistic regression models. A summary stepwise logistic regression model was also fit, using all variables that were significant in the univariate analyses as candidate variables. SPSS 14.0 for Windows was used for data analyses and $p < 0.05$ was considered statistically significant.

Results

Background characteristics

Amongst the index PLWH and the spouses, respectively, 46.0 and 54.0% were male; 33.5 and 38.1% were less than 40 years old, and 23.3 and 27.3% attained secondary or higher education (Table 1 and 2). Around 83.5% of the index PLWH reported an annual household income which was lower than 3000 RMB (around 450 US$, Table 1). Among the index PLWH, 71.6% had sold blood/plasma for over 10 times and 88% had been diagnosed with HIV for over 2 years. The majority of them were on treatment (88.6%) and 34.1% experienced some treatment side effects; 53.4% of them mentioned suffering from at least one symptom and 37.5% had some relatives died of AIDS. Respectively, 15.3, 34.7, and 38.1% of the index PLWH perceived being discriminated against by their family members, relatives and friends, and neighbors. Among the spouses, respectively, 58.5, 32.4, and 9.1 were HIV negative, HIV positive and were receiving HAART, and HIV positive but were not receiving HAART (Table 2).

Prevalence of suicidal ideation and attempted suicide

The prevalence of the index PLWH having suicidal ideation and suicidal attempts in the past year was, respectively, 34.1 (95% CI = 27–42%) and 8% (95% CI = 4–13%). Factors in association with suicidal attempts were not analyzed due to the small number of cases.

Table 1. Characteristics of the index PLWH respondents.

	N	Percentage (%)
Socio-demographic characteristics		
Gender		
Male	81	46.0
Female	95	54.0
Age group (year)		
<40	59	33.5
40–49	69	39.2
≥50	48	27.3
Education level		
Illiterate	39	22.2
Elementary school	96	54.5
Middle school or higher education	41	23.3
Annual household income (RMB[a])		
0–1000	69	39.2
1001–3000	78	44.3
3001–11,000	29	16.5
HIV-related information		
Number of times of blood donation		
1–10	50	28.4
11–100	98	55.7
>100	28	15.9
Duration HIV diagnosis made (year)		
0–2	21	12.0
3–5	128	72.7
6–14	27	15.3
HAART[b]and side effect mentioned		
No treatment	20	11.4
Treatment with side effect	60	34.1
Treatment with no side effect	96	54.5
Number of symptoms mentioned[c]		
0	82	46.6
≥1	94	53.4
Number of relatives died of AIDS[d]		
0	110	62.5
≥1	66	37.5

[a]1US$ = 6.8RMB.
[b]HAART, highly active antiretroviral treatment.
[c]Symptoms in the past month include fever, fatigue, sleep disorder, headache, cough, diarrhea, nausea, etc.
[d]Types of relatives include spouse, parents, grandparents, siblings, aunt and uncle, and nephew and niece.

Factors in association with suicidal ideation

A number of variables that were derived from the index PLWH's data, including socio-demographic characteristics, HIV-related information (e.g., number of times of donation, duration of HIV diagnosis, HAART treatment and side effects, number of symptoms), and perceived discrimination related to relatives and friends or neighbors were not significantly associated with suicidal ideation, neither in the univarite nor the multiple logistic regression analysis (Table 3). In contrast, all except one (Energy Subscale) QOL variables (adjusted odds ratio (AOR) = 2.89–5.20) and all the three DASS subscales

Table 2. Characteristics of the spouses.

	N	Percentage (%)
Gender		
Male	95	54.0
Female	81	46.0
Age group (year)		
<40	67	38.1
40–49	63	35.8
≥50	46	26.1
Education level		
Illiterate	39	22.1
Elementary school	89	50.6
Middle school or higher education	48	27.3
HIV status		
HIV negative	103	58.5
HIV positive with HAART[a]	57	32.4
HIV positive without HAART	16	9.1

[a]HAART, highly active antiretroviral treatment.

(AOR = 1.36–37.89) were statistically significant in both the univarite and the adjusted multiple logistic regression analyses ($p < 0.05$; Table 3). Similarly, neither the spouse's socio-demographic characteristics, nor their HIV status was significantly associated with the index PLWH's suicidal ideation, whilst the Stress and Depression subscale scores were significantly associated with the index PLWH's suicidal ideation (AOR ranged from 3.51 to 6.91, $p < 0.01$; Table 4).

A summary model to identify independent factors in association with suicidal ideation

Using all the univariately significant variables that were listed in Table 3 and 4 as candidate variables, the results of the stepwise logistic regression model showed that the index PLWH's Physical Function subscale score (OR = 6.67, 95% CI = 1.69–26.27; comparing those with scores ≤25th percentiles and those with scores >75th percentiles, $p < 0.05$), Depression (OR = 9.26, 95% CI = 1.32–64.77; comparing those with scores >75th and ≤25th percentiles, $p < 0.05$), and spouse's Depression subscale score (OR = 7.64, 95% CI = 1.37–42.77; comparing those with scores >75th and ≤25th percentiles, $p < 0.05$) were significantly associated with the PLWH's suicidal ideation (results not tabulated).

Discussion

Suicidal ideation can lead to attempted and completed suicides and about one-third of the sampled PLWH who were FBPD mentioned suicidal ideation in the last year. Another study targeting rural Chinese PLWH reported a higher figure of 60% but it only had a small sample size of 28 (Jin et al., 2006). It is worth-noting that around one-fourth of our participants self-reporting suicidal ideation in the past year did attempt committing suicide. This high proportion signifies a real danger. The factors predicting attempted suicide among PLWH in China have not been reported. There are also no data about the prevalence of completed suicide among PLWH in rural China. Future studies and interventions are hence warranted.

Suicides are not encouraged, nor reinforced, in the resilient Chinese culture. There is an ancient Chinese saying: "Even ants escape from danger to preserve their lives, not to mention human beings." In China, suicides are seen as cowardly acts. The prevalence of suicidal ideation reported in this study would therefore not be among the highest in the world. Unlike PLWH who were injecting drug users or female sex workers, PLWH who were FPBD were less likely to be seen as immoral. These PLWH have been given treatments and a small monetary allowance. It is apparent that the prevalence of suicidal ideation should be rather low. However, discrimination toward this group is common (Cao et al., 2006), possibly due to fear of the disease. In addition, the lack of comprehensive psychological support services and the high level of stress experienced by these rural PLWH seem to keep the prevalence of suicidal ideation relatively high. There are tens of thousands PLWH who were FPBD in rural China, and service gaps are evident. The study, therefore, is an important step for assessing the needs of this group of PLWH, advocating for prevention of suicides in this study population.

Suicidal prevention among PLWH in rural China should not be treated as a taboo. Some studies demonstrated that open discussion about suicide with PLWH upon their HIV diagnosis would facilitate them re-evaluating the meaning of life, establishing life goals, and activating motivation for self-help and help-seeking (Siegel & Meyer, 1999). Screening for suicidal ideation, accompanied by psychological counseling services should be provided to PLWH in rural China. Such services are currently unavailable.

The participants were not living in a resourceful environment. In rural China, the levels of social services and social security were minimal. Many of the index PLWH were in their middle age. They were not well educated and the majority had an annual household income <450 US$. A very large proportion of that income would be spent on the food bills. Moreover, though the majority of the index PLWH received HAART, almost one-third of them were experiencing some side effects. Over half of the index PLWH frequently suffered from some symptoms and

Table 3. Factors associated with suicidal ideation of the index respondents using index respondents' information as independent variables.

	Row (%)	OR_u^a (95% CI)	OR_a^b (95% CI)	OR_m^c (95% CI)
Socio-demographic characteristics				
Gender				
Male	28.4	1.00		
Female	38.9	1.61 (0.85–3.04)	**NA**	–
Age group (year)				
<40	28.8	1.00		
40–49	37.7	1.49 (0.71–3.15)		
≥50	35.5	1.36 (0.60–3.07)	**NA**	–
Education level				
Illiterate	43.6	1.00		
Elementary school	30.2	0.56 (0.26–1.21)		
Middle school or higher education	34.1	0.67 (0.27–1.66)	**NA**	–
Annual household income (RMB[d])				
0–1000	36.2	1.00		
1001–3000	34.6	0.93 (0.47–1.83)		
3001–11,000	27.6	0.67 (0.26–1.74)	**NA**	–
HIV status of the spouse				
HIV negative	30.1	1.00	1.00	
HIV positive with HAART	42.1	1.69 (0.86–3.31)	1.92 (0.95–3.87)	
HIV positive without HAART	31.2	1.06 (0.34–3.29)	1.24 (0.39–3.98)	–
HIV-related information				
Number of times of blood donation				
1–10	38.0	1.00	1.00	
11–100	32.7	0.79 (0.39–1.61)	0.77 (0.36–1.62)	
>100	32.1	0.77 (0.29–2.05)	0.81 (0.29–2.28)	–
Duration HIV diagnosis made (year)				
0–2	33.3	1.00	1.00	
3–5	34.4	1.05 (0.39–2.79)	1.03 (0.38–2.76)	
6–14	33.3	1.00 (0.30–3.35)	0.96 (0.29–3.28)	–
HAART [e]and side effect mentioned				
No treatment	50.0	1.00	1.00	
Treatment with side effect	36.7	0.41 (0.15–1.10)	0.40 (0.15–1.10)	
Treatment with no side effect	29.2	0.58 (0.21–1.61)	0.61 (0.22–1.73)	–
Number of symptoms mentioned[f]				
0	34.1	1.00	1.00	
≥1	34.0	1.00 (0.53–1.86)	1.06 (0.55–2.02)	–
Number of relatives died of AIDS[g]				
0	31.8	1.00	1.00	
≥1	37.9	1.31 (0.69–2.48)	1.28 (0.66–2.45)	–
Perceived discrimination arising from				
Family members				
No	30.2	1.00	1.00	
Yes	55.6	**2.89 (1.25–6.67)****	**2.69 (1.15–6.29)****	NS
Relatives and friends				
No	33.0	1.00	1.00	
Yes	36.1	1.14 (0.60–2.19)	1.12 (0.58–2.16)	–
Neighbors				
No	35.8	1.00	1.00	
Yes	31.3	0.82 (0.43–1.57)	0.79 (0.41–1.52)	–
QOL (MOS-HIV score)				
Physical function				
Higher (>75 percentile)	19.5	1.00	1.00	1.00
Moderate (25–75 percentile)	29.2	1.70 (0.69–4.18)	1.50 (0.59–3.84)	2.00 (0.69–5.79)
Lower (≤25 percentile)	56.5	**5.36 (2.04–14.11)*****	**5.14 (1.83–14.47)****	**4.58 (1.33–15.76)****

Table 3 (*Continued*)

	Row (%)	OR_u^a (95% CI)	OR_a^b (95% CI)	OR_m^c (95% CI)
Energy				
Higher (>75 percentile)	39.6	1.00	1.00	–
Moderate (25–75 percentile)	37.5	0.92 (0.42–2.02)	0.95 (0.40–2.21)	
Lower (≤25 percentile)	31.9	0.72 (0.31–1.66)	0.80 (0.33–1.94)	
Quality of life				
Higher (>75 percentile)	25.6	1.00	1.00	NS
Moderate (25–75 percentile)	28.6	1.16 (0.55–2.45)	1.07 (0.49–2.32)	
Lower (≤25 percentile)	62.9	**4.91 (2.09–11.52)*** **	**5.20 (2.12–12.76)*** **	
Health transition				
Higher (>75 percentile)	69.8	1.00	1.00	NS
Moderate (25–75 percentile)	78.1	0.65 (0.29–1.45)	0.65 (0.29-1.48)	
Lower (≤25 percentile)	44.9	**2.84 (1.31–6.19)****	**2.89 (1.28–6.56)*** **	
Mental health (DASS score)				
Stress				
Lower (≤25 percentile)	11.6	1.00	1.00	NS
Moderate (25–75 percentile)	33.7	**3.86 (1.39–10.76)****	**3.40 (1.19–9.72)***	
Higher (>75 percentile)	60.5	**11.65 (3.74–36.32)*** **	**13.85 (4.25–45.10)*** **	
Anxiety				
Lower (≤25 percentile)	19.0	1.00	1.00	NS
Moderate (25–75 percentile)	28.4	1.69 (0.69–4.14)	1.36 (0.52–3.56)	
Higher (>75 percentile)	58.7	**6.04 (2.29–15.91)*** **	**6.38 (2.25–18.11)*** **	
Depression				
Lower (≤25 percentile)	7.1	1.00	1.00	1.00
Moderate (25–75 percentile)	31.6	**6.00 (1.71–20.97)****	**6.52 (1.77–23.92)****	**4.75 (1.02–22.13)***
Higher (>75 percentile)	69.2	**29.25 (7.53–113.62)*** **	**37.89 (9.01–159.39)*** **	**15.72 (2.56–96.58)****

[a]OR_u = Univariate odds ratio.
[b]OR_a = Odds ratio adjusted for index respondents' socio-demographic characteristics (gender, age, education, and annual household income).
[c]OR_m = Odds ratio obtained from stepwise multivariate logistic regression analysis using univariately significant variables as candidate variables.
[d]1US$ = 6.8RMB.
[e]HAART, highly active antiretroviral treatment.
[f]Symptoms in the past month include fever, fatigue, sleep disorder, headache, cough, diarrhea, nausea, etc.
[g]Types of relatives include spouse, parents, grandparents, siblings, aunt and uncle, and nephew and niece.
Bold figures indicate $p < 0.05$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Note: NA, not applicable; –, non-significant in univariate analysis hence not considered in the multivariate stepwise analysis; NS, significant in univariate but not in multivariate analysis.

about 40% had some relatives died of AIDS. The social environment is equally unsupportive – close to 40% of the index PLWH perceived themselves being discriminated against by their relatives and neighbors and one out of eight were even being discriminated against by their own family members. Rural PLWH who were FBPD and were hence living in adversities. Unlike other international studies (Chandra et al., 1998; Preau et al., 2008; Sherr et al., 2008), most of the aforementioned adversities were not significantly associated with suicidal ideation. In our case, these adversities therefore, did not hence seem to foster suicidal ideation, as rural villagers in China are used to live in resource-limited settings (Bhalla, 1990).

Family values are of central importance to the life of rural peasants in China. In a Chinese study, HIV-positive status brought shame to the family and damaged the relationship among family members (Li et al., 2008). Being discriminated by one's family members may result in a sense of abandonment. In this study, the association between family related perceived discrimination and suicidal ideation was highly significant. The association, however, disappeared after adjusting for PLWH's Physical Function and Depression scores. PLWH's physical and mental health conditions therefore mediated the association between family based discrimination and the PLWH's suicidal ideation. In other words, family related discrimination might result in deterioration of PLWH's health conditions, and induces suicidal ideation.

Our previous study showed that our sampled rural PLWH were more likely to report symptoms of depression, anxiety, and stress, as compared to their

Table 4. Factors associated with suicidal ideation of the index respondents using spouses' information as independent variables.

	Row (%)	OR_u^a (95% CI)	OR_a^b (95% CI)	OR_m^c (95% CI)
Socio-demographic characteristics				
Gender				
Male	37.9	1.00		
Female	29.6	0.69 (0.37–1.30)	NA	–
Age group				
<40	28.4	1.00		
40–49	33.3	1.26 (0.60–2.66)		
≥50	43.5	1.94 (0.88–4.28)	NA	–
Education level				
Illiterate	33.3	1.00		
Elementary school	40.4	1.36 (0.62–2.99)		
Middle school or higher education	22.9	0.59 (0.23–1.53)	NA	–
HIV status				
HIV negative	30.1	1.00	NA	–
HIV positive with HAART	42.1	1.69 (0.86–3.31)		
HIV positive without HAART	31.2	1.06 (0.34–3.29)		
Mental health (DASS score)				
Stress				
Lower (≤25 percentile)	18.4	1.00	1.00	NS
Moderate (25–75 percentile)	33.0	2.18 (0.87–5.46)	2.29 (0.88–5.97)	
Higher (>75 percentile)	54.3	**5.26 (1.83–15.12)*** **	**5.73 (1.78–18.45)*** **	
Anxiety				
Lower (≤25 percentile)	21.4	1.00	1.00	NS
Moderate (25–75 percentile)	36.0	2.06 (0.88–4.79)	2.16 (0.88–5.29)	
Higher (>75 percentile)	44.1	**2.90 (1.06–7.88)*** **	3.04 (0.94–9.80)	
Depression				
Lower (≤25 percentile)	14.3	1.00	1.00	1.00
Moderate (25–75 percentile)	35.2	**3.25 (1.24–8.55)***	**3.51 (1.31–9.41)** **	2.91 (0.94–8.98)
Higher (>75 percentile)	51.2	**6.29 (2.20–17.98)*** **	**6.91 (2.20–21.68)*** **	**4.51 (1.08–18.82)** **

[a]OR_u = Univariate odds ratio.
[b]OR_a = Odds ratio adjusted for spouses' socio-demographic characteristics (gender, age, educational level, and HIV status).
[c]OR_m = Odds ratio obtained from stepwise multivariate logistic regression analysis using univariately significant variables as candidate variables.
Bold figures indicate $p < 0.05$; *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
Note: NA, not applicable; –, non-significant in univariate analysis hence not considered in the multivariate stepwise analysis; NS, significant in univariate but not in multivariate analysis.

rural HIV-negative counterparts (Yu et al., 2009). All the three DASS subscale scores were significantly associated with suicidal ideation. After adjusting for relevant QOL subscale scores and Depression scores, the associations between anxiety or stress and suicidal ideation became non-significant. The high level of stress and anxiety may therefore have lowered the QOL and increased the likelihood of depression, hence fostered suicidal ideation among the index PLWH.

The results of the stepwise summary model showed that lower Physical Function QOL subscale scores and higher Depression subscale scores were independently associated with suicidal ideation. After controlling for these two variables, other independent variables could not enter the stepwise model. These two factors may hence be the most important factors in association with suicidal ideation in our study population. In the literature, these two factors are also independently associated with suicidal ideation among PLWH (Haller & Miles, 2003; Sherr et al., 2008).

The mental health status but not the HIV status of the spouse, was significantly associated with the index PLWH's suicidal ideation. Such findings have not been reported in the literature. Within a couple, depression resulted from the suffering of chronic illness could be contagious (Druley, Stephens, Martire, Ennis, & Wojno, 2003). In our study, depression status of the PLWH was associated with that of the spouse (data not tabulated). In this study, depression status of PLWH and depression status of the spouse had independent effects onto the suicidal

ideation of PLWH. To prevent suicide among PLWH who were FBPD, health workers should take into account the mental health status of both PLWH and the spouse; therapies should be simultaneously provided to both of them. Future studies should investigate suicidal ideation of the spouse, in relationship with that of PLWH.

Prevention and treatment of depression, an important factor in association with suicidal ideation, are of utmost importance to reduce suicidal ideation. Unfortunately, psychiatric services are virtually nonexistent in rural villages in China. Villagers have to travel for hours to towns or cities to utilize psychological or psychiatric services. Furthermore, such services are unlikely to be affordable to these rural PLWH. Primary, secondary as well as tertiary services for psychological problems among PLWH are desperately required.

The study has some limitations. First, information about suicidal ideation of the spouse and HIV-related information of the HIV-positive spouse had not been collected. HIV-related information of PLWH was, however, non-significant and it is likely that the same observation would hold true for the spouse's HIV-related information. Second, reporting bias with regard to suicidal ideation may occur but the direction of such a bias is unclear. Confidentiality has been ensured and respondents were confirmed that no personal information was recorded. Third, suicidal ideation and attempted suicides were assessed by a single item. Similar approaches were used in some other studies (Haller & Miles, 2003; Preau et al., 2008). The one-year reference period for recalling suicidal ideation is arbitrary, though it has been used in a number of studies (Fuller-Thomson & Shaked, 2009; Mather, Cox, Enns, & Sareen, 2009). We believe that the situations of the rural PLWH were relatively stable. Fourth, a screening instrument (DASS) rather than clinical diagnosis was used to measure the mental health status. This is acceptable as the Chinese DASS was fully validated and has been applied to PLWH studies (Yu et al., 2009). These subscales did not have cut-off points and we used inter-quartile ranges for categorization, which is arbitrary though the method was also used in other studies. The study, however, has the strength that the sample was randomly selected.

In summary, the life of a high proportion of PLWH who were FBPD living in rural China were threatened by their suicidal ideation, which was independently associated with PLWH's and the spouse's depression status and with PLWH's physical functioning. Discrimination related to the family might lower physical functioning QOL and result in depression, inducing suicidal ideation indirectly. Primary, secondary, and tertiary prevention services with regard to depression are desperately warranted to save lives of PLWH who are FPBD in rural China.

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