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ORIGINAL PAPER

Associations of Physical and Sexual Health with Suicide Attempts Among Female Sex Workers in South Korea

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Abstract This study investigated suicidal behavior prevalence and its association with physical and sexual health, and behavior-related factors among female sex workers in South Korea. Using time location sampling, we recruited 1,083 sex workers for an interviewer-administered questionnaire regarding sexual behavior, sociodemographics, and self-rated health (SRH) status. Participants were also tested for sexually transmitted diseases (STDs). We used binary logistic regression analysis to define suicide attempt factors. Around 28 % of sex workers in the sample reported that they had attempted suicide in the past year. Suicide attempts were independently associated with drinking alcohol almost every day, not using condom regularly, STD infection experience, and unfavorable SRH status. Higher suicide attempt likelihood was associated with poor sexual and physical health, but there was no significant association with the number of customers per week. We thus need to revive STD screening programs provided by the government and to support mental health programs.

Keywords Suicide · Female sex workers · Sexually transmitted disease · South Korea

Introduction

South Korea, at 31.7 suicide deaths per 100,000 people, has the highest suicide rate among the thirty OECD countries. With 33.4 suicide deaths for men and 18.7 suicide deaths for women in 2008, South Korea currently has the second highest suicide rate in the world

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[1, 2]. Moreover, suicide is the number one cause of death of women under 40 in South Korea [2, 3].

Common mental disorders such as depressive and anxiety disorders, and poverty are major risk factors for suicide among women [4–7]. However, although the high prevalence of suicidal behavior among female sex workers (FSWs) has been established, the diverse factors that lead them to commit suicide have yet to be fully clarified [8, 9]. In particular, only a few studies have examined the association between sex workers' sexual and physical health and their suicidal behavior. Consequently, to strengthen the hypothesis that FSWs' adverse working environment and mental illnesses are likely to increase their rate of suicide, it is necessary to examine the association between sex workers' physical health and mental health, including the possibility of reverse causality among related factors.

Even though it is an industrialized society with the 10th largest economy in the world, South Korea is conservative when it comes to the topic of sex; thus, a large-scale sex industry has been operating in South Korea, similar to other East Asian patriarchal societies, such as those of China and Japan [10–12]. With the existence of red light districts (RLDs) in the downtown area of each major city, an estimated 3.5 % of the female adult urban populations are engaged in commercial sexual transactions [13]. However, prostitution is illegal, and, in general, sex workers are considerably exposed to the risk of infection if they have sexually transmitted diseases (STDs), such as syphilis, chlamydia, and gonorrhea [14]. STDs are medically and psychologically serious diseases that can cause acute diseases, sterility, long-term disabilities, and death; in addition, not treating them can increase the risk of infection and contagion with HIV by ten times [15]. Considering that STD infection is associated with depression [16, 17] and that an adverse working environment increases the possibility of STD infection [18], an indirect association with mental stress is possible [8]. This is also in line with studies whose findings state that the more one evaluates oneself as unhealthy, the more likely one is to attempt suicide [19, 20]. Therefore, examining the association between sex workers' sexual and physical health and their suicidal behavior may help us to clarify the context of their attempts at suicide. Utilizing a national sample of female sex workers in South Korea, we explored the association of sexual and physical health with suicide attempts in the past year.

Methods

Sampling

The FSWs in this study were recruited using a multistage stratified cluster random sampling method that was applied to time location sampling (TLS). TLS is appropriate for the representative sex workers who are easily located at visible and designated sites. It has been used to sample sex workers who are accessible at public locations that can be listed in a sampling frame [21, 22]. However, TLS may reduce the representativeness of the sample when the visible portion of a population does not represent the whole population [23]. Sex workers in Korea, however, are well segregated by location and types of prostitution.

The prostitution occurring in established locations is largely divided into two types. Establishments with full-time sex workers mainly deal in sex trafficking and are densely populated in RLDs. In these areas, FSWs maintain their livelihood exclusively through prostitution. In contrast, establishments that offer prostitution as a side-business mainly sell alcohol or massage services, and try to supplement these by also offering prostitution. The FSWs in the former types of prostitution establishment exhibit typical and consistent

sexual behaviors that differ from those of FSWs in situations where they directly or indirectly make contact with clients and form relationships, but not at a set location. Brothels are generally located at the periphery of busy downtown areas with a high volume of population movement. An RLD usually has about 10–50 brothels located in close proximity to each other, and they solicit clients as a group. Each brothel usually houses about 2–10 FSWs who live with their pimps and stay there for a long time. Accordingly, RLDs in Korea have the most appropriate conditions for FSW recruitment using TLS.

For this study, the 42 national RLDs (with approximately 6,000 sex workers) listed by the Ministry of Gender Equality and Family were stratified according to city population and brothel size, and 13 areas were selected. All of the sex workers of the selected areas were contacted and surveyed (N = 1,083). The response rate for the survey was 89.2 %.

Data Collection

Research data were collected through the national survey for female sex workers, which was conducted through 25 field interviews administered from June 2 to November 28, 2008. As for the field surveys, a team consisting of one physician, two clinical pathologists, two individuals with master's degrees in public health, and one director was dispatched. Trained interviewers facilitated sex workers to answer the questionnaire on sexual behaviors, while laboratory technicians gathered urine, oropharyngeal swab and blood samples. Biological samples were tested as follows: TP-PA for treponema pallidum, and urine PCR for chlamydia trachomatis and neisseria gonorrhea.

Measures

The survey instrument was developed from an abridged version of Behavioral Surveillance Surveys as an international validated scale [24] and from the results of three focus groups, each of which were attended by ten sex workers. The objectives of the focus groups were to probe in-depth the working environment, mental stress, and suicide attempts of FSWs. Given their open-ended nature, the focus groups allowed us to probe in greater depth the reasons of suicidal behavior. Based on the focus group data, a questionnaire was developed to assess suicidal behavior among sex workers more systematically.

Dependent Variables

Suicidal behavior was assessed through asking "Have you ever attempted suicide in the past year?" with the response options of yes or no. To reduce social desirability bias, we used an informal confidential voting interview to collect responses to sensitive questions. We also used validity checks to measure internal consistency.

Independent Variables

Sexual and Physical Health We asked the participants a series of questions about sexual and physical health. Sexual health was measured by whether or not the subjects had STDs, and it included all subjects diagnosed as having been infected with STDs at present and in the past. Current infection was identified through clinical examinations, and past infection was identified by physicians through a survey that was conducted during the examinations. A subject who had been diagnosed with an STD at least once was coded as 1, and a subject

who had never been diagnosed with an STD was coded as 0. Physical health was measured by self-rated health (SRH) status. We asked "In general, would you say your health is" which was collapsed into the categories of 'good' (1), 'average' (2), and 'poor' (3). For analysis, this original scale was categorized, with 1 representing unfavorable SRH ('poor'), and 0 representing favorable SRH ('good' and 'average'). This is consistent with previous studies using a binary outcome of SRH for sex workers [11]. Although this rating simplifies a complex issue, it has reliably predicted survival in populations even after taking into account other known health risk factors [25]. It has also been validated as a good predictor of morbidity and mortality [26].

Sexual Risk Behaviors We measured sexual risk behaviors with the number of customers and the frequency of condom use with customers. The number of customers was assessed by asking the open-ended question of "How many customers did you have per week on average during the last 3 months?" The frequency of condom use was assessed by asking "How often did you use condoms with your customers?" which was collapsed into the categories of 'over 90 %', '70–90 %', '50–70 %', and 'under 50 %.' For analysis, this original scale was categorized, with 1 representing regular use ('over 90 %') and 0 representing irregular use ('70–90 %','50–70 %', and 'under 50 %').

Health Risk Behaviors For smoking, we asked, "How many cigarettes do you smoke a day?" For analysis, we categorized this item with 0 representing nonsmokers ('never smoke') and 1 representing smokers (all other options). For alcohol consumption, we asked, "How often do you drink alcohol?" which was collapsed into the categories of 'almost every day', 'sometimes', and 'not at all.'

Potential Confounders

Sociodemographic confounders were selected based on a theoretically and empirically defined relationship with suicide attempt among sex workers [11]. The length of time of involvement in sex work, the obtainment of medical check-ups for STDs, educational attainment, age, and recruitment locations were considered as potential confounders of this study. The length of time of involvement in sex work was calculated by subtracting the age of the first prostitution experience from the current age. For STD awareness, we also asked the participants about whether they had regular check-ups for STDs on their own accord. Educational attainment was assessed on the basis of "Have you ever attended school" and "What is the highest level of school you attended," with responses categorized as 'elementary school', 'middle school', 'high school', and 'college or higher.' Age was divided into the categories of 19–24, 25–29, 30–39, and 40 or older.

Statistical Analysis

First, we described the general characteristics of the sample. Second, we conducted bivariate analyses between suicide attempts and study variables utilizing the Mantel–Haenszel X^2 test, which allows the comparison of two groups for a dichotomous/categorical response. This method is used when the effect of the independent variable on the dependent variable is influenced by covariates. Third, we estimated the sex workers' prevalence rates for three STDs: *T. pallidum*, chlamydia, and *N. gonorrhoeae*. Lastly, we carried out logistic regression with suicide attempt in the past year as the outcome. We

assessed the associations among health behavior, sexual behavior, physical health, and suicide attempt via binary logistic regression analysis, entering all variables identified by other studies as significant factors into the model. To adjust for potential biases in recruitment, we weighted the data by the inverse of the approximate probability of recruitment [27]. We performed analyses with STATA version 9 (STATA Corp, College Station, TX), incorporating the weights through the survey analysis functions, and all percentages and adjusted odds ratio (aOR) quoted were weighted with 95 % confidence intervals (CIs). Continuous variables were converted to categories based on published studies and a priori definition, and missing values were excluded using a pairwise method.

Results

General Characteristics of the Sample

We recruited 1,083 FSWs from 13 different RLDs throughout South Korea. The average age of the participants was 28.7 years (±5.8) and their first experience of sexual intercourse was when they were 18.4 (±2.5) years old on average. Most of the participants, 91.5 %, were currently smokers, and 11.2 % were heavy drinkers. Of the 1,083 participants, 22.9 % have over 31 customers a week and 53.4 % always used a condom. Around 25.4 % have had an STD infection and 44.1 % FSWs responded they were getting regular checkups for STDs. Around 11.5 % of the participants have poor SRH status, and the prevalence of suicide attempts in the past year was 28.3 % (Table 1).

Bivariate Analysis of Suicide Attempt Among Female Sex Workers

The results of the bivariate analysis of suicide attempt are presented in Table 2. The differences between the never-attempted group and the attempted group were revealed in the educational level ($p < 0.01$), regular condom use with customers ($p < 0.001$), STD infection experience ($p < 0.05$), and SRH status ($p < 0.001$). Those who had attempted suicide in the past year had a lower percentage of condom use, a higher percentage of STD infection experience and unfavorable SRH status than those who had never attempted suicide.

STD Prevalence Rates of Female Sex Workers

Of the 1,083 FSWs examined, 21.8 % were currently infected with an STD, 18.2 % had been infected in the past and 60.0 % had never been infected. The prevalence rates, which were estimated by dividing the number of participants with positive (+) reactions discovered in each area by the total number studied, were as follows (Table 3). The STD prevalence rates were 9.7 % (95 % CI 8.0–11.6) for *T. pallidum*, 12.1 % (95 % CI 10.5–14.5) for chlamydia, and 2.5 % (95 % CI 1.6–3.6) for gonorrhea. An oropharyngeal swab test was also carried out, but all clinical specimens were negative. The STD prevalence rate was generally higher in metropolitan areas, such as the Gangdong district of Seoul and Busan.

Sexual and Physical Factors of Suicide Attempts

Table 4 describes the relationship between physical/sexual health and suicide attempts in the past year after we adjusted for baseline factors such as region and gender, etc. The risk

Table 1 General characteristics of the sample ($n = 1{,}083$)

	n (Unweighted %)
Age, year [Mean (SD)]	28.7 (5.8)
The length of the time of involvement in sex work, year [Mean (SD)]	10.3 (3.4)
Education	
Elementary school	18 (1.7)
Middle school	173 (16.0)
High school	782 (72.2)
College or higher	95 (8.8)
Missing	15 (1.3)
Smoking	
2 pack per day	251 (23.2)
1 pack per day	581 (53.6)
Half pack per day	128 (11.8)
Less than half pack	31 (2.9)
Nonsmoker	85 (7.8)
Missing	7 (0.7)
Alcohol consumption	
Almost every day	121 (11.2)
Sometimes	601 (55.5)
Not at all	356 (32.9)
Missing	5 (0.5)
Number of customers per week	
$\leq$10	244 (22.5)
11–20	266 (24.6)
21–30	204 (18.8)
$\geq$ 31	248 (22.9)
Missing	121 (11.2)
Condom use with customers	
Regular use (over 90 %)	564 (53.4)
Irregular use (under 90 %)	492 (44.1)
Missing	27 (2.5)
STD infection experience	
Ever	275 (25.4)
Never	750 (69.4)
Missing	58 (5.4)
Medical check-ups for STD	
Regularly	478 (44.1)
Sometimes	507 (46.9)
None	87 (8.0)
Missing	11 (1.0)
Self-rated health status	
Good	449 (41.5)
Average	507 (46.8)
Poor	124 (11.5)

Table 1 continued

	n (Unweighted %)
Missing	3 (0.3)
Suicide attempt	
Never-attempted	771 (71.2)
Attempted	307 (28.3)
Missing	5 (0.5)

SD standard deviation

of suicide attempts was higher for those who drank alcohol almost every day (aOR = 1.56; 95 % CI 1.04–2.70) and for those who did not practice regular condom use (aOR = 1.40; 95 % CI 1.06–1.73). This probability was also higher for those who had STD infection experience (aOR = 1.84; 95 % CI 1.78–1.91) and those who had unfavorable SRH status (aOR = 2.49; 95 % CI 1.79–3.48). These results demonstrated that the probability of attempting suicide was significantly associated with sexual and physical health, but there was no association between the likelihood of attempting suicide and the number of customers per week.

Discussion

This study explored the relationship between sexual and physical health and suicidal behavior among female sex workers in South Korea. The major findings of this analysis are as follows. First, South Korean female sex workers' prevalence of suicidal behavior in the past year amounted to 28.3 %, which is a higher rate than the 18.7 % for India and the 18.5 % for Israel [9, 28]. A Chinese study of a comparable population found that 14 % of female sex workers had contemplated suicide and 8–9 % had attempted suicide in the past 6 months [8, 29]. While direct comparisons are difficult, such figures show that Korean sex workers are at risk for suicidal behavior. Second, the STD prevalence rate is 9.7 % for syphilis, 12.1 % for gonorrhea, and 2.5 % for chlamydia, respectively. Such figures are higher than those for other Asian countries: 6.9 % for syphilis in China and 10.2 % for gonorrhea in India [30, 31]. Lastly, SRH status, STD infection, condom use practice, and alcohol consumption were associated with suicide attempts. Sex workers who had been infected with an STD were 1.84 times more likely to have attempted suicide in the same period. At the same time, those who had unfavorable SRH status were 2.49 times more likely to have attempted suicide, which suggests that women with poor sexual and physical health are an at-risk population who ought to have access to mental health programs.

The fact that adverse physical health levels aggravate mental health and eventually increase the risk of suicide has been well-documented in the general population [8, 20, 32, 33]. In the case of sex workers, however, such a fact has not received adequate attention. Korean FSWs have significantly lower SRH status than women in the same age group [11, 20] and a considerably higher STD prevalence rate as well [11]. Women's unsatisfactory health status may be consistently associated with mental illnesses [34]. In particular, in the case of sex workers, STD infection can increase the likelihood of a suicide attempt in three aspects. First, STD infection may indicate that it was very difficult to practice safe sex. The degree of condom use differs for each business establishment in the RLDs in South Korea [11]. While there are establishments that refuse customers who do not use condoms, there are others for which the issue is irrelevant. Such differences make it difficult for sex

Table 2 Bivariate analysis of suicide attempt among female sex workers in South Korea, 2008 (n, %)

	Suicide attempt in the past year		Mantel–Haenszel X^2 test (p value)
	Never	Ever	
Age (years)			
19–24	154 (20.2)	62 (20.3)	ns
25–29	362 (47.5)	149 (48.7)	
30–39	213 (28.0)	72 (23.5)	
≥40	33 (4.3)	23 (7.5)	
Education			
Elementary school	11 (1.4)	7 (2.3)	<0.01
Middle school	110 (14.5)	62 (20.5)	
High school	579 (76.1)	200 (66.0)	
College or higher	61 (8.0)	34 (11.2)	
Smoking			
Nonsmoker	65 (8.5)	20 (6.6)	ns
Smoker	703 (91.5)	284 (93.4)	
Alcohol consumption			
Not at all	270 (35.2)	86 (28.0)	ns
Sometimes	424 (55.3)	173 (56.4)	
Almost every day	73 (9.5)	48 (15.6)	
Number of customers per week			
≤10	171 (24.9)	73 (26.6)	ns
11–20	200 (29.1)	65 (23.7)	
21–30	138 (20.1)	66 (24.1)	
≥31	178 (25.9)	70 (25.5)	
Condom use with customers			
Regular use (over 90 %)	300 (39.8)	82 (27.4)	<0.001
Irregular use (under 90 %)	454 (53.5)	217 (72.6)	
STD infection experience			
Never	477 (61.9)	168 (54.7)	<0.05
Ever	293 (38.1)	139 (45.3)	
Self-rated health status			
Favorable	396 (51.5)	233 (75.9)	<0.001
Unfavorable	373 (48.5)	74 (24.1)	

ns non-significant

workers to prevent themselves from contracting STDs through condom use and are likely to decrease self-efficacy in suppressing suicide [35].

Second, having an STD infection experience may indicate that the working environment is quite adverse. Without rules that enforce the condom use of customers, sex workers are likely to be in a position that requires them to succumb to their customers' diverse demands [36, 37]. In other words, in this case, prostitution becomes the worst form of emotional labor. The fact that emotional workers with higher responsiveness to customers' demands suffer more from mental illnesses [38] may be yet another reason for the association between sex workers' STD infection and suicide.

Table 3 Prevalence rates of sexually transmitted diseases by recruitment locations among female sex workers in South Korea (*n*, %)

Recruitment locations	*T. pallidum*	Chlamydia	*N. gonorrhoeae*
The metropolis of Seoul (Capital)			
Gangdong ($n = 110$)	14 (12.7)	20 (18.2)	6 (5.5)
Yongsan ($n = 82$)	7 (8.6)	8 (9.9)	1 (1.2)
Seongbuk ($n = 124$)	12 (9.8)	13 (10.7)	5 (4.1)
Yeongdeungpo ($n = 63$)	3 (4.8)	6 (9.5)	0 (0.0)
Dongdaemun ($n = 69$)	1 (1.5)	5 (7.4)	1 (1.5)
Gyeonggi province			
Paju ($n = 75$)	3 (4.0)	14 (18.6)	1 (1.3)
Suwon ($n = 73$)	9 (12.3)	5 (6.8)	0 (0.0)
Gangwon province			
Chuncheon ($n = 46$)	7 (14.9)	6 (12.8)	0 (0.0)
Wonju ($n = 40$)	1 (2.6)	2 (5.1)	1 (2.6)
Jeolla province			
Jeonju ($n = 90$)	9 (10.1)	5 (5.6)	4 (4.5)
Gyeongsang province			
Pohang ($n = 70$)	14 (20.3)	9 (13.0)	2 (2.9)
Daegu ($n = 27$)	2 (7.7)	3 (11.5)	1 (3.8)
Busan metropolitan ($n = 212$)	22 (10.4)	34 (16.1)	5 (2.4)
Total ($N = 1{,}081$)	104 (9.7)	130 (12.1)	27 (2.5)

The average response rate of pathological test is 99.8 %

Third, sex workers are likely to experience social stigma as a result of STD infection. Since the illegalization of prostitution in South Korea in 2004, the budget for STD prevention and treatment has seen a 15–20 % reduction; furthermore, the budget for screening sex workers who live in RLDs for STDs has been completely annihilated [39]. Consequently, sex workers infected with STDs should visit community health centers or medical institutes and receive treatment on their own, and, in such situation, often experience social stigma [40, 41]. They are likely to experience stigma as sex workers through an STD screening system that does not adequately guarantee privacy, and this is likely to be an influential factor of suicide attempts. Consequently, it is necessary to prevent sex workers from experiencing social stigma by political and legal improvements.

While hundreds of thousands of sex workers engage in an underground sex industry in South Korea, there are almost no institutional apparatuses for protecting their physical and mental health status, which are adverse for the reason that prostitution is illegal. According to the present study, however, increase in STD infection may be likely to increase these sex workers' suicide rates.

Limitations

First, as part of a cross-sectional study, we made a series of assumptions about causal order based on existing theories. For example, poor physical health status may be a manifestation of suicidal behavior and not vice versa. Thus, these causal relationships need to be further examined and generalized based on longitudinal data. Second, measuring instruments,

Table 4 Association between sociodemographic characteristics, health risk factors, sexual risk factors, physical health factors, and suicide attempt among female sex workers: South Korea, 2008

	Prevalence of suicide attempt in the past year		
	n (Weighted %)	*n* (Weighted %)	aOR (95 % CI)[a]
Smoking			
Nonsmoker (Ref)	85 (7.9)	20 (6.6)	1.00
Smoker	991 (92.1)	284 (93.4)	1.31 (0.71–2.42)
Alcohol consumption			
Not at all (Ref)	356 (33.0)	86 (28.0)	1.00
Sometimes	601 (55.8)	173 (56.4)	1.21 (0.86–1.71)
Almost every day	121 (11.2)	48 (15.6)	1.56 (1.04–2.70)**
Number of customers per week			
≤10 (Ref)	244 (25.4)	73 (26.6)	1.00
11–20	266 (27.7)	65 (23.7)	1.26 (0.80–1.97)
21–30	204 (21.2)	66 (24.1)	0.83 (0.54–1.27)
≥31	248 (25.8)	70 (25.5)	1.15 (0.74–1.76)
Condom use with customers			
Regular use (Ref)	385 (36.4)	82 (27.4)	1.00
Irregular use	672 (63.6)	217 (72.6)	1.40 (1.06–1.73)*
STD infection experience			
Never (Ref)	650 (60.1)	168 (54.7)	1.00
Ever	432 (39.9)	139 (45.3)	1.84 (1.78–1.91) **
Self-rated health status			
Favorable (Ref)	631 (58.4)	74 (24.1)	1.00
Unfavorable	449 (41.6)	233 (75.9)	2.49 (1.79–3.48)***
−2Log Likelihood			1002.05
Nagelkerke R^2			0.25

aOR adjusted odds ratio, *CI* confidence interval, *STD* sexually transmitted disease

[a] Adjusted for baseline factors (i.e., recruitment locations, age, educational attainment, medical check-ups for STD, and the length of time of involvement in sex work)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

including mental health and social discrimination, need to be further developed and validated utilizing multi-dimensional items. We used standardized and field-tested tools for the diagnosis of sexual and physical health indicators that were culturally appropriate and validated, but the remaining questions were informed by the qualitative survey and extensive field surveys.

Conclusions

Suicidal behavior was found to be very common in Korean female sex workers. Both sexual and physical health were independently associated with suicide attempt. Our study findings indicate that it is necessary to simultaneously revive STD screening programs provided by the government and to support mental health programs. FSWs' physical and

sexual health is closely related to their mental health and suicide prevention programs cannot be effective without STD screening services.

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