

Effects of a safe sex intervention on the commercial sexual behaviour of brothel sex workers in Bangladesh: Evidence from a randomized controlled trial

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Abstract

Objectives. To evaluate the effect of the intervention, consisting of a combination of having information about sexually transmitted infections, especially human immune deficiency virus, and receiving training in negotiation to increase safer sexual behaviours among female sex workers and their clients.

Methods. We implemented a randomized controlled study which recruited 1,332 female sex workers from eight different brothels in Bangladesh. The study consisted of a control and two treatments (T1 and T2). Participants in T1 took part in a safe sex information session and participants in T2 participated in a safe sex information session and received a counselling session in which they were taught the skills and techniques to negotiate with their clients to get them to wear condoms.

Results. In this study we found no improvement in the sexual behaviour of female sex workers upon intervention. We find minimal differences in treatment effects between the control and treated participants. We did, however, find that participants in T2 were marginally more likely to engage in protected sexual transactions than T1 participants.

Conclusions. Although the implemented intervention did not work, in this study, we examined several factors that might explain this result and help to develop future effective interventions.

Background

Recent concern about the potential for COVID-19 to spread rapidly in developing countries highlights the potential costs associated with the spread of infectious diseases in developing countries more generally. The United Nations Development Program, for instance, estimates that income losses from COVID-19 in developing countries to exceed \$US 220 billion.¹ Developing countries are also on the frontline when it comes to fighting other infectious diseases such as human immunodeficiency virus (HIV). In 2018, it was estimated that approximately 38 million people were living with HIV, with most of them from low- and middle-income countries.² The problem is that many developing countries lack the resources to spend on treatment of infectious diseases such as COVID-19 or HIV, making it even more important to reduce the spread in the first place. In 2015, lower and middle-income countries had 75 per cent of all HIV/AIDS disability adjusted life years, but just 37 per cent of HIV/AIDS spending.³

The risks associated with transmission of HIV in developing countries are magnified, relative to developed countries, because the level of knowledge about sexually transmitted infections (STIs) is generally low.⁴

Bangladesh, which is the country in which our study is situated, faces the prospect of a HIV epidemic.⁵ A combination of factors, including a high STI prevalence rate among HIV high-risk groups, such as female sex workers (FSWs), the widespread injection drug-use (IDU), and the close geographical proximity between Bangladesh and India contribute to this epidemic. The risk of HIV transmission is heightened in Bangladesh because a majority of FSWs are IDUs,⁶ most of whom are STI positive, and they tend to practice unprotected sex and have multiple sexual partners.⁷ The frequent migration of FSWs between Bangladesh and India, which has the third largest population infected with HIV,⁸ also increases the likelihood of a HIV epidemic in Bangladesh.⁹

In addition to the low level of STIs/HIV knowledge among sex workers in developing countries, such as Bangladesh, it is generally difficult for sex workers to obtain information from potential clients about their STI/HIV status. Thus, improving the knowledge of sex workers about STIs/HIV could potentially assist them in making more informed decisions about whether to engage in protected sex, regardless of their clients' STI/HIV status.¹⁰⁻¹¹ Existing studies have provided mixed evidence about the effectiveness of giving more information about STIs/HIV to sex workers. However, some studies have found that rather than knowledge of STIs per se, the ability of FSWs to negotiate with clients about unprotected sex was more important in increasing condom use and reducing incidence of infectious diseases.¹²⁻¹³ Thus, even with knowledge of the risks associated with STIs/HIV, if FSWs have poor negotiation skills, they might not be able to negotiate with clients to get them to use condoms.¹⁴ This suggests that improving the negotiation skills of FSWs, particularly skills to negotiate around condom use, could lead to more protected sex between FSWs and their clients. Indeed, some studies in other contexts have observed that improved negotiation skills translate to better economic outcomes.

In this study, we examine whether the combination of having *both* more information about STIs/HIV *and* receiving training in negotiation skills can lead to increased safer sexual behaviours between FSWs and their clients in Bangladesh (e.g., more protected sex).

Methods

Population description. Between February 2016 and April 2016, a total of 1,332 FSWs from eight different brothels participated in our baseline survey. We worked with an NGO (Global Development and Research Initiative- GDRI), which also collaborated with brothel-based NGOs to facilitate the survey and interventions among sex workers. These NGOs have been working in the brothels with the FSWs on several different issues including their legal rights, health, and their children's education, so they are well known to the FSWs. To select our sample, we used the following criteria: (i) aged between 17 and 36 years; (ii) must have engaged in a commercial transaction in the past few days; and (iii) not be pregnant. We introduced the age restriction to ensure that the average age of our baseline sample is like the average age of FSWs reported in other studies.¹⁵ All FSWs who participated in the survey received 100 Taka (US\$1.28) each to compensate them for their time. The baseline survey collected demographic information from each of the participants, as well as information on their general health and awareness of STIs and safe sex practices, (e.g., knowledge of STIs/HIV and whether the participant been tested for STIs in the past). FSWs provided information on their commercial sexual transactions in the last three days. If FSWs did not engage in any sexual transaction in the last three days, they were asked to backtrack the reference period by an additional three days until they were able to provide information

on three days of commercial sexual transactions. To understand the characteristics of the client and the nature of the interaction in each sexual transaction, we also asked FSWs to provide further information on each of their last three transactions.

Experimental design. We randomly assigned FSWs employed in our study to one of two treatment groups or the control group. In treatment 1 (T1), FSWs participated in a safe sex information session in which they were provided with information on STIs/HIV and safe sex practices; Supplement 1. In treatment 2 (T2), they participated in a safe sex information session, *and* received a counselling session in which they were taught the skills and techniques to negotiate with their clients to get them to wear condoms; Supplement 2. The control group did not receive any treatment. For counselling, we adapted four approaches of condom negotiation that were used by Wong et al. 1994 and Maher et al. 2013 with FSWs in Singapore and Cambodia, respectively.^{16–17} The four approaches are the positive approach, fear arousal approach, peer pressure approach and assertive approach. The positive approach highlights the benefits of condom use to clients; the fear arousal approach emphasises the consequences of non-condom use to clients (i.e. increased risk of contracting STIs or HIV/AIDS); the peer pressure approach encourages clients to wear condoms by highlighting that other clients are also wearing condoms; and with the assertive approach FSWs are taught how to encourage clients to use condoms by refusing to have any form of sexual penetration with the client unless he agrees to wear a condom. In addition to the enumerators employed in our study, who were responsible for conducting the baseline survey and T1 intervention, qualified education psychologists were deployed as counsellors to conduct the T2 intervention. The counsellors were trained by a professional counsellor, who had prior counselling experience in HIV/AIDS prevention programmes in Bangladesh, on how to conduct the condom negotiation session with the participants. Both interventions were conducted between April 2016 and June 2016. The follow-up survey was conducted with all participants between October 2016 and November 2016, which was approximately eight months after the baseline survey was first rolled out, and approximately six months after the intervention first commenced; Supplement 3.

Randomization. Sex workers live in close proximity and also frequently communicate with each other outside their own residence or place of work. We mapped the locations of each FSW in each brothel and then separated them into treatment and control groups using relevant geographic information (such as blocks, roads or buildings within the brothel). Some brothels are horizontally dispersed, while others consist of a few buildings with FSWs living in different rooms in those buildings; Supplement 4. Due to the proximity of the buildings in these brothels in which some FSWs live (rooms are generally located side-by-side with each other and share a common wall), there is a higher possibility of contamination of our intervention from the treated participants to the control participants through social interaction among the participants and/or changes in the sex work behaviour of participants in the treated groups. For randomization, we grouped together rooms that were close to one another. Participants located in rooms in a building (or in blocks in some cases) that are close to one another may share similar characteristics. We conduct our analysis, including the balancing test for randomization, by clustering the standard errors at the building (blocks) level. Within the area in which FSWs reside, we also used a randomized saturation design in which there was exogenous variation in the saturation/intensity of participants assigned to the treated group across the buildings, which ranged between 0 and 100 per cent. The 'intensity' measure is defined as the number of participants assigned to the treated group in each building (or block) divided by the total number of participants in the building. The variation in the intensity measure allows us to estimate any potential spill over effects. Supplement 5 shows the variation in saturation/intensity of participants assigned to treated group across buildings in the brothels.

Ethics approval

Ethical and institutional approval were obtained from the Monash University Human Research Ethics Committee (CF 13/3517-2013001769). Written informed consent was taken from all the participants participated in this study. All research activities and experiments were performed in accordance with the relevant guidelines and regulations of the approved research ethics committee.

Trial Registration

The study is registered on 31/01/2022 and the registration number is ACTRN12622000161729.

Statistical analysis. Participants' characteristics were summarized using descriptive statistics, mean and standard deviation (SD). Ordinary least square regression models were used to measure the impact of our intervention on the outcomes of interest. The first set of outcomes of interest are market transaction outcomes (e.g., earnings and the commercial sexual transaction price) and behavioural responses (e.g., whether the client was a regular, whether the client was suspected of having STIs; whether the participant inspected the client for STIs, and whether the transaction involved safe sex) based on the last three transactions. In the appendix, we also report results based on the last three days' transactions which are potentially more susceptible to recall errors or bias. The second set of outcomes was beliefs and knowledge about HIV and other STIs and self-reported risk attitudes (overall risk, financial risk, and health risk). We also estimated the effect of the intervention on self-reported risk attitudes and the anxiety level of FSWs using the Health Anxiety Inventory (HAI-18).¹⁸ All outcomes of interest were collected at baseline and follow-up. Finally, we measured whether the interventions indirectly influence non-treated individuals. We define an overall treatment 'intensity' measure, I_T , which is the number of participants assigned to either of the two treatments in each building divided by the total number of participants in the building to estimate the joint spill over effects of the two interventions on the outcomes of non-treated participants in the *treated* buildings. To do that, we again used ordinary least square regression models.

Results

Population Description. Of the total 1132 participants, 673 (59%) were allocated in the control arm. Of the total 659 participants enrolled in intervention arm, 330 participants received T1 and 329 received T2. Table 1 shows summary statistics of key variables at baseline (columns 1–5), and the results of the balance test between the control and treated groups (columns 6–10). The mean age of sex workers in our sample is around 25 years old and is similar across participants in the control, T1, and T2 groups. Sex workers across groups had similar levels of education (on average 2.3 years), life satisfaction and big five personality traits. There are some differences across groups in terms of patience and general risk and financial risk attitudes, but none of the joint tests of statistical difference is significant at the 5 per cent level. A total of 147 participants (11%) did not participate in the follow-up survey as they could

not be located. Although Table 2 shows that there was a higher number of participants from the control group (n = 80) lost to follow-up compared to the treated group (n = 67), the baseline characteristics of attriters did not differ statistically between the control and treated participants, except for the variables denoting health risk attitude and the proportion of safe sex transactions. We controlled for these variables when we analysed the impact of our intervention. Among the participants who remained at follow-up, 27 reported zero past transactions (control = 12; T1 = 9; T2 = 6) and these participants were excluded from the analysis.

Table 1
Summary statistics and randomization check

Variables	Overall mean	Control	Treated	T1	T2	Treated - Control	T1 - Control	T2 - Control	T2 - T1	test of joint significance
		Mean				P-Values				
Age	25.44	25.33	25.55	25.39	25.71	0.40	0.96	0.23	0.36	0.48
Education	2.35	2.35	2.35	2.17	2.53	0.98	0.32	0.39	0.12	0.31
Has high self esteem	3.38	3.41	3.36	3.38	3.33	0.32	0.62	0.22	0.60	0.47
Satisfaction with own life	4.92	4.91	4.93	5.02	4.85	0.88	0.68	0.80	0.58	0.84
Extraversion	0.31	0.33	0.29	0.22	0.37	0.68	0.30	0.79	0.22	0.48
Agreeableness	1.46	1.44	1.51	1.52	1.50	0.31	0.35	0.45	0.92	0.58
Conscientiousness	1.11	1.08	1.13	1.20	1.06	0.48	0.19	0.82	0.26	0.35
Neuroticism	0.04	0.08	-0.00	0.02	-0.02	0.34	0.54	0.32	0.77	0.58
Openness	-0.05	-0.00	-0.10	-0.12	-0.09	0.20	0.30	0.34	0.84	0.44
Patience	4.13	4.09	4.16	4.00	4.33	0.50	0.44	0.06*	0.02**	0.06
Communicates well	4.02	4.04	4.00	4.02	3.98	0.44	0.75	0.34	0.50	0.63
Is approachable/sociable/friendly	4.15	4.15	4.15	4.17	4.13	0.97	0.76	0.74	0.51	0.78
General risk attitude	4.25	4.37	4.13	4.22	4.05	0.16	0.44	0.09*	0.52	0.23
Financial risk attitude	4.06	3.21	3.14	3.28	3.01	0.09*	0.04**	0.53	0.14	0.13
Health risk attitude	3.18	4.20	3.93	3.77	4.09	0.73	0.70	0.34	0.19	0.43
STI likelihood	1.49	1.49	1.50	1.49	1.52	0.91	0.94	0.86	0.80	0.98
STI belief	27.53	28.12	26.94	27.25	26.61	0.42	0.73	0.32	0.68	0.61
STI anxious	7.00	7.03	6.95	6.97	6.94	0.69	0.70	0.70	1.00	0.92
Ever watched video on sex education, STIs, and/or HIV/AIDS	0.45	0.46	0.44	0.43	0.45	0.45	0.39	0.72	0.66	0.69
Regular test for STIs	0.78	0.77	0.79	0.77	0.81	0.50	1.00	0.26	0.20	0.40
Health knowledge test score	9.00	9.01	9.00	8.84	9.16	0.96	0.47	0.56	0.19	0.48
Sex work information:										
Managed by sardarnis/brothel madam	0.13	0.13	0.14	0.15	0.12	0.96	0.59	0.49	0.26	0.48
Price per client (Taka)	352.42	361.27	343.38	343.38	343.39	0.38	0.57	0.39	0.86	0.67
Proportion of clients using condoms	0.87	0.87	0.87	0.87	0.87	0.95	1.00	0.94	0.96	1.00
Total observations:	1332	673	659	330	329	1332	1003	1002	659	1332

Notes: The first five columns report the mean value. The p-values are based on standard errors clustered at the building level. Appendix III lists the definitions of variables. At the time of the baseline survey in 2016, US\$1 was approximately 78 Taka.

Table 2
Attrition

	(1) All		(2) Treated		(3) Control		(4) Attrited sample	
Variables	Attrited (n = 147) - Non-attrited (n = 1185)	p- value	Attrited (n = 67) - Non-attrited (n = 592)	p- value	Attrited (n = 80) - Non-attrited (n = 593)	p- value	Treated (n = 67) - Control (n = 80)	p- value
Baseline characteristics of FSWs:								
Age	-1.01	0.05*	-1.31	0.06*	-0.73	0.24	0.02	0.85
Beauty	-0.02	0.74	0.02	0.84	-0.06	0.32	-0.31	0.67
Education	0.18	0.48	0.21	0.61	0.16	0.65	0.05	0.92
Has high self esteem	0.03	0.76	0.02	0.87	0.03	0.82	-0.06	0.71
Satisfaction with own life	0.22	0.44	0.26	0.53	0.19	0.63	0.09	0.87
Extraversion	-0.00	1.00	0.17	0.45	-0.15	0.49	0.25	0.38
Agreeableness	0.03	0.75	0.04	0.79	0.03	0.86	0.09	0.70
Conscientiousness	-0.03	0.81	-0.01	0.95	-0.04	0.81	0.07	0.76
Neuroticism	0.02	0.88	0.17	0.33	-0.11	0.56	0.17	0.46
Openness	-0.09	0.49	-0.24	0.21	0.03	0.85	-0.34	0.13
Patience	0.22	0.11	-0.02	0.95	0.42	0.04**	-0.31	0.35
Communicates well	-0.01	0.82	-0.00	0.99	-0.03	0.75	-0.01	0.92
Is approachable/sociable/friendly	-0.12	0.09*	-0.05	0.63	-0.18	0.06*	0.12	0.35
General risk attitude	0.34	0.25	0.04	0.92	0.57	0.17	-0.71	0.12
Financial risk attitude	0.14	0.65	0.06	0.88	0.19	0.68	-0.38	0.53
Health risk attitude	-0.04	0.89	0.52	0.20	-0.52	0.14	0.86	0.06*
Belief of own STI status	0.24	0.41	0.30	0.43	0.18	0.56	0.13	0.73
Belief of STI rates among brothel clients	0.30	0.90	-1.68	0.61	1.91	0.61	-4.36	0.39
Anxiety toward possible STI-positive status	0.27	0.24	0.58	0.08*	-0.00	1.00	0.45	0.34
Ever watched video on sex education, STIs, and/or HIV/AIDS	-0.03	0.40	-0.04	0.42	-0.03	0.61	-0.03	0.62
Regular test for STIs	-0.06	0.12	-0.01	0.86	-0.10	0.04**	0.10	0.16
Health knowledge test score	-0.47	0.16	-0.61	0.18	-0.35	0.43	-0.25	0.65
Sex work information:								
Managed by sardarnis/brothel madam	-0.01	0.67	-0.03	0.36	0.00	0.93	-0.03	0.61
Price per client	-24.72	0.23	13.22	0.69	-58.60	0.02**	45.63	0.24
Proportion of clients using condoms	0.01	0.67	-0.03	0.37	0.04	0.05**	-0.07	0.07*
Total observations:	1332	1332	659	659	673	673	147	147
Notes: The p-values are based on standard errors clustered at the building level. At the time of the baseline survey in 2016, US\$1 was approximately 78 Taka.								

Intervention Effect. Table 3 shows the results for the behavioural and market transaction outcomes for the last three transactions. In Table 3, the intervention had no effect on the market transaction outcomes or most of the behavioural responses. Participants in the treatment were 5 per cent less likely than those in the control to inspect clients for STIs. This result reflects the response of T2 participants, who were 6 per cent less likely to inspect clients for STIs relative to participants in the control (column 5). T2 participants were also 4 per cent less likely to enter into a transaction with a repeat client than participants in the control group (column 3). These seemingly riskier behaviours, though, have to be seen in light of the results for whether the transaction involved using a condom. Within the treated group, participants in T2 are 4 per cent more likely to use a condom with their clients than participants in T1, in

their last three transactions (column 2). This result could be attributed to the condom negotiation session in which T2 participants took part. That participants in T2 were more likely to engage in safe sex, presumably made them less concerned about inspecting clients for STIs or having sex with repeat clients.

Table 3
Behavioural and market transaction outcomes: No interaction between treatment status and intensity measure

Last three transactions:									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Earnings (Taka)	Was a safe sex transaction	Had a repeat client	Had a client suspected of having STIs	Inspected client for STIs	Price per client (Taka)	Proportion of clients using condom (%)	Proportion of regular clients (%)	Proportion of clients suspected of having STIs (%)
(i) Treated vs control, overall									
Treated (T1 & T2)	24.37	-0.00854	-0.0351	-0.0119	-0.0494*	23.57	0.675	-2.636	-0.769
Control	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
(ii) Treated vs control, by treatment type									
Treatment1 (T1)	22.02	-0.0271	-0.03	0.00581	-0.0346	36.67	-0.397	-2.552	-1.913
Control	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Treatment2 (T2)	26.22	0.00809	-0.0415*	-0.0309	-0.0617*	10.83	1.507	-2.901	0.216
Control	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
(iii) Treatment 2 vs treatment 1									
Treatment2 (T2)	4.531	0.0361*	-0.012	-0.037	-0.0257	-20.82	2.035	-0.398	2.047
Treatment1 (T1)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
<i>Notes: A total of 1185 sex workers participated in the follow-up survey and reported their past three transactions; 27 sex workers (12 from control, 9 from T1 and 6 from T2) reported zero past transactions at follow-up, therefore the total number of observations at follow-up is 3474. +Anxiety score is derived from Health Anxiety Inventory (HAI-18) and it is only collected at follow-up. Robust standard errors reported in parentheses are clustered at the building level. *** $p < 0.01$; ** $p < 0.05$; *$p < 0.1$.</i>									

Table 4 shows the results for the effect of the treatment on participants' beliefs and knowledge about STIs, attitudes to risk, anxiety and esteem. Again, most of the treatment effects are insignificant. Of those which are significant, participants in the treated group report a lower tolerance towards health risk, relative to participants in the control group (column 4). Participants in T2 also report having a lower anxiety level than participants in T1 (column 8). It is plausible that the lower ability of participants in T1 compared with T2 to successfully negotiate with their clients to use a condom could have led them to worry about contracting STIs, since they are more likely to have to engage in unprotected sex with their clients.

Table 4
Effects on attitudes and beliefs: No interaction between treatment status and intensity measure

	(1) Health score (on a scale of 0–20)	(2) Overall risk attitude (on a scale of 0–10)	(3) Financial risk attitude (on a scale of 0–10)	(4) Health risk attitude (on a scale of 0–10)	(5) STI likelihood	(6) STI anxious	(7) STI belief	(8) Anxiety score	(9) Esteem
(i) Treated vs control, overall									
Treated (T1 & T2)	0.205	-0.034	-0.00427	-0.214*	0.017	0.2	1.869	0.192	0.00144
Control	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
(ii) Treated vs control, by treatment type									
Treatment1 (T1)	0.192	-0.0804	-0.0434	-0.329**	0.0676	0.238	0.162	0.725	0.0332
Control	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Treatment2 (T2)	0.213	-0.00104	0.0243	-0.113	-0.0312	0.151	3.399**	-0.361	-0.0298
Control	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
(iii) Treatment 2 vs treatment 1									
Treatment2 (T2)	0.0404	0.0757	0.0733	0.209	-0.0988	-0.0856	3.303**	-1.05*	-0.0643
Treatment1 (T1)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
<i>Notes: A total of 1185 sex workers participated in the follow-up survey and reported their past three transactions; 27 sex workers (12 from control, 9 from T1 and 6 from T2) reported zero past transactions at follow-up, therefore the total number of observations at follow-up is 3474. +Anxiety score is derived from Health Anxiety Inventory (HAI-18) and it is only collected at follow-up. Robust standard errors reported in parentheses are clustered at the building level. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.</i>									

The results show that our intervention did not improve the level of STI knowledge (as measured by the health knowledge score) of treated participants relative to control participants as both the treated and control participants had a higher health knowledge score at follow-up compared with their scores at baseline. This finding could be due to treated participants sharing information about STIs/HIV with control participants (i.e., spill over effects). That our main results, as shown in Tables 3–4, illustrate that our intervention has hardly any impact on treated participants could theoretically be because of spill over effects. We test for spill over effects for the outcomes corresponding to Table 3–4. Our spill over analysis shows that within the *treated* buildings there is generally no spill over from the treated participants to the control participants.

Discussion

We implemented a RCT to examine whether an intervention aimed at improving the knowledge of female brothel sex workers (FSWs) in Bangladesh on STIs and HIV/AIDS, as well as improving their skills to negotiate with clients about condom use, can lead to safer commercial sexual behaviour, such as higher condom usage. We recruited 1,332 FSWs from eight different brothels in Bangladesh. The RCT consisted of a control and two treatments (T1 and T2). Participants in T1 took part in a safe sex information session in which they are provided with information on different types of STIs including chlamydia, gonorrhoea, syphilis, hepatitis B, and HIV/AIDS. Participants in T2 participated in a safe sex information session, and a condom negotiation session in which they are provided with techniques to negotiate condom use with clients. Participants in the control group did not receive any intervention. All participants in our study also completed a survey at follow-up which allows us to measure changes in their commercial sexual behaviour upon intervention.

Overall, we find minimal differences in treatment effects between the control and treated participants. We did, however, find that participants in T2 were marginally more likely to engage in protected sexual transactions than T1 participants. This could be attributed to the negotiation session that enabled T2 participants to negotiate with clients to get them to use condoms more successfully. The spill over analysis suggests that there was hardly any effect since there are generally no changes in the commercial sexual behaviour of participants in the control group at follow-up. This result suggests that our intervention did not seem to improve the sexual behaviour of treated participants. The only significant result from our spill over analysis is that participants in the control group were less likely to receive repeat clients as the proportion of treated participants increases and this is because treated participants received more repeat clients. This puts participants in the control group at a high risk of contracting or transmitting STIs/HIV if they do not use a condom with their new clients.

Several factors could explain why our intervention failed in encouraging the treated participants to exhibit safer sexual behaviours with their clients. Among these, we explored three possible channels for which we had data that are reasonable proxies. First, although Bangladesh is one of the few Islamic countries to allow for sex work, sex workers in Bangladesh are subjected to extreme oppression. We find that discrimination against sex workers lowers their self-esteem and self-confidence through internalised stigma, which impedes their ability to successfully negotiate with their clients to get them to use condoms even if they are aware of the risks associated with unprotected sex. Second, we find that the low level of STIs/HIV knowledge among male clients,

proxied by low education, could help explain why FSWs in our study failed to successfully negotiate for more condom use with their clients. Finally, in contrast with previous studies, we find that economic hardships faced by FSWs in our study generally did not affect their commercial sexual behaviour.

In Bangladesh, sex workers experience high levels of discrimination.¹⁹ For instance, police traditionally do not allow FSWs to leave the brothels with their shoes on to mark them as being different from mainstream society. Although sex work is legalised,²⁰ religious beliefs and patriarchal attitudes within Bangladeshi society mean that FSWs are an oppressed minority.^{21–22} In our study, approximately half of our sample reported that they have been abused by various community groups, including their clients, *sardarnis*, police, local *mastans*/leaders, and their *babus*/husbands. Studies find that ongoing discrimination and oppression results in internalized stigma among sex workers, which subsequently lower their self-esteem and self-confidence.^{23–24} The internalized stigma experienced by FSWs could undermine their ability, through non-cognitive capacity, to interact with clients in a successful manner. We test this conjecture by utilizing information collected from participants on their history of abuse. Our survey included questions on the type of abuse (physical, sexual, emotional, and financial abuse), and the type of perpetrator (police, *sardarnis*, local *mastans*, customer or *babu*) to which participants were subjected. We first derive an 'intensity of abuse' measure which is based on the number of forms of abuse that a participant has experienced – the higher the number of forms of abuse, the higher the value of the measure. Next, we estimate how changes in esteem level (at baseline) affect the commercial sexual behaviour of participants at follow-up, by treatment type. Financial hardship may also explain the ineffectiveness of our intervention. Our baseline survey shows that a FSW, on average, incurs daily expenses of 420 Taka (US\$5.40), and earns a daily wage of 117 Taka (US\$1.50). Since FSWs incur relatively high expenses, they could be reluctant to negotiate for condom use with their clients in order to earn a higher premium that is associated with unprotected sex.²⁵ An inverse relationship between financial constraints on sex workers and their probability of negotiating for condom use with their clients has been observed among sex workers in countries such as China and Vietnam.²⁸ Finally, the clients of sex workers could also play a significant role in contributing to the ineffectiveness of our intervention. Data from our baseline and follow-up surveys show that clients are the main initiators of unprotected sex with FSWs. The high initiation of non-condom use by male clients in Bangladesh could be attributed to their low level of knowledge on STIs/HIV.²⁹

Conclusion

This result highlights the needs for future studies and shows the path towards developing more effective interventions. For, example, future studies could examine the efficacy of interventions designed to improve the confidence of sex workers when negotiating with their clients to use a condom while also educating the clients of sex workers on the risks of STIs/HIV in order to reduce the spread and prevalence of STIs/HIV in Bangladesh. Interventions along these lines could include training designed to enhance the personal psychological resources.

Declarations

DATA AVAILABILITY

The datasets generated and/or analysed during the current study are not publicly available considering the study population vulnerability from sociocultural aspect, but are available from the corresponding author on reasonable request.

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