

The influence of psychosocial difficulties on women's attrition in an HIV/STD prevention programme

B. BEADNELL, S. BAKER, K. KNOX, S. STIELSTRA,
D. M. MORRISON, E. DEGOOYER, L. WICKIZER,
A. DOYLE & M. OXFORD

University of Washington, Seattle, WA, USA

Abstract We examined attrition from an HIV/STD group counselling intervention in two ways: quantitative analyses of the entire sample ($n = 287$) and structured interviews of a subset of 30 women with low attendance. In the interviews, the most common reasons for low attendance were time conflicts and enrolling primarily to obtain the monetary incentives given for completing research questionnaires. Latent class statistical analysis of the full sample identified two subgroups that differed from each other in the number of psychosocial problems recently experienced. Relative to the 'non-distressed' class, the 'distressed' class members had higher probabilities of psychological distress, low incomes, heavy substance use, sex for trade, relationship violence, and unstable housing. This group had higher HIV/STD risk, but lower intervention attendance. Members also had less education and less knowledge about HIV/STD. A higher proportion of the distressed group was African-American. Study findings suggest that in interventions for women at HIV/STD risk, it is not necessarily enough to ensure cultural relevance and to provide food, childcare, and transportation. To increase retention, interventionists should consider (1) the use of strategies to support attendance (such as monetary incentives and attention to group process factors) and (2) intervention formats that are brief, matched to participants' stage of change, population-specific, and/or maximally accessible.

Introduction

The prevention of sexually transmitted diseases (STD) in women is an important public health goal. However, the same factors that increase risk for STD and HIV also can hinder efforts for intervention. Risk for STD and HIV transmission in heterosexual women has been associated with a number of psychological and/or economic disadvantages: poverty (Centers for Disease Control, 1997), substance use (Grella *et al.*, 1996; Wingood & DiClemente, 1998), relationship violence (Beadnell *et al.*, 2000; Champion & Shain, 1998), emotional distress (Grella *et al.*, 1996; Orr *et al.*, 1994), and involvement in sex work (Cohen &

Address for correspondence: Blair Beadnell, Ph.D., Research Scientist, School of Social Work, University of Washington, 4101 15th NE, Seattle, WA 98105, USA. Tel: +1 206 685 3163; Fax: +1 206 5431228; E-mail: blairb@u.washington.edu

Alexander, 1995). Such factors also have been found to decrease health-seeking behaviours, making those at highest risk difficult to recruit into interventions (Aral & Wasserheit, 1995; Cohen & Alexander, 1995; O'Leary & Jemmott, 1995; Weissman & Brown, 1995). This raises the question as to whether such circumstances also impede retention, even when engagement in intervention occurs.

Although HIV/STD intervention research supports the use of multi-session contact for interventions targeting sexual risk behaviours (National Institutes of Health, 1997), evidence suggests that engaging and retaining women for repeated meetings can be a challenge. While researchers frequently do not report intervention retention rates, those who do have found rates to be as low as 44–54% (El-Bassel *et al.*, 1995; Kelly *et al.*, 1994). In the few studies that have specifically examined correlates of low attendance, predictors of attrition have included testing HIV-negative, reporting injection needle risk, or ever having an STD (Lauby *et al.*, 1996); and perceiving more positive outcomes with condom use, having lower safer sex knowledge, and being younger (DiFranceisco *et al.*, 1998). In contrast, Kelly *et al.* (1994) examined HIV risk and demographic characteristics among high-risk urban women and found no differences between intervention completers and non-completers.

Examining attrition in interventions is important because attrition has negative implications for both clinical effectiveness and research validity. In terms of clinical effectiveness, individuals who receive a lower dose of the therapeutic intervention are presumably less likely to benefit from the intervention than those who receive a higher dose. Additionally, in cases where the highest risk individuals are more likely to drop out of interventions, those needing the most assistance are lost. Research trials are also negatively affected because generalizability to the larger population is limited if conclusions are made based on only a biased subset of participants. Similarly, attrition may contribute to inaccurate conclusions about intervention efficacy, with over-estimates if drop-outs are excluded from analyses (DiFranceisco *et al.*, 1998) and under-estimates if drop-outs are included (Newell, 1992). Hence, identifying the characteristics of individuals not retained in a particular study's intervention provides important information for the design of future research and for targeting services to particular sub-populations with low retention.

We report here on data collected in a randomized controlled efficacy trial of two interventions, each 16 sessions in length, designed to help women reduce their risk for the heterosexual transmission of STD/HIV. Greater detail about intervention content is reported elsewhere (Baker *et al.*, in press). Aware of the possibility of attrition, the investigators paid considerable attention to supporting participant attendance. We provided professional childcare, healthy snacks, and transportation (in the form of vans that picked women up at their homes). Leaders contacted women who missed group meetings, and prizes were given at the end of the intervention for women who attended at least 12 meetings. In addition, efforts were made to ensure that the structure and content of each session would be both educational and engaging. Finally, issues of cultural sensitivity were addressed by involving a diversity consultant in the intervention design, pairing intervention co-facilitators of differing ethnicities, integrating support for diversity into the intervention, and carefully attending to diversity issues in weekly consultations for group leaders. In spite of these efforts, we found that 28% of enrolled women attended no group sessions and another 31% attended half or fewer of the 16 meetings.

For this report, we explored factors related to low or non-attendance in two ways. First, we performed qualitative interviews with 30 randomly selected women who never attended or were low attenders to gather qualitative information about factors contributing to their lack of attendance. Next, we used Latent Class Analysis (Hagenaars & McCutcheon, 2002; McCutcheon, 1987) to quantitatively identify homogeneous subgroups in the sample that

differed with regard to eight risk factors generally known to be related to greater HIV/STD risk, and hypothesized to be related in this study to intervention attendance. Our hypothesis for the quantitative analysis was that women in subgroup(s) with greater psychosocial difficulties would attend fewer sessions, while at the same time report greater risk of STD transmission. We also wished to examine whether the more distressed subgroup(s) would differ on demographic characteristics (ethnicity and education) and on STD/HIV knowledge. We anticipated that findings from the qualitative analyses would contribute to the interpretation of the quantitative results.

Overall project methods

Data for both the qualitative and the quantitative analyses come from a longitudinal study in Seattle, Washington.

Participants

Potential participants came from referrals (from medical clinics, friends/family members or community agencies) or in response to our media campaign, which was targeted to geographic areas with relatively high concentrations of low-income women and higher than average STD rates (based on health department data). Participants had to be age 18 or older, have the ability to communicate in English, and report STD risk in the previous four months. STD risk was defined as unprotected intercourse: (1) with multiple male partners, (2) with a male partner who had risk factors (other sexual partners or injection needle use), or (3) while she or a sexual partner had an untreated STD (of any kind) or an untreatable viral STD. Descriptive characteristics of the 287 participants who were enrolled in the study are shown in Table 1.

Methods

Baseline measures used in this study were from a mailed self-administered questionnaire for which participants received \$30.

The 287 eligible participants were randomly assigned to one of two interventions designed to reduce risk for STD/HIV. These differed only in the type of intervention provided (cognitive-behavioural skills-building versus health education and social support). Incentive payments were not made for intervention attendance. No differences were found between conditions on level of attendance.

Qualitative interviews of women with low attendance

Methods

From the 287 women enrolled and assigned to one of the two interventions, we randomly selected 30 women who had never attended a group session and 30 who had attended between one and 11 (out of the 16 possible) sessions. We were able to contact 30 of these women, 15 of whom never attended and 15 of whom had attended at least one session, and offered them \$20 to participate in an interview.

The interview was a set of structured questions concerning the participant's life situation when she first called to enrol in the project and about intentions, motivators, and barriers for project participation. These included specific and direct questions about level of motivation,

Table 1. *Descriptive information for the 287 participants*

		Frequency	%
Age (Mean = 28.9, SD = 8.4)	18–19	30	10
	20–29	151	53
	30–39	69	24
	40–49	37	13
Race/ethnicity	White/Caucasian	156	54
	African-American	84	29
	Multiracial/Other	13	5
	Native American	14	5
	Asian/Pacific Islander	9	3
	Hispanic	8	3
	Other	3	1
Education	Less than high school	31	11
	High school or GED	48	17
	Some college or voc. tech.	152	53
	4-year college degree	54	19
Annual household income	< \$5,200	72	25
	\$5,200–15,600	128	45
	> \$15,600	78	21

whether motivation changed at some point after enrolling (either increased or decreased), and what factor(s) most influenced the decision not to attend a group session. We then asked about several specific barriers, regardless of whether the participant had previously cited them as problems. These included group time and location, transportation and childcare, and relationship with steady partners. In addition, the women who attended at least one session were asked whether anything about the group sessions (e.g., a group leader, another group member, or the material covered) created dissatisfaction that limited their attendance.

The questions were open-ended and worded so that the frequency of simple ‘yes’ or ‘no’ responses would be minimized. Prompts were used, when appropriate, to get more detailed information. We attempted to decrease socially desirable responding by making a specific request for frank feedback about thoughts and experiences. To assist with recall, participants were given specific information at the start of the interview to orient them to their life circumstances during the time period in question. These included such facts as the date they first called to enrol, and what their address and living situation were at that time. The interviews were audio-recorded and later transcribed.

Results

Content analyses of the interview transcripts were performed by four of the authors. They read each of the 30 transcripts, creating summary statements about each woman’s initial motivation for enrolment and stated primary reason for missing sessions. These summaries were developed through group discussion among the four reviewers. Table 2 shows the frequencies for the primary reasons for non-attendance given by participants.

Overall, two reasons for non-attendance were most common. The most commonly stated reason ($n = 10$) was that the participant enrolled mainly to earn the incentive payments given for filling out baseline questionnaires. Three of these women stated that they had never intended to attend a group session, and the remainder stated that they had some interest in

Table 2. *Breakdowns of stated reasons for nonattendance*

Stated reasons	N	%
• Primarily interested in filling out questionnaires for money	10	33
• Time conflicts (work, school, care-giving, and/or childcare)	8	27
• Moving out of town or on vacation	3	10
• Interest in group was Inconsistent with intervention content	3	10
• Controlling boyfriends who did not like them coming	2	7
• Felt there were too many sessions and got tired of coming	1	3
• Preferred spending time 'going out and partying'	1	3
• Health problems	1	3
• Did not plan well enough	1	3

attending (although secondary to their interest in making money). The second most commonly stated reason was time conflicts (typically caused by work, school, care-giving, or childcare). Some of the remainder of the reasons reflected practical barriers to attendance, such as moving out of town and health problems. Three women reported being motivated to enrol by reasons that were inconsistent with the purpose of the groups, such as to receive mental health care. Two reported having boyfriends who did not want them to come, and in one of these cases the participant reported being physically beaten as a result of her attendance.

These findings show that while the use of financial incentives for measurement activities can attract some women at risk of STD/HIV transmission, women recruited in this manner may not have the motivation for attending unpaid intervention activities. In addition, some women who are attracted to the intervention itself may have low or uneven attendance because of the time constraints imposed by other responsibilities and roles, or because of pressure from intimate partners.

Quantitative analyses of intervention attendance

The purpose of the quantitative analyses was to identify subgroups among the 287 participants based on eight psychological or practical life difficulties: low income, unstable living situation, sex for trade, intravenous needle use, alcohol use, drug use, psychological distress, and relationship violence. As stated earlier, these are factors reported in the literature to be associated with greater HIV/STD risk, and theorized here as likely to interfere with intervention attendance.

Methods

We combined women from the two intervention conditions into one sample of 287 for analyses, based on two findings suggesting that attrition was not differentially associated with treatment condition assignment. First, we found no evidence in the qualitative analyses that participants' attendance was influenced by the type of treatment they received. Second, there were no statistically significant differences (using *t*-test) in the number of sessions attended by women in the two conditions.

Measures

All measures used in these analyses were pilot tested for clarity and readability among a separate sample of 31 women at risk for STD and HIV.

Income. Participants selected a category representing their total household income. We collapsed income into three categories: those with annual incomes less than \$5,200; those between \$5,201 and \$15,600; and those over \$15,600. These categorizations were based on an examination of the frequency distributions, with the goal of reflecting levels of poverty in this generally low-income sample.

Unstable housing. We created a dichotomous variable (unstable versus stable living situation) by combining a variety of responses that pertained to their living arrangements in the previous 4 months. Unstable living situations included being homeless, living in a shelter or other temporary housing, or living rent-free with friends or relatives.

Sex for trade. Participants indicated whether, in the previous 4 months, they had sex with a man (or men) who paid 'for sex with money, drugs, gifts, or rent'. A dichotomous variable was computed based on whether the participant did or did not have a partner who paid for sex in these ways.

Injection drug use. Participants indicated, on a single item, whether they had injected drugs in the previous 4 months. This was coded dichotomously (0 = 'no', 1 = 'yes').

Substance use. Substance use variables were based on items from the Alcohol Use Disorders Identification Test (AUDIT; Saunders *et al.*, 1993). Participants were asked how often they had used drugs during the previous 4 months, with possible responses ranging on a five-point scale from not at all to daily. We recoded responses into three categories: no use, lighter use (one to three times a month), and heavier use (four times a month or more). In addition, participants were asked to estimate the number of drinks they typically had on an occasion of drinking. Responses ranged from 0 to 18. We categorized these responses into none, lighter use (one to four drinks), and heavier use (five or more drinks).

Psychological distress. The Global Severity Index of the Brief Symptom Inventory was used as a summary measure of generalized psychological distress (BSI; Derogatis, 1993). Based on existing norms for non-patient, adult women, scores were split into two categories. *T* scores greater than or equal to 63 (Derogatis, 1993) comprised the group considered to be experiencing clinically significant distress.

Relationship violence. Two items asked about the frequency of abusive behaviours by male partners in the previous 4 months: 'Your partner threatened to physically hurt you' and 'Your partner hit, pushed, shoved, kicked, slapped, or in any other way physically hurt you'. Response categories ranged from 'never' to 'several times a day'. These items were asked (separately) about both casual and steady sexual partners. We computed a dichotomous variable that reflected whether the participant reported any occurrence of either of the two behaviours (threatening violence or being violent) by either a casual or steady partner.

STD/HIV knowledge. We measured STD knowledge with a set of 21 true/false questions. The measure contains items of varying levels of difficulty and taps knowledge of AIDS, other

STDs, and prevention behaviours (Cronbach's $\alpha = 0.74$). Scores were dichotomized, with the lowest third categorized as 'low knowledge'.

STD/HIV Risk Index. The STD/HIV Risk Index was the sum of unprotected sex acts that posed a risk for STD transmission in the previous 4 months. The risk index utilized information from questionnaire items about: (1) frequency of vaginal, oral, and anal intercourse; (2) use of barrier methods with steady, casual, and paying partners; and (3) whether sexual acts with steady partners posed an STD transmission risk. Concerning the latter, sex acts were considered risky (and thus included in the sum score) if: (1) the woman knew (or was uncertain whether) the man had other partners; (2) she reported that he used injection drugs; (3) she had unprotected sex with other partners; or (4) she or her partner had an untreatable viral STD or a recent STD. With casual and paying partners, all unprotected penetrative acts were considered 'risky' and were included in the calculation of the summed risk score. Scores were dichotomized, with the highest third categorized as the higher risk group.

Satisfaction with intervention. We used the mean of 27 items (Cronbach's $\alpha = 0.94$) reflecting satisfaction with group meetings, project staff, group leaders, group materials, transportation, food, and childcare. The scores were dichotomized as low (lower than 3 on a four-point scale) or high (greater than or equal to 3) satisfaction.

Results

Latent Class Analysis. Latent Class Analysis (LCA; Hagenaars & McCutcheon, 2002; McCutcheon, 1987) was used to identify subgroups (classes) of participants. LCA is a statistical method used as a 'person-oriented' approach to analysis. Person-centred approaches seek to identify 'profiles' that are seen as arising when the sample is composed of different sub-populations (each with its own profile) (Magnusson, 1998). Because membership in the sub-populations is typically unknown by the researcher, a latent categorical variable (composed of 'classes') is assumed to exist and must be inferred from the data. These classes represent subgroups of individuals who are similar to each other on the variables entered into the analysis, and different from individuals in the other subgroups.

We performed LCA to identify classes of participants based on aspects of their sexual behaviour. For the purposes of this study, LCA was seen as being more informative than other techniques. Specifically, LCA capitalizes on the associations between the variables entered in the model, allowing researchers to see how they operate together to create risk 'profiles'. This is in contrast to predictive approaches in which shared variance among the predictors allows only some to appear to be associated with the outcome, although in actuality they all may be. We believed that the identification of specific 'types' of people at greater risk of attrition could provide greater information about for whom interventions need to be made more accessible.

The analyses were implemented using Mplus 2.02. In LCA, the researcher typically determines the number of classes that exist in a sample by performing the analyses iteratively, each time specifying an increasing number of classes. The solutions are compared, and the one chosen is that with the best 'fit' to the data. The primary measure of fit used was the Bayesian Information Criterion value (BIC; Schwartz, 1978). This statistic balances two components of a model, the likelihood value and parsimony (Muthén & Muthén, 2000). Lower BIC values typically reflect better fit to the data, and reductions of 6 or greater are considered 'strong' and 10 or greater 'very strong' evidence of improvement (Raftery, 1995).

In addition to BIC values, other factors for choosing the superior solution are the interpretability of the results, theoretical meaningfulness of the classes, and the classification quality (Muthén & Muthén, 2000). The latter is reflected in the ability to distinguish membership in the latent classes given the model and the data, and is reflected in 'average class probabilities'. Higher average class probabilities indicate superior ability to accurately classify individuals into their most likely class.

Eight categorical observed variables (income, alcohol use, drug use, BSI global severity, partner violence, unstable housing, sex for trade, and intravenous needle use) were entered into the analysis. An unrestricted two-class model (BIC = 3012.5) was found to provide the best fit to the data. Both the unrestricted one-class and unrestricted three-class model had poorer model fits (BIC = 3120.2 and 3044.1, respectively). Additionally, the average class probabilities for the two-class model (0.88 and 0.96) were superior to the three-class model (0.91, 0.81, 0.78). In the two-class model, classification of individuals into their most likely class resulted in Class 1 and 2 having 60 (21%) and 227 (79%) participants, respectively.

Conditional probabilities are shown on Table 3. These are the probability that an individual in a particular class is at a specific level for each observed variable. For example, Table 3 shows that an individual in Class 1 had a 0.23 probability of reporting no drinks of alcohol per occasion, a 0.39 probability of reporting one to four, and a 0.38 probability of reporting five or more.

Overall, Class 1 members had higher probabilities of experiencing each of the psychosocial difficulties represented by the variables. For each variable, probabilities ranged from 0.38 to 0.61 of being in the most severe category. Notably, this group had a zero probability of having not used drugs in the previous 4 months. In comparison, Class 2 members had relatively low probabilities of being in the most severe category for each variable. All probabilities were less than 0.21, with some being very low. Notably, Class 2 displayed very low probabilities for engaging in sex for trade (0.02) and using intravenous needles (0.00) in the previous 4 months. In contrast, Class 1 probabilities for engaging in sex for trade and needle use were relatively high (0.51 and 0.39, respectively). We constructed a sum score reflecting the number of the eight psychosocial problems each participant reported and found that Class 1 members had a higher average number (Mean = 3.8, S.D. = 1.3) compared to Class 2 members (Mean = 0.9, S.D. = 0.9), a statistically significant result ($t = 15.6$, d.f. = 75, $p < 0.001$).

Associations of class membership. The two classes were compared on the primary variable of interest, intervention attendance, as well as on demographic information, STD/HIV knowledge, and risky sexual behaviour (Table 4). Statistically significant differences were found between class membership and attendance. Specifically, Class 1 members were more likely to attend less than half of the sessions (odds ratio = 6.39, CI: 2.90–14.06) (38% attended no sessions at all and 48% attended between one and eight sessions). In contrast, 50% of the Class 2 members attended greater than half of the sessions (25% attended no sessions; 26% attended between one and eight sessions). Other statistically significant findings indicated that, compared to Class 2, Class 1 members were less likely to be a high school graduate (odds ratio = 2.22, CI: 1.00–4.90), and more likely to have high STD/HIV risk (odds ratio = 3.34, CI: 1.86–6.02) and low STD/HIV knowledge (odds ratio = 3.94, CI: 2.18–7.15). Among those who attended at least one session, no statistically significant difference was seen for satisfaction with the intervention (it should be noted that satisfaction was high for most of the sample).

Because of small expected frequencies in several cells, we were not able to perform χ^2 analysis on the entire sample for the variable of ethnicity. Therefore, analyses included only

Table 3. Conditional probabilities of psychosocial difficulties for the two classes identified in latent class analysis (unrestricted two-class model)

	Class	
	1 (<i>n</i> = 60)	2 (<i>n</i> = 227)
Annual income		
< \$5,200	0.43	0.21
\$5,201–15,600	0.44	0.47
> \$15,600	0.12	0.32
Number of drinks per occasion ^a		
0	0.23	0.65
1–4	0.39	0.22
5 or more	0.38	0.13
Frequency of drug use ^a		
None	0.00	0.62
1–3 times a month	0.50	0.27
4 or more times a month	0.50	0.11
BSI Global Severity Index		
< <i>T</i> = 0.63	0.61	0.83
<i>T</i> ≥ 0.63	0.39	0.17
Partner violence or threats ^a		
None	0.39	0.82
Once or more	0.61	0.19
Unstable housing ^a		
No	0.60	0.84
Yes	0.40	0.16
Sex for trade ^a		
No	0.49	0.98
Yes	0.51	0.02
Intravenous needle use ^a		
No	0.61	1.00
Yes	0.39	0.00

^aIn the previous 4 months.

Note: Conditional probabilities for some variables do not equal 1.00 due to rounding.

African-American and White individuals. Statistically significant differences indicated that Class 1 had a disproportionately large number of African-Americans (odds ratio = 2.04, CI: 1.09–3.82).

Discussion

We performed both structured interviews and empirical analyses to better understand attrition in an HIV/STD intervention. Despite efforts to reduce barriers, attendance was highly variable among participants and our impressions were that women experiencing multiple life problems were more likely to never attend, drop out, or attend sporadically.

The best fitting statistical model in the latent class analyses was one in which the overall sample was composed of two subgroups. The largest class (Class 2) was composed of women with low probabilities of psychosocial difficulties. In comparison, Class 1 members had relatively higher probabilities of experiencing each of the problems included in the analysis. Overall, Class 1 members reported experiencing an average of four of the psychosocial problems used in the analyses, compared to an average of one for Class 2 members. As hypothesized, the two classes differed in intervention attendance, with only 13% of Class 1

Table 4. Associations of class membership with attendance, demographics, risk, STD knowledge and intervention satisfaction

		Class membership (%)			Cramer's	
		1 (<i>n</i> = 60)	2 (<i>n</i> = 227)	χ^2	df	<i>V</i> ^a
Number of sessions attended	0–8	87	50	25.5***	1	0.30
	9–16	13	50			
Demographics						
	Ethnicity ^b					
	Black	48	31	5.1*	1	0.15
	White	52	69			
High school degree	No	19	9	4.0*	1	0.12
	Yes	81	91			
STD/HIV Risk Index	Low	45	73	17.1***	1	0.25
	High	55	27			
STD/HIV Knowledge	Low	55	24	22.0***	1	0.28
	High	45	76			
Intervention satisfaction ^c	Low	3	7	0.7	1	0.06
	High	97	93			

^aCramer's *V* is a correlation coefficient reflecting effect size. Typically, interpretations are 0.10 as small, 0.25 as medium, and 0.40 as large effect sizes (Hays, 1987).

^bBecause of small expected frequencies in several cells, other ethnicities were not included in this analysis. In terms of the overall sample, Class 1 frequencies were 0% Asian-American/Pacific Islander, 42% African-American, 2% Hispanic, 3% Multi-racial, 7% Native American, 45% White, and 2% Other. Class 2 frequencies were 4% Asian-American/Pacific Islander, 26% African-American, 3% Hispanic, 5% Multi-racial, 4% Native American, 57% White, and 1% Other.

^c*n* is smaller because participants who attended 0 intervention sessions were missing on this variable (*n* = 32 and 154).

* *p* < 0.05

*** *p* < 0.001

Note: Column percents for some variables do not equal 100% due to rounding.

members, compared to 50% of Class 2 members, attending more than half of the sessions. Unfortunately, members of Class 1 may have been those needing the most help since they had poorer scores on the STD/HIV knowledge test and had higher numbers of risky sexual acts in the previous 4 months.

The results suggest that a portion of women at high risk for STD/HIV are likely to experience multiple psychosocial problems. This is likely to influence intervention participation in two ways. First, such women may be drawn to enrol in projects where financial incentives are provided (even if they are not interested in the risk reduction counselling itself). This was illustrated by the qualitative interviews in this study, in which the most common reason given for non-attendance was a primary interest in earning the cash incentive given for questionnaire completion. Consistent with this finding, Class 1 members had greater likelihood of lower incomes. Additionally, Class 1 members were more likely to report other problems potentially related to lack of financial resources, such as unstable housing. The second way that multiple psychosocial problems influence attendance may be by overriding whatever level of interest in intervention individuals have. The practical and psychological stresses associated with the problems common in Class 1 are likely to foster a focus on survival and problem-solving, rather than on illness prevention. Finally, it is of interest that dissatisfaction with the program appeared to have no role in the lower attendance of Class 1.

It is important to note that ethnicity was associated with class membership such that a higher proportion of Class 1 (as compared to Class 2) was African-American. For them, greater inclusion in this class is likely to be related to both demographic (e.g., income and education) and contextual (e.g., experience of societal discrimination and stigma) factors. While beyond the scope of the present study, future research should seek to elaborate on the implications of these factors for intervention attendance and benefit, especially given the disproportionate incidence of HIV/STD infection among African-Americans in the United States.

Implications for intervention development

Although efficacious for those who attend, many of the interventions reported in the literature have a rigid meeting structure involving multiple sessions at fixed times. The results of this study suggest that attendance at such interventions is unlikely for some women, including those at highest STD/HIV risk. Two major challenges arise in trying to minimize attrition. The first is to find ways to support women's attendance at traditional structured groups. The second is to design interventions that can be more flexible and responsive to the competing responsibilities and difficulties in the lives of many women at risk. The results of this study provide some clues as to ways to meet these challenges.

Challenge 1: supporting attendance. During the implementation of the intervention counselling groups, our impression (based on informal feedback from participants) was that making the groups enjoyable and providing food, childcare, and transportation were useful for reducing accessibility barriers. The findings of this study suggest two other avenues for supporting attendance. First, given that financial incentives for measurement activities attracted some women to the study, providing them for ongoing group attendance also might have been useful. Based on findings from a multi-site study with 444 high-risk women, Greenberg *et al.* (1998) have argued that monetary incentives for attendance are key to recruitment and retention. They found that women, on average, attended five of six paid sessions, but only one of 12 unpaid sessions. Although contrary to standard public health practice, this approach to intervention retention may be cost-effective overall. The savings derived from averting new HIV and STD infections among both participants and the individuals to whom they may, in turn, transmit infection may far outweigh the cost of such financial incentives.

A second way to support retention involves carefully attending to group process factors that might reinforce attendance. To explore this, we performed a structured debriefing with group facilitators to learn their assessment of the group process factors that facilitated retention in their group. They suggested that a number of factors seemed to enhance attendance, especially among women experiencing stressful lives: the presence of group members who could model talking comfortably about sensitive topics, exercises that were structured and focused in nature, the effective use of humour, and strong bonding between group members (e.g., arising from common concerns, rallying around members needing extra support, good connection between the leaders, and the presence of 'lay leaders' in the group). These suggestions are consistent with group work theory and support the tenets that group cohesion (Hogg, 1992; Yalom, 1995) and mutual aid factors (Shulman, 1999) are crucial to the optimal functioning of groups, including attendance. Attention to facilitation approaches that support or elicit these factors may positively enhance session attendance.

Challenge 2: designing more flexible interventions. The second challenge requires the use of creative approaches to account for the factors found in this study to occur more frequently

among those with lower attendance, such as lack of stable housing, drug and alcohol use, controlling or abusive partners, and/or financial dependence on sex work. For example, flexibility in where, when, and how an intervention is delivered may better match the needs of women unlikely to attend medium to longer-term interventions. Brief (as short as one meeting length), individual (rather than group) formats, and the provision of choices of locations and times would each allow greater flexibility and accessibility. Interventions with the flexibility to match the session focus to the individual's stage of change (Prochaska *et al.*, 1992) might better retain women whose initial motivation has more to do with financial needs or other interests. Also, the convenience and accessibility of telephone counselling may facilitate contact with women experiencing competing responsibilities or lack of control (such as women in violent relationships). Evidence exists in the literature that brief interventions can be efficacious with women at high-risk (Belcher *et al.*, 1998; Carey *et al.*, 1997), and that telephone contact is effective in promoting STD/HIV risk reduction (Roffman *et al.*, 1997). Further research is needed to clarify if such interventions can successfully produce changes in the subgroup identified in this study as having high attrition.

Another way that prevention programs might better reach women at higher risk is through population-specific interventions. Researchers have recommended and/or reported providing interventions to specific populations of women similar to those in the subgroup at greatest risk of attrition in this study: substance users (Grella *et al.*, 1996), victims of domestic violence (Beadnell *et al.*, 2000), the homeless (Somlai *et al.*, 1998), those in the sex industry (Cohen & Alexander, 1995), and ethnic minority members (Marin, 1996; Shain *et al.*, 1999). Such interventions have a 2-fold advantage: They can include both intervention content and attrition reduction strategies that are specific to the target population.

Conclusions and suggestions for future research

Unfortunately, published research reports do not always provide adequate information about intervention attrition. However, an intervention's ability to retain participants can be considered one aspect of its efficacy, since individuals cannot benefit from an intervention they do not attend. In addition to providing information for evaluating the viability of an intervention, reporting factors associated with lower attendance also helps in the design of future interventions. At the very least, all reports on intervention efficacy or effectiveness should clearly report the number of women recruited versus the number who actually participated.

The findings of this study strongly point to the importance of designing and testing interventions that take into account the multiple limitations present in the lives of disadvantaged women. While important, the provision of childcare, transportation, and food may not be sufficient. To reach women whose lives are affected by homelessness, substance abuse, domestic violence, or work in the sex industry, the delivery of interventions must be devised to be flexible and responsive to the unique needs of these women.

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