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Sexual Network Profiles and Risk Factors for STIs Among African-American Sexual Minorities in Mississippi: A Cross-Sectional Analysis

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Abstract

This cross-sectional study assessed sexually transmitted infection (STI) prevalence, socio-demographic characteristics, substance use, sexual behaviors, and sexual network profiles among African American sexual minorities in Jackson, Mississippi. Bivariate chi-square tests and generalized estimating equation (GEE) models explored individual and partner-related factors. Compared to their heterosexual counterparts, male African American sexual minorities reported fewer sex partners (odds ratios [OR] 0.33, 95% confidence intervals [CI] 0.16–0.65) and lower concurrency levels (OR 0.42, 95%CI 0.24–0.72). African American sexual minority women reported greater substance abuse, more sex partners (OR 2.54, 95%CI 1.47–4.38), higher concurrency levels (OR 1.81, 95%CI 1.24–2.64), and more transactional sex (OR 2.52, 95%CI 1.25–5.11). These results highlight the need for nuanced STI interventions tailored to African American sexual minorities in Mississippi.

Key words: African Americans, HIV, Mississippi, risk factors, sexual minorities, STIs.

Introduction

The Deep South has disproportionately high rates of sexually transmitted infections (STIs) and HIV.[1] Jackson, Mississippi (MS), is the metropolitan area with the fourth highest rate of people living with HIV in the country.[1] MS has wide racial disparities in STI and HIV infection. While African Americans represent 37% of the state's population, they comprised 75% of the HIV cases reported in the state.[2] African Americans represented 66% of chlamydia and 75% of gonorrhea cases.[3]

These disparities are even more marked among African American sexual minorities, including individuals who identify as lesbian, gay, bisexual, men who have sex with men (MSM), or women who have sex with women (WSW).[4,5] For example, a recent study finds that African American bisexual women in Jackson, MS, are 2.5 times more likely have STIs compared to WSW.[5] Another national study reported black MSM were 3 times more likely to be HIV infected compared to MSM in spite of the fact that they do not engage in higher risk behaviors than people of other races.[4] Complex sexual networks, or how individuals are connected directly and indirectly through sexual contact, may contribute to disparities in HIV and STIs.[4] A growing body of evidence suggests that complex sexual networks may contribute to these disparities in the Deep South and warrant further investigation.[6,7] Taken together, these studies highlight the disproportionate disease burden experienced by African American sexual minorities and underscore the need to identify the risk factors driving these epidemics.

Methods

To characterize the risk profiles of African American sexual minority men and women in Jackson, MS, we conducted a cross-sectional survey exploring STI outcomes, socio-demographic characteristics, substance use, sexual behaviors, and sexual network profiles at an urban, publically funded STI clinic between January and June 2011.

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The preliminary sample included 1,542 adult patients. This site serves a largely African American population in Jackson, MS, many of who are uninsured. The sample was restricted to the 1,456 (94.4%) participants who identified as African American. Among the remaining participants, those who did not provide information on at least one partner ($n = 102$), identified as transgender ($n = 1$), or did not report a gender ($n = 3$) or sexual orientation ($n = 1$) were excluded from the study sample. Further, six men were HIV-positive and were also excluded from the sample, resulting in a total data analytic sample of 1,343 African Americans (851 women and 492 men).

Eligibility criteria included: being at least 18 years of age; presenting for STI and HIV screening; being willing to complete a 30-minute computerized survey; and speaking English. Participants did not receive compensation for their participation. This study was approved by the Institutional Review Boards (IRBs) of the University of Mississippi Medical Center and the Miriam Hospital. All participants provided digital informed consent prior to taking the self-administered survey, and trained research assistants were present at all time to answer any questions. Among individuals invited to participate, 93% completed our survey.

Measures

The following measures commonly employed in the peer-reviewed literature were selected to describe STI outcomes, socio-demographic characteristics, substance use, sexual behaviors, and sexual network profiles among African American sexual minorities in Jackson, MS:

Sexual orientation

Participants indicated whether they self-identified as straight (heterosexual), gay or lesbian (homosexual), or bisexual (have sex with men and women). Differences between homosexuals and bisexuals for both males and females were not significant. Variables were combined into a single group of ''sexual minorities'' to gain better precision in parameter estimation and to increase statistical power.

STI outcomes

Chlamydia or gonorrhea diagnosis in the past year was confirmed by medical record abstraction.

Socio-demographic characteristics

Socio-demographic characteristics included self-reported African American race, age determined by the CDC definition of young adult (age 18–24) compared to adults (age 25 and older), relationship status (unmarried versus married, divorced, long term domestic partnership, or other relationship status), education (some high school, high school degree/GED, or at least some college), and monthly household income (less than or equal to $500, $501–$1500, or greater than or equal to $1500).

Substance use

Substance use included frequency of heavy episodic drinking (never, less than once a month, or at least once a month) and lifetime use of marijuana, crack or cocaine, and other drug use (including recreational prescription drug use, heroin, crystal methamphetamine, ecstasy, and ketamine).

Sexual behaviors

If participants reported engaging in oral, vaginal, or anal sex, binary variables were created to assess event-level condom use with each partner. Additional variables included lifetime number of sex partners (1–5, 6–9, ≥ 10), having ever received gifts, favors, food, shelter, transportation, money, drugs or alcohol in exchange for sex (yes versus no), sex with high-risk partners (intravenous drug users or an HIV-infected individual), and concurrent sexual relationships (defined as a self-reported partnership that overlapped in time with another sexual partnership in the last year).

Sexual network profiles

Among three most recent sexual partners, binary variables indicated whether the partner was at least five years older, more educated, or of a different race. Participants also reported where they met each partner (at school, introduced by friend, at work, at a social event, on the internet, or other), whether their partner was a one-time sexual encounter, whether their partner had other sexual partners, and whether the participant or partner used alcohol or drugs during sex.

Analyses

Associations for individual level correlates were examined using bivariate chi-square tests stratified by participant gender. Sexual behaviors were examined at the partner level using generalized estimating equations (GEE) to account for clustering resulting from participants reporting on maximum of three sexual partners. Data were collected on a desktop computer with a self-administered survey program using Illume™ software (Datstat, Washington) and analyzed with Statistical Analysis System (SAS). GEE analysis extends the generalized linear regression model to account for the correlation of event (partner) level outcomes within an individual, thus permitting robust estimation of the standard errors for the regression coefficients. The number of male and female sexual minorities was small, precluding a multivariable analysis.

Results

Of the 1,343 eligible African American participants, 851 (63.4%) were female and 492 (36.6%) were male. The majority were under age 25 (62.4%) and were single (87.4%). A total of 86 women (10.1%) and 50 men (10.2%) self-identified as being a sexual minority. Sexual minority males had increased odds of obtaining a high school degree (OR 3.88, 95%CI 1.89–7.97) or at least some college education (OR 3.60, 95%CI 1.42–9.14) compared to heterosexual males. In contrast, sexual minority women reported decreased odds of completing a high school degree (OR 0.54, 95%CI 0.34–0.85) or at least some college education (OR 0.09, 95%CI 0.02–0.39) compared to heterosexual women.

The overall STI prevalence (see Table 1) for chlamydia and gonorrhea, based on clinical chart extraction, was 22.5% and 6.2% for men. The overall STI prevalence was 17.5% and 5.4% for women (see Table 2). Self-reported STI infection was 26.6% for men and 31.5% for women.

TABLE 1. INDIVIDUAL LEVEL ($N=492$) AND EVENT LEVEL PARTNER CORRELATES ($N=1178$) FOR SELF-IDENTIFIED SEXUAL ORIENTATION FOR MEN

Variable	*Total (n=492)* n *(%)*	*Heterosexual (n=442; 89.8%)* n *(%)*	*Sexual Minority (n=50; 10.2%)* n *(%)*	*Sexual Minority vs. Heterosexual OR (95% CI)*
STI Diagnosis				
Chlamydia-infected	87 (22.5)	84 (23.6)	3 (9.7)	0.35 (0.10, 1.17)
Gonorrhea-infected	24 (6.2)	21 (5.9)	3 (9.7)	1.71 (0.48, 6.08)
Any STI past year[a]	126 (26.6)	111 (26.1)	15 (30.6)	1.25 (0.65, 2.38)
Socio-Demographic Characteristics				
Age 24 or younger	273 (57.2)	233 (54.4)	40 (81.6)	**3.72 (1.76, 7.86)**
Never married	426 (86.6)	378 (85.5)	48 (96.0)	4.06 (0.96, 17.14)
Education				
Some high school	240 (48.8)	229 (51.8)	11 (22.0)	Reference
High school degree/GED	191 (38.8)	161 (36.4)	30 (60.0)	**3.88 (1.89, 7.97)**
At least some college	61 (12.4)	52 (11.8)	9 (18.0)	**3.60 (1.42, 9.14)**
Monthly income				
≤$500	129 (26.6)	116 (26.7)	13 (26.0)	Reference
$501–$1,500	192 (39.6)	175 (40.2)	17 (34.0)	0.87 (0.41, 1.85)
≥$1,501	164 (33.8)	144 (33.1)	20 (40.0)	1.24 (0.59, 2.60)
Substance Abuse				
Episodic heavy drinking				
Never	316 (64.4)	280 (63.5)	36 (72.0)	Reference
Less than once a month	87 (17.7)	78 (17.7)	9 (18.0)	0.90 (0.42, 1.94)
At least once a month	88 (17.9)	83 (18.8)	5 (10.0)	0.47 (0.18, 1.23)
Ever reported marijuana use	317 (64.4)	293 (66.3)	24 (48.0)	**0.47 (0.26, 0.85)**
Ever reported crack or cocaine use	29 (5.9)	27 (6.1)	2 (4.0)	0.64 (0.15, 2.78)
Ever reported other drug use	65 (13.2)	62 (14.0)	3 (6.0)	0.39 (0.12, 1.30)
Sexual Behaviors of the Participant and Their Sexual Partners				
Condom use				
Always use condoms for oral sex[b]	90 (12.6)	71 (11.6)	19 (19.0)	1.36 (0.61, 3.05)
Always use condoms for vaginal sex[b]	259 (30.7)	254 (30.4)	5 (62.5)	3.14 (0.62, 15.79)
Always use condoms for anal sex[b]	74 (37.8)	26 (29.6)	48 (44.4)	**2.03 (1.03, 4.01)**
Participant's lifetime number of sex partners				
1–5	93 (19.1)	76 (17.3)	17 (34.0)	Reference
6–10	101 (20.7)	88 (20.1)	13 (26.0)	0.66 (0.30, 1.45)
>10	294 (60.3)	274 (62.6)	20 (40.0)	**0.33 (0.16, 0.65)**
Participant ever received gifts, favors, food, shelter, transport, money, drugs or alcohol for sex	31 (6.3)	26 (5.9)	5 (10.0)	1.78 (0.65, 4.86)
Participant reported sex with a risky partner[c]				
No	421 (86.6)	389 (88.0)	32 (64.0)	**4.13 (2.17, 7.87)**
Yes/Don't know	71 (14.4)	53 (12.0)	18 (36.0)	
Participant has concurrent relationship[b]	547 (48.1)	512 (50.6)	35 (27.8)	**0.42 (0.24, 0.72)**
Sex partner characteristics				
Partner is more than 5 years older[b]	132 (12.2)	108 (11.2)	24 (20.3)	**2.06 (1.23, 3.45)**
Partner is different race/ethnicity[b]	74 (6.5)	61 (6.0)	13 (10.3)	1.67 (0.69, 4.02)
Partner is more educated[b]	343 (29.1)	310 (29.6)	33 (25.4)	0.85 (0.50, 1.45)
Partner has other partners[b]				
No	372 (32.7)	327 (32.3)	45 (35.7)	Reference
Yes	336 (29.6)	298 (29.5)	38 (30.2)	0.93 (0.55, 1.56)
Don't know	429 (37.7)	386 (38.2)	43 (34.1)	0.75 (0.45, 1.27)
One-time sexual encounter[b]	278 (23.6)	238 (22.7)	40 (30.8)	**1.57 (1.03, 2.39)**
Used alcohol or drugs at last sex[b]	293 (24.9)	273 (26.1)	20 (15.4)	0.57 (0.30, 1.07)
Partner used alcohol or drugs at last sex[b]	214 (18.2)	194 (18.5)	20 (15.4)	0.83 (0.45, 1.50)
Met partner[b]				
At school	346 (29.9)	308 (29.9)	38 (29.9)	0.97 (0.58, 1.62)
Introduced by a friend	249 (21.5)	214 (20.7)	35 (27.6)	1.48 (0.94, 2.32)
At work	142 (12.3)	136 (13.2)	6 (4.7)	**0.33 (0.14, 0.76)**
At a social event	137 (11.8)	112 (10.9)	25 (19.7)	**2.06 (1.13, 3.77)**
On the internet	72 (6.2)	55 (5.3)	17 (13.4)	**2.71 (1.29, 5.68)**

[a]Other STIs included Trichomonas, Herpes, Syphilis, nongonococcal urethritis (NGU), mucopurulent cervicitis (MPC), pelvic inflammatory disease (PID), and a box labeled ''Other'' in which the survey participant could specify STI.
[b]Event (partner) level variables.
[c]Sex with a high-risk partner included sex with intravenous drug users or HIV-positive individuals.
Bold numerals indicate statistically significant findings.
STI, sexually transmitted infections.

TABLE 2. INDIVIDUAL LEVEL ($N = 851$) AND EVENT LEVEL PARTNER CORRELATES ($N = 1798$) FOR SELF-IDENTIFIED SEXUAL ORIENTATION FOR WOMEN

Variable	*Total* (n = *851*) n *(%)*	*Heterosexual* (n = *765; 89.9%*) n *(%)*	*Sexual Minority* (n = *86; 10.1%*) n *(%)*	*Sexual Minority vs. Heterosexual OR (95% CI)*
STI Diagnosis				
Chlamydia-infected	116 (17.5)	106 (17.8)	10 (14.7)	0.80 (0.39, 1.61)
Gonorrhea-infected	36 (5.4)	31 (5.2)	5 (7.4)	1.44 (0.54, 3.85)
Any STI past year[a]	261 (31.5)	233 (31.2)	28 (33.3)	1.10 (0.68, 1.78)
Socio-Demographic Characteristics				
Age 24 or younger	541 (65.3)	484 (64.8)	57 (69.5)	1.24 (0.76, 2.03)
Never married	747 (87.9)	674 (88.2)	73 (84.9)	0.75 (0.40, 1.41)
Education				
Some high school	317 (37.3)	269 (35.2)	48 (55.8)	Reference
High school degree/GED	411 (48.3)	375 (49.1)	36 (41.9)	**0.54 (0.34, 0.85)**
At least some college	122 (14.4)	120 (15.7)	2 (2.3)	**0.09 (0.02, 0.39)**
Monthly income				
≤ $500	283 (33.5)	245 (32.2)	38 (44.7)	Reference
$501–$1,500	305 (36.1)	278 (36.6)	27 (31.8)	0.63 (0.37, 1.06)
> $1,501	257 (30.4)	237 (31.2)	20 (23.5)	**0.54 (0.31, 0.96)**
Substance Abuse				
Episodic heavy drinking				
Never	661 (77.7)	610 (79.7)	51 (59.3)	Reference
Less than once a month	116 (13.6)	92 (12.0)	24 (27.9)	**3.12 (1.83, 5.31)**
At least once a month	74 (8.7)	63 (8.2)	11 (12.8)	**2.09 (1.04, 4.21)**
Ever reported marijuana use	398 (46.9)	347 (45.5)	51 (59.3)	**1.75 (1.11, 2.75)**
Ever reported crack or cocaine use	26 (3.1)	18 (2.4)	8 (9.3)	**4.26 (1.79, 10.11)**
Ever reported other drug use	61 (7.2)	46 (6.0)	15 (17.4)	**3.30 (1.76, 6.21)**
Sexual Behaviors of the Participant and Their Sexual Partners				
Condom use				
Always use condoms for oral sex[b]	77 (8.2)	73 (8.7)	4 (4.3)	0.67 (0.40, 1.10)
Always use condoms for vaginal sex[b]	389 (25.8)	365 (26.4)	24 (19.7)	0.39 (0.14, 1.05)
Always use condoms for anal sex[b]	28 (15.9)	28 (17.7)	0 (0.0)	—
Lifetime number of sex partners				
1–5	357 (42.2)	333 (43.8)	24 (27.9)	Reference
6–10	257 (30.3)	231 (30.3)	26 (30.2)	1.56 (0.88, 2.79)
> 10	233 (27.5)	197 (25.9)	36 (41.9)	**2.54 (1.47, 4.38)**
Ever received gifts, favors, food, shelter, transportation, money drugs or alcohol for sex	53 (6.2)	42 (5.5)	11 (12.8)	**2.52 (1.25, 5.11)**
Reported sex with a risky partner[c]				
No	706 (83.0)	638 (83.4)	68 (79.1)	Reference
Yes/Don't know	145 (17.0)	127 (16.6)	18 (20.9)	1.33 (0.76, 2.31)
Participant has concurrent relationship[b]	610 (34.6)	514 (33.1)	96 (46.6)	**1.81 (1.24, 2.64)**
Sex partner characteristics				
Partner is more than 5 years older[b]	452 (26.8)	390 (26.1)	62 (32.0)	1.33 (0.90, 1.94)
Partner is different race/ethnicity[b]	54 (3.1)	42 (2.7)	12 (5.8)	1.92 (0.76, 4.83)
Partner is more educated[b]	391 (21.8)	332 (20.9)	59 (28.1)	1.45 (0.96, 2.18)
Partner has other partners[b]				
No	420 (23.9)	368 (23.7)	52 (25.2)	Reference
Yes	754 (42.8)	646 (41.6)	108 (52.4)	1.12 (0.73, 1.72)
Don't know	586 (33.3)	540 (34.7)	46 (22.3)	**0.59 (0.37, 0.96)**
One time sexual encounter[b]	323 (18.0)	283 (17.8)	40 (19.1)	1.17 (0.79, 1.74)
Used alcohol or drugs at last sex[b]	294 (16.4)	227 (14.3)	67 (31.9)	**2.83 (1.88, 4.26)**
Partner used alcohol or drugs at last sex[b]	385 (21.4)	310 (19.5)	75 (35.7)	**2.27 (1.56, 3.32)**
Met partner[b]				
At school	519 (29.3)	467 (29.9)	52 (25.1)	0.80 (0.53, 1.19)
Introduced by a friend	392 (22.1)	330 (21.0)	62 (30.0)	**1.61 (1.10, 2.37)**
At work	233 (13.2)	213 (13.6)	20 (9.7)	0.68 (0.41, 1.12)
At a social event	177 (10.0)	166 (10.6)	11 (5.3)	**0.50 (0.27, 0.92)**
On the internet	46 (2.6)	37 (2.4)	9 (4.4)	1.74 (0.65, 4.62)

[a]Other STIs included Trichomonas, Herpes, Syphilis, nongonococcal urethritis (NGU), mucopurulent cervicitis (MPC), pelvic inflammatory disease (PID), and a box labeled ''Other'' in which the survey participant could specify STI.
[b]Event (partner) level variables
[c]Sex with a high-risk partner included sex with intravenous drug users or HIV-positive individuals.
Bold numerals indicate statistically significant findings.
STI, sexually transmitted infections.

Female sexual minorities reported increased odds of illicit drug use across all categories compared to their heterosexual counterparts, especially with respect to crack use (OR 4.26, 95%CI 1.79–10.11). Heterosexual and sexual minority men reported similar rates of substance use, with the exception that sexual minority men reported decreased odds of marijuana use compared to their heterosexual counterparts (OR 0.47, 95%CI 0.26–0.85).

Sexual minority men reported fewer sex partners (OR 0.33, 95%CI 0.16–0.65) and decreased odds of concurrent relationships (OR 0.42, 95%CI 0.24–0.72) compared to heterosexual men. Sexual minority women, however, reported more sexual partners (OR 2.54, 95%CI 1.47–4.38) and had increased odds of concurrent relationships (OR 1.81, 95%CI 1.24–2.64) compared to their heterosexual counterparts. Additionally, sexual minority women reported more engagement in transactional sex (OR 2.52, 95%CI 1.25–5.11) and more frequent individual and partner substance use at last sex (individual: OR 2.83, 95%CI 1.88–4.26; partner: OR 2.27, 95%CI 1.56–3.32) compared to heterosexual women.

With respect to sexual network profiles, compared to their heterosexual counterparts, sexual minority men had increased odds of having a partner more than five years older (OR 2.06, 95%CI 1.23–3.45). Sexual minority men were at increased odds of reporting always using a condom for anal sex (OR 2.03 95%CI 1.03–4.01) and meeting partners at a social event (OR 2.06, 95%CI 1.13–3.77) or online (OR 2.71, 95%CI 1.29–5.68). Sexual minority women had increased odds of being introduced to their partners by a friend (OR 1.61; 95%CI 1.10–2.37) and decreased odds of meeting their partner at a social event (OR 0.50; 95%CI 0.27–0.92) compared to heterosexual women.

Discussion

Compared to the national averages of chlamydia rates from STI clinics, we found similar rates for males, while the rates were twice as high among women in our sample.[8,9] With respect to gonorrhea, however, rates were lower in our sample for both men and women. National data were not further disaggregated by sexual orientation or race; therefore, further comparisons could not be made based on these characteristics. Our results suggest that, in addition to continuing the focus on African American male sexual minorities, there is also a critical need to investigate why African American sexual minority women are disproportionately impacted by STIs.

With respect to socio-demographic characteristics, African American sexual minority men reported higher levels of education compared to their heterosexual counterparts. This is consistent with findings from a study analyzing three national datasets that showed gay men also reported higher rates of college and post-college education than their heterosexual counterparts.[10] These studies, however, did not disaggregate data by race or ethnicity. Our results suggest that higher levels of education may not translate into a reduced risk for STI acquisition. In our study, African American sexual minority women reported lower levels of education compared to their heterosexual counterparts. This contrasts with a national study that found lesbian women reported higher rates of college degrees and post-college education than heterosexual women.[10] This contrast further underscores how the lower socio-economic position of African American sexual minority women in Jackson, MS, may contribute to increased vulnerability for HIV and STIs. More efforts are needed to respond to the health needs of these women, including both provider and patient health education programs.

With respect to substance abuse, stark differences emerged: While African American sexual minority men reported a similar prevalence of illicit drug use compared to heterosexual men, we found a higher prevalence of illicit drug use, both by the participants and their partners, among African American sexual minority women compared to heterosexual women. These results are consistent with previous findings for sexual minority men and women, though the studies did not disaggregate their results by race or ethnicity.[11–13]

Sexual risk behavior profiles differed between heterosexual men and women compared to their sexual minority counterparts. As found elsewhere, African American sexual minority men in this study had lower rates of concurrency and lower numbers of lifetime sexual partners.[14] African American sexual minority women reported more sex partners, higher levels of concurrency, and more transactional sex compared to their heterosexual counterparts. These findings are consistent with previous studies highlighting similar vulnerabilities. A survey of adolescent women in Minnesota found that sexual minority adolescents were more likely to have engaged in sex work, and a survey in British Columbia, Canada, found that sexual minority adolescent women were more likely to have ever had sex, sexual debut before age 14, and two or more sexual partners than their heterosexual peers.[15,16] Neither of these studies disaggregated their results according to race or ethnicity. A study from Jackson, MS, focused on African American sexual minority women reported that bisexual women were significantly more likely to engage in sexual behaviors that increase HIV and STI acquisition risks.[5] Taken together, these findings highlight significant levels of sexual risk behaviors among African American sexual minority women and underscore the need for urgent attention.

There are some important limitations to note: Due to convenience sampling at an urban, publically funded clinic known to specialize in lesbian, gay, bisexual, and transgender (LGBT) medical care, disease and behavioral outcomes among this sample may not be representative of the broader population. Sampling bias is of potential concern because heterosexuals who seek care at this clinic may be at higher-risk compared to other patients. Notably, limitations in sample size did not allow for the exploration of differences among African American sexual minorities or to conduct a multivariate analysis. We also did not ask questions about transgender populations in our survey.

Conclusion

Our study adds to a mounting body of evidence that African American sexual minority men do not engage in higher risk behaviors than their heterosexual counterparts. However, our findings suggest that African American sexual minority women are particularly vulnerable because of their significantly higher rates of substance use and sexual risk behaviors, both of which may play important roles in contributing to racial disparities in HIV and STI among African American sexual minorities in Mississippi. These findings underscore the urgent need for STI prevention efforts tailored to African American sexual minorities in the Deep South.

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