

### PREVALENCE AND CORRELATES OF PATERNAL POSTPARTUM DEPRESSION IN SAUDI ARABIA

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#### ABSTRACT

##### Background and objective

Literature concerning paternal postpartum depression (PPPD) is rare. However, PPPD is a highly relevant disorder and can have a detrimental effect on the well-being of the family. Paternal care is an essential factor for infants' mental development, and PPPD has been clearly shown to influence infants' psychopathology and behavior later in life. This preliminary study aimed to detect the prevalence of PPPD and the correlated demographic and socioeconomic factors in fathers to newborns at the King Abdulaziz University Hospital (KAUH) in Jeddah, Saudi Arabia.

##### Materials and methods

This was a cross-sectional study conducted at KAUH in Jeddah, Saudi Arabia, between January 1, 2017 and June 25, 2018. We collected data telephonically through questionnaires based on previous studies. A PPPD cutoff score of >10 using a validated Arabic translation of the Edinburgh Postpartum Depression Scale was used. We enrolled 150 fathers with a mean age of  $36.61 \pm 7.72$  years in the study.

##### Results

The results showed that more than a quarter (27.3%) of the participants suffered from PPPD. Factors that correlate with PPPD included a weak relationship with the paternal/mother ( $p=0.001$ ), trouble sleeping ( $p=0.010$ ), lower self-esteem ( $p=0.012$ ), family-related problems ( $p<0.0001$ ), work-related problems ( $p=0.002$ ), work–family conflict ( $p<0.0001$ ), and perceived perinatal and postpartum stress ( $p=0.001$  and  $<0.0001$  respectively).

## Conclusions

The results confirm that PPPD is prevalent among fathers in Jeddah. Screening for and treatment of PPPD in Saudi Arabia is currently lacking, and the prevalence of PPPD according to these findings indicates that these deficiencies urgently need to be addressed. Counselling and support for managing health, family, and work issues during and after pregnancy could contribute to preventing PPPD.

**Key Words:** *paternal postpartum depression (PPPD); depression; Jeddah; Edinburgh Postnatal Depression Scale; men's health*

## INTRODUCTION

Depression, which can affect many aspects of an individual's daily life, is a widespread global disorder that affects more than 300 million people. Approximately 800,000 individuals die every year from depression-related disorders, and depression is predicted to be one of the leading diseases, on a global scale, by 2030.<sup>1,2</sup> Despite these numbers, stigmatization around depressive disorders still persists.<sup>3</sup>

Postpartum depression (PPD) is defined as moderate to severe depression diagnosed during the postpartum period, that is, shortly following—and up to 1 year after—childbirth.<sup>4</sup> Symptoms include restlessness, sudden mood swings, thoughts of self-harm, and thoughts of causing harm to the infant.<sup>3</sup> Maternal PPD has been extensively studied and is found to affect up to 11% of women worldwide.<sup>5</sup> Contrastingly, literature pertaining to paternal postpartum depression (PPPD) is scarce, although PPPD cases are on the rise.<sup>6</sup> Recent studies have shown mixed results in the estimated incidences of PPPD in the first year postpartum, ranging from 1.7% to 31.1%, and averaging around 8%.<sup>7</sup> This variation may be caused by different cut-off points, sample sizes, and cultural backgrounds.<sup>8</sup>

No definite biological cause for PPPD has been found. However, there have been a number of theories concerning hormonal changes—such as low testosterone, estrogen, or prolactin, among others—which could lead to mood swings. Furthermore, psychosocial risk factors, maternal

PPD, familial and sexual issues, work issues, and the lack of a paternal role model have all been found to pose an increased risk.<sup>9</sup> According to recent studies, poor self-esteem and work–family conflicts are significant risk factors at 6 weeks postpartum. Social support was found to be a significant factor in late pregnancy and at 2 weeks postpartum.<sup>10,11</sup> Other risk factors—such as unplanned pregnancy, low income, and marital dissatisfaction—did not achieve statistical significance at all levels.<sup>10</sup>

The significance of PPPD is rooted in its detrimental effect on the family. The father's early interactions with the infant have been proven to be as important as the mother's.<sup>12</sup> Moreover, paternal care is essential to an infant's mental development, and thus PPPD has been shown to be a risk factor for psychopathology and behavioral problems later in the infant's life.<sup>13</sup> Depressed fathers are able to establish a secure relationship with their infants to a lesser extent, making the infant more susceptible to insecure attachments later on in life<sup>14</sup> and possibly harming the infant's relationship with its mother. The father's depressed condition may also lead to a failure to compensate for the mother's possible existing depressive state due to fathers' inability to provide support, increasing the mothers' vulnerability to psychological stressors.<sup>15</sup> Lastly, PPPD may lead to the abuse or neglect of the infant, just as PPD may.<sup>9,16</sup>

Limited data concerning the prevalence and the associated factors of PPPD are available in the Middle East. Saudi Arabia, specifically, is unique because of its cultural and social structure and the

role of the father in the family, making it an area of specific interest for our study. A study conducted in Riyadh, Saudi Arabia, showed that 16.6% of the respondents suffered from PPD.<sup>17</sup> Moreover, in neighboring Egypt, another study showed a prevalence of 31.4%.<sup>18</sup> The role of patriarchy in Saudi culture—where the father is mainly, if not entirely, responsible for providing for the family—is also a relevant factor. The study conducted in Riyadh showed that a father's employment situation—whether he has a permanent or a temporary position and the amount of time spent at work—were significant factors in the diagnosis of PPPD.<sup>17</sup> In addition to these factors, the stigma concerning mental illness still often prevents sufferers from seeking help. This is particularly true for the patriarch of the family, as others may see them as “weak” or “incompetent” if they do decide to seek help.<sup>19,20</sup>

This study aims to fill some of the gaps concerning PPPD data and to take the first step for future studies regarding PPPD in various regions of the country. We accomplish this by examining the prevalence of PPPD as well as the correlated demographic and socioeconomic factors in fathers at the King Abdulaziz University Hospital in Jeddah, Saudi Arabia.

## METHODS

This was a cross-sectional study conducted at King Abdulaziz University Hospital (KAUH) in Jeddah, Saudi Arabia. Fathers of newborns were recruited and interviewed telephonically over a period between January 1, 2017 and June 25, 2018. King Abdulaziz University Hospital is one of the biggest teaching centers in the western region of Saudi Arabia, with an 800-bed capacity. Ethical approval was obtained from the Institutional Review Board (IRB) of King Abdulaziz University Hospital.

### *Selection of Participants*

We collected 461 data profiles of parents of newborns. Out of this sample, only 182 fathers

conformed to the study's inclusion criteria, which were: (1) having a newborn between 4 and 8 weeks of age, (2) ability to communicate in Arabic, and (3) age of at least 18 years. Some fathers who did meet these criteria refused to participate, and there was a high turnover of phone numbers. We excluded 32 of the 182 eligible participants due to missing information and a timing cut-off. Interviewers contacted eligible participants over the telephone. After assuring respondents that all information would be confidential, fathers' verbal consent was obtained before continuing with the questionnaire.

### *Measurement of Paternal Depression*

To collect demographic data and other variables, we used a questionnaire based on previous studies ensuring that the questions were posed in a culturally appropriate way. We also used the Edinburgh Postnatal Depression Scale (EPDS), a self-administered survey that consists of 10 items, with each item rated from 1 to 4 to assess the severity of PPD. Higher scores reflect a higher level of symptom severity.<sup>21</sup> The EPDS has been translated into several languages and has been validated in many cultures. It is the most commonly-used measure to determine depressive symptoms among mothers in the postpartum period and to screen for paternal depression among fathers.<sup>22</sup> It has also been reported to be a valid and reliable tool in Arabic.<sup>23</sup> A recommended cut-off score of 10 points or more was considered to indicate probable PPPD and a consequent need for further evaluation.<sup>22</sup> The chosen cutoff elicited a sensitivity of 91% and a specificity of 84%. The Cronbach's alpha for the EPDS is 0.84<sup>23</sup> in the Arabic scale, similar to another existing study.<sup>22</sup>

### *Measurements of Risk Factors and Other Variables*

The demographics questionnaire was formulated based on previous studies.<sup>7,8,10</sup> Factors such as age, marital status, level of education, monthly income, occupation, and hours worked per day

were obtained. The questionnaire also included psychosocial risk factors such as quality of relationship with partner/infant's mother, marital satisfaction, planned/unplanned pregnancy, self-esteem, gender preference of infant, number of children, work–family conflict, history of paternal or maternal depression, trouble sleeping, and diseases in the father or the child.

### **Statistical Analysis**

The data were entered into an excel sheet and then converted to SPSS (version 21) data for further analysis. The categorical variables—including primary variables—were described using a frequency table. Continuous variables for normal distribution were described using mean, standard deviation, and range. The data were then processed to determine statistical significance using a chi-squared test. For all statistical analyses, *p*-values lower than 0.05 were considered to be significant.

## **RESULTS**

A sample of 182 fathers participated in both the EPDS and the demographic factors questionnaire. After the answers of 32 fathers were excluded owing to them not fulfilling the inclusion criteria, 150 fathers' completed questionnaires were included in the analysis.

The mean age of the fathers was 36.61 ( $\pm 7.72$ ) years and the ages of the infants ranged from the 4th to the 8th week after birth. From amongst the sample, 23.3% of the respondents were first-time parents. The median income of the respondents was between Saudi Riyal (SAR) 7,001 and SAR 15,000, similar to the average family income range in Saudi Arabia. Concerning education, 73 of the fathers held a bachelor's degree, 54 held a high-school diploma, 14 held a post-graduate degree, five held a middle school diploma, three held an elementary school diploma, and one did not attend school. Regarding employment, 140 of the fathers were employed and only 10 were

unemployed. Two of the fathers reported having a poor relationship with the partner/infant's mother and five had a history of depression. Lastly, according to the respondents, five of the respondents' partners had a history of depression.

A score of 10 points or higher was set as the cutoff point to screen for PPPD. According to this cutoff, 27.3% of the respondents were considered to have PPD. A comparison of the correlated factors was conducted between fathers with and without PPPD.

Factors such as nationality ( $p=0.144$ ), occupation ( $p=0.402$ ), education level ( $p=0.289$ ), monthly income ( $p=0.970$ ), and being a first-time parent ( $p=0.402$ ) showed no correlation between those with depression and those without. Table 1 presents all of the variables used in the research.

The respondents with a score above 10 reported experiencing sleep problems ( $p=0.010$ ), self-esteem issues ( $p=0.012$ ), family problems ( $p=0.00001$ ), work problems ( $p=0.002$ ), and conflicts between work and family life ( $p=0.000034$ ). Table 2 shows the factors with significant *p*-values. Fathers who reported having a poor relationship with the partners/infant's mothers ( $p=0.001$ ) were significantly more likely to be depressed. Moreover, fathers with perceived stress during or after pregnancy—( $p=0.001$ ) and ( $p=0.00002$ ) respectively—were significantly more depressed. Fathers who had better knowledge of the newborns' ( $p=0.047$ ) or wives' ( $p=0.038$ ) health status were less likely to have PPPD.

## **DISCUSSION**

This research addressed the issue of PPPD in fathers in the Middle East, specifically Saudi Arabia. Its goal was to determine the prevalence and associated correlates of PPPD from among a sample of fathers in Jeddah, Saudi Arabia. The research was conducted by making use of a telephonic questionnaire with a sample of fathers

**TABLE 1** Factors Related to Paternal Postpartum Depression Measured Using Chi-Squared Test (n=150)

Studied factors	PPPD (% within factor)		p-value
	No depression based on EPDS	Depression based on EPDS	
	(n=109, 72.7%)	(n=41, 27.3%)	
Nationality			0.128
Saudi	85 (75.9%)	27 (24.1%)	
Non-Saudi	24 (63.2%)	14 (36.8%)	
Occupation			0.402
Government	63 (77.8%)	18 (22.2%)	
Private	39 (67.2%)	19 (32.8%)	
Unemployed	6 (60%)	4 (40%)	
Student	1 (100%)	0 (0%)	
Education level			0.289
None	0 (0%)	1 (100%)	
Elementary school	2 (66.7%)	1 (33.3%)	
Middle school	5 (100%)	0 (0%)	
High school	39 (72.2%)	15 (27.8%)	
College	51 (69.9%)	22 (30.1%)	
Post graduate	12 (85.7%)	2 (14.3%)	
Monthly income			0.97
< SAR 3,000	11 (68.8%)	5 (31.3%)	
SAR 3,001–5,000	17 (70.8%)	7 (29.2%)	
SAR 5,001–7,000	25 (73.5%)	9 (26.5%)	
SAR 7,001–15,000	41 (71.9%)	16 (28.1%)	
> SAR 15,000	15 (78.9%)	4 (21.1%)	
Currently smoking			0.621
No	66 (74.2%)	23 (25.8%)	
Yes	43 (70.5%)	18 (29.5%)	
Work hours per day			0.309
< 6 hours	21 (75%)	7 (25%)	
6–8 hours	50 (79.4%)	13 (20.6%)	
8–10 hours	26 (63.4%)	15 (36.6%)	
> 10 hours	12 (66.7%)	6 (33.3%)	
Postpartum vacation			0.097
No	55 (73.3%)	20 (26.7%)	
< 1 week	26 (61.9%)	16 (38.1%)	
1–2 weeks	14 (73.7%)	5 (26.3%)	

**TABLE 1** Related to Paternal Postpartum Depression Measured Using Chi-Squared Test (n=150)  
(Continued)

Studied factors	PPPD (% within factor)		p-value
	No depression based on EPDS	Depression based on EPDS	
	(n=109, 72.7%)	(n=41, 27.3%)	
2–4 weeks	10 (100%)	0 (0%)	
> 4 weeks	4 (100%)	0 (0%)	
Previously diagnosed with depression			0.614
No	106 (73.1%)	39 (26.9%)	
Yes	3 (60%)	2 (40%)	
Wife previously diagnosed with depression			0.02
No	108 (74.5%)	37 (25.5%)	
Yes	1 (20%)	4 (80%)	
Subjective depressive feelings for father			0.006
No	95 (77.9%)	27 (22.1%)	
Yes	14 (50%)	14 (50%)	
Subjective depressive feelings for wife			0.12
No	94 (75.2%)	31 (24.8%)	
Yes	15 (60%)	10 (40%)	
Self-esteem issues			0.012
No	90 (78.3%)	25 (21.7%)	
To some extent	11 (47.8%)	12 (52.2%)	
Yes	8 (66.7%)	4 (33.3%)	
Father's social relationships			0.872
Weak	1 (100%)	0 (0%)	
Average	16 (66.7%)	8 (33.3%)	
Good	35 (72.9%)	13 (27.1%)	
Excellent	57 (74%)	20 (26%)	
Relationship with the wife			0.001
Weak	0 (0%)	2 (100%)	
Average	9 (90%)	1 (10%)	
Good	13 (48.1%)	14 (51.9%)	
Excellent	78 (78.4%)	24 (21.6%)	
Multiple wives			0.728
No	101 (72.1%)	39 (27.9%)	
Yes	8 (80%)	2 (20.0%)	
Other family members living with husband and wife			0.619
No	89 (73.6%)	32 (26.4%)	



**TABLE 1.** Related to Paternal Postpartum Depression Measured Using Chi-Squared Test (n=150)  
(Continued)

Studied factors	PPPD (% within factor)		p-value
	No depression based on EPDS	Depression based on EPDS	
	(n=109, 72.7%)	(n=41, 27.3%)	
Yes	20 (69%)	9 (31.0%)	
Sleep problems			0.01
Never	53 (84.1%)	10 (15.9%)	
Rarely	13 (76.5%)	4 (34.5%)	
Sometimes	30 (68.2%)	14 (31.8%)	
Always	13 (50%)	13 (50%)	
Family-related problems			0.00001
No	106 (78.5%)	29 (21.5%)	
Yes	3 (20%)	12 (80%)	
Work-related problems			0.002
No	97 (78.2%)	27 (21.8%)	
Yes	12 (46.2%)	14 (53.8%)	
Family-work conflict			0.000034
No	93 (81.6%)	21 (18.4%)	
Yes	16 (44.4%)	20 (55.6%)	
Father health problems			0.437
No	87 (71.3%)	35 (28.7%)	
Yes	22 (78.6%)	6 (21.4)	
Newborn health problems			1
No	101 (72.7%)	38 (27.3%)	
Yes	8 (72.7%)	3 (27.3%)	
Perceived stress during pregnancy			0.001
Never	57 (78.1%)	16 (21.9%)	
Rarely	22 (87.5%)	4 (12.5%)	
Sometimes	20 (60.6%)	13 (39.4%)	
Always	4 (33.3%)	8 (66.7%)	
Perceived stress postpartum			0.00002
Never	84 (82.4%)	18 (17.6%)	
Rarely	14 (73.3%)	5 (26.3%)	
Sometimes	11 (42.3%)	15 (57.7%)	
Always	0 (0%)	3 (100%)	
Knowledge of infant's health from medical staff			0.047
No	22 (61.6%)	14 (38.9%)	

**TABLE 1.** Related to Paternal Postpartum Depression Measured Using Chi-Squared Test (n=150)  
(Continued)

Studied factors	PPPD (% within factor)		p-value
	No depression based on EPDS	Depression based on EPDS	
	(n=109, 72.7%)	(n=41, 27.3%)	
To some extent	15 (62.5%)	9 (37.5%)	
Yes	72 (80%)	18 (20%)	
Knowledge of wife's health from medical staff			0.038
No	22 (57.9%)	16 (42.1%)	
To some extent	16 (69.6%)	7 (30.4%)	
Yes	71 (79.8%)	18 (20.2%)	
Was pregnancy planned			0.881
No	57 (72.2%)	22 (27.8%)	
Yes	52 (73.2%)	19 (26.8%)	
Preference of infant's gender			0.762
Male	32 (76.2%)	10 (23.8%)	
Female	17 (68%)	8 (32%)	
Neither	60 (72.7%)	23 (27.7)	
Newborn gender			0.877
Male	53 (74.6%)	18 (25.4%)	
Female	53 (70.7%)	22 (29.3%)	
Twins	3 (75%)	1 (25%)	

PPPD, Paternal postpartum depression; EPDS, Edinburgh Postnatal Depression Scale.

during the postpartum period from the 4th to the 8th week. Our results revealed that the prevalence of PPPD in our sample was 27.3%, based on the cutoff score of >10 points in the EPDS. The prevalence of 27.3% is high, compared to most previous international studies<sup>7</sup>; however, Philpott and Corcoran<sup>24</sup> found a similar prevalence rate (28%) in Ireland. In their study, however, the EPDS cutoff score was set at 9 instead of 10.

The significant factors concerning fathers with PPPD include a poor relationship with the partner/infant's mother, trouble sleeping, work-related problems, work–family conflict, history of depression in partner/infant's mother, subjective depressive feeling in father, perceived stress—in both perinatal and postnatal periods—and poor

knowledge regarding partner and infant's health while in the hospital.

While it has been documented that younger fathers are at increased risk of depressive symptoms,<sup>25</sup> our results did not show any significant association between age and an increased risk of PPPD. This finding is similar to the findings of Cameron et al. and Gawlik et al.<sup>7,26</sup> Gwalik et al. also documented that low income, low level of education, and poor relationship quality increased the risk of PPPD. Our study showed a positive association with poor relationship quality with the partner/infant's mother, which is similar to the results of Zhang et al.'s study in northwestern China<sup>27</sup>; however, there were no other significant



**TABLE 2** Factors Significantly Correlated with Paternal Postpartum Depression Measured Using a Chi-Squared Test (n=150)

Studied factors	p-value
Relationship with the wife	0.001
Sleep problems	0.010
Self-esteem issues	0.012
Family-related problems	0.00001
Work-related problems	0.002
Family–work conflict	0.000034
Wife previously diagnosed with depression	0.020
Subjective depressive feelings (father)	0.006
Perceived stress in pregnancy	0.001
Perceived stress postpartum	0.00002
Knowledge of infant's health from medical staff	0.047
Knowledge of wife's health from medical staff	0.038

similarities between the results from the two studies.

In Cameron et al.'s meta-analysis,<sup>7</sup> the sociodemographic variables were not conditional for depressive symptoms. Our study had similar findings in that age, nationality, marital status, city of residence, level of education, monthly income, occupation, hours worked per day, and whether the father took paternal leave showed no positive association with PPPD. The supplementary articles by Nelson and Guyer and Nishimura and Ohashi<sup>28,29</sup> showed that occupation had a positive association with work status, signifying that unemployment was a risk factor. Our research also showed a strong association between PPPD and work–family conflict and work-related problems, although no existing study was found to corroborate this result. The pressure of providing for a new family member will likely place an additional burden on the father, especially if he was the sole provider. However, according to Nishimura and Ohashi's study in Japan,<sup>29</sup> not enough data are available to confirm this association. Moreover,

Nishimura and Ohashi's study<sup>29</sup> also stated that emotional problems between the father and the partner/infant's mother is a risk factor. This supports our results, which showed an association between a poor relationship with partner/infant's mother and PPPD. Lastly, we also found a positive correlation between PPPD and the partner/infant's mother's previous depression, which could be in relation to previous marital dissatisfaction for spouses of depressed persons. Literature showed increase of marital discord when one of the partners' is depressed.<sup>30,31</sup> However, we weren't able to find anything that reflects on our findings, which calls for further investigations related to the marital outcome of PPD.

The factors related directly to the father—such as subjective depressive feelings, trouble sleeping, and self-esteem problems—all had a positive association with PPPD and are plausible risk factors for PPPD. Nevertheless, further research is needed to validate these results. Moreover, considering the factors of medical or surgical health problems, the results are relatively insignificant. A study by Gawlik et al.<sup>26</sup> implied that preparing for the upcoming life changes associated with a newborn could somewhat alleviate PPPD; however, our study showed that perceived stress—in both perinatal and postpartum periods—is also strongly correlated with PPPD.

As the notion of PPPD becomes more prevalent and mainstream, prevention and intervention are both needed to deal with this rising dilemma. There are several ways to prevent PPPD, starting with educating both parents regarding the subject, that not only the mother is vulnerable to this condition, but so is the father. Raising awareness, providing educational classes or pamphlets might also decrease the stigma, as well as provide the opportunity to discuss the symptomatology that may accompany it.<sup>32</sup> A study conducted by Suto et al.<sup>33</sup> reported that screening fathers at risk during the perinatal period may provide greater insight into the fathers condition to the

practitioners managing the family, in addition to providing an early intervention to help halt the progress of the condition. Managing cases of PPPD still requires more evidence for the most optimal management. It might be helpful to start the father on pharmacological or psychological therapies, but as Musser et al.<sup>34</sup> mentioned, the most effective way to deal with PPPD is focusing on cause(s) that might be triggering it.

There are, of course, certain limitations to this study. First, the cross-sectional nature of the study makes it impossible to ascertain the onset of PPPD in the study sample, the possible causality between the presumed risk factors and PPPD, or whether participants experienced PPPD beyond the 1–2 month postpartum period that this study targeted. The second limitation is the relatively small sample size, drawn from only one medical center. The reason for the small study size is that our study is a pilot study for the particular region. Future studies should therefore follow a prospective design, preferably starting at pre-pregnancy and running up to 6 months postpartum. There should also be a multi-center study to more confidently assess the prevalence and risk factors of PPPD.

The third limitation was that the EPDS was not applied to the mothers to identify current PPD and to correlate with PPPD. The importance of this factor has been highlighted in previous studies.<sup>8</sup> Instead, we asked the father about his perception of the mother's mood and whether she was ever diagnosed with major depression disorder or PPD. The fourth limitation is that we did not implement a full face-to-face psychological evaluation. Instead, the questionnaire was completed telephonically by the father. Carrying out the face-to-face evaluation could have been valuable to further investigate and verify the results of the EPDS. The last notable limitation is that a considerable number of fathers refused to be enrolled in the study due to the sensitivity of the subject, and only Arabic speakers could be included. This influenced the size of our study

sample. At the outset, we attempted to measure religiosity using the Duke University Religiosity Index,<sup>35</sup> as religiosity and spirituality are observed factors in the development of depression and PPD.<sup>36,37</sup> However, many respondents refused to complete it for reasons of privacy or because it is unusual to deviate from cultural norms regarding religion and spirituality.

## CONCLUSION

Our findings confirm that PPPD is prevalent in the study area. PPPD screenings and treatment are currently lacking and there is an urgent need to improve these factors, especially considering risk factors such as a maternal history of depression and poor work or family status. Counselling and support for managing health, family, and work issues—both perinatal and postpartum—could contribute to preventing PPPD. We recommend prospective and multi-center studies for better assessment of PPPD in the Middle East.

## CONFLICT OF INTEREST

The authors have declared that they have no conflicts of interest.

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