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**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1470631>Available online at: <http://www.iajps.com>**Research Article****DESCRIPTIVE, CROSS-SECTIONAL TRIAL TO ASSOCIATE
HYPERTENSION WITH THE INCIDENCE OF OBESITY BY
COMPARING VARIOUS CORRELATED VARIABLES****Dr. Khurram Iqbal, Dr. Aswad Mustafa, Dr. Muhammad Ahmed**
Allied Hospital, Faisalabad**Abstract:**

Objectives: Hypertension and obesity have a close relationship. People belonging to different geographical locations and demographics are suffering from an imbalance of energy owing to the conditions of overweight and obesity. Obesity control can result in a reduction of hypertension in most of the cases. The aim of the study was to establish a relationship between obesity and hypertension and to explore the incidences of corpulence in connection with BMI and waist to hip ratio among medical students.

Methodology: The study scheme was descriptive and cross-sectional in nature carried out at Services Hospital, Lahore (February – November 2017). A total of 213 medical students from MBBS (1st year) and BDS participated in the research. All the parameters for measurement of obesity were in control for the sample which included height, weight, the circumference of hip and waist etc. The results of BMI, WC (Waist Circumference) and WHR (Waist to Hip Ratio) measured and recorded for each student.

Results: The sample consisted of 97 male and 116 female students (45.5% & 54.5% respectively). The number of students with underweight was 2 males and 8 females, with normal weight were 55 males and 52 females. Overweight female students were 22 whereas overweight male students were 17. Obese I category consisted of 20 males and 23 females whereas obese II comprised of 3 males and 11 females. The obese females were greater in numbers than obese males based on BMI and WHR measurements. Hypertension was prevailing in all categories except underweight medical students. The results showed 12 normal weight students, 6 overweight students, 14 obese – I and 7 obese – II category medical students were suffering from hypertension. The relationship between BMI, WC and WHR was significant in relation to hypertension.

Conclusion: The study delivered that overweight and obesity was prevailing among medical students. The research produced that high blood pressure was closely related to BMI, WC and WHR. The increase in hypertension confirmed in students with higher BMI values.

Keywords: Body Mass Index (BMI), Diabetes Mellitus (DM), Hypertension, Obesity, Waist-Hip Ratio (WHR), Waist Circumference (WC)

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INTRODUCTION:

The obesity represents a condition in which surplus fat accrues in the body [1]. It occurs due to the excessive malnutrition and dietary irregularities and reported in developing and developed countries indifferently. The number of obese and overweight in the world is more than 1.5 billion [2]. Almost two third of the adults in the developed societies are facing obesity and it is growing with great number worldwide [3]. A significant number of Pakistani populations residing in cities (22% – 37%) is also facing obesity [4]. The presence of other diseases such as diabetes, high blood pressure and heart diseases are more common in the overweight population due to their life pattern [5]. The risk of hypertension increases with the prevalence of obesity [6]. An early diagnosis and treatment of obesity can put a barrier to the development of heart diseases in the overweight population.

The number of patients suffering from hypertension is increasing day by day, especially in developing countries. The risk of hypertension doubles in obese people as compared to non-obese patients [8]. The abdominal obesity leads to cardiovascular diseases and is a grave public health issue.

The association of abdominal obesity parameters such as WC and WHR are more closely related to heart diseases as compared to BMI [9]. The HTN catalyzed by obesity usually come in combination with other diseases namely heart attack, CVD, CAD, kidney degradation and many others. Also, lifestyle and dietary habits play a vital role in the control of HTN. HTN in obese population can be controllable by the loss of weight [11]. The use of junk food is on the rise in all parts of the world. Due to the busy lifestyle, people prefer to take fast food instead of fruits, vegetables and a healthy diet. Moreover, people spend more time on desk jobs and leisure time with mobile and television. Due to lack of physical activity, people are becoming victims of obesity, HTN & CVDs. The rate of morbidity and mortality all over the world is on rising due to these conditions [11].

A large number of medical college students were overweight (40%). They were not aware of the possible risk factors associated with obesity [12]. Very few students (8.5%) were regularly consuming fruits and vegetables. The rest were not taking a balanced diet. The Pakistani people are genetically obese that is a big challenge [13]. In our research, we encompassed obesity by three parameters i.e. BMI, WC, WHR and established the correlation of these parameters with HTN in students of (18 – 21) years of age. The age group is critical for the reason that students are

entering from one phase to other (from teenage to adulthood). The students remain busy with their study and are likely to become overweight due lack of physical exertions.

METHODOLOGY:

The study scheme was descriptive and cross-sectional in nature carried out at Services Hospital, Lahore (February – November 2017). Two hundred & thirteen students of MBBs 1st year participated in the research. The participants' details of biodata and other information recorded on a predesigned form. The height and weight (in cm and kg) of students measured with the help of stadiometer. We measured BMI with the help of this formula (Weight in kg / Height in meter square). Five categories (according to BMI) implemented for the research process. The categories were; Underweight, Normal, Overweight, Obese I and Obese II [14].

To assess the abdominal obesity, waist circumference and waist to hip ratio measured from the iliac crest and lower ribs. The average of three waist measurements utilized for the research. Trochanter readings at main trochanter and 2cm above and below the main trochanter measured an average of the readings used for the measurement of HC. The ratio of WC and WHR measured by simple arithmetic means. The recommendations of the international diabetic federation (IDF) were in effect for WC of male and females in South Asia (Male >90cm; Female >80cm). The WHR cut off values for the male and female in South Asians were > 0.90cm and >0.85cm respectively [15].

The students' BP measurements measured through sphygmomanometer and stethoscope from both arms and 1st and 5th Korotkoff sounds observed in each case for upper and lower values. The BP readings again measured after a time interval of 2 minutes and students had a distribution in four types according to HTN values. The HTN categories were normal, pre-hypertension, stage 1 HTN and stage 11 HTN [16]. Researcher uses SPSS for data analysis. Quantitative and qualitative variables received a treatment according to their types and p-value < 0.05 showed a significant correlation among different parameters.

RESULTS:

The number of male students was 97(45.5%) and a number of females were 116(54.5%). The number of underweight students was 10 (2 males and 8 females) as shown in Table - I. The students with normal body weight were 107 and included 55 males and 52 females. The number of students in each overweight

category as depicted in Table - I. Table – II showed that females were more obese than males according to the BMI and WHR values. The prevalence of hypertension in normal-weight students, overweight students, obese I and obese II students was 12(30.8%),

6(15.4%), 14(35.9%) and 7(17.9%) respectively (Table – III). The relationship of obesity parameters such as BMI, WC and WHR was significant in relation to HTN. The details of BMI, WC and WHR for the sample as summarized in the tabular data.

Table – I: Comparison of study variables between male and female students

Male (97) / Female (116)	Gender	Mean	SD	P-Value
Height (cm)	Male	173.747	5.7803	0.357
	Female	158.72	5.4591	
Weight (Kg)	Male	69.412	12.5098	0.470
	Female	59.603	11.6722	
Waist Circumference (cm)	Male	86.24	7.062	0.057
	Female	83.62	9.186	
Hip Circumference (cm)	Male	96.43	7.241	0.152
	Female	98.45	8.963	
Body Mass Index (Kg/m ²)	Male	22.9199	3.39985	0.043
	Female	23.6431	4.3738	
Waist to Hip Ratio	Male	0.8942	0.02664	0.000
	Female	0.8489	0.04277	
Systolic Blood Pressure (mmHg)	Male	125.9	13.54	0.648
	Female	113.88	12.906	
Diastolic Blood Pressure (mmHg)	Male	83.45	10.467	0.000
	Female	74.96	8.431	

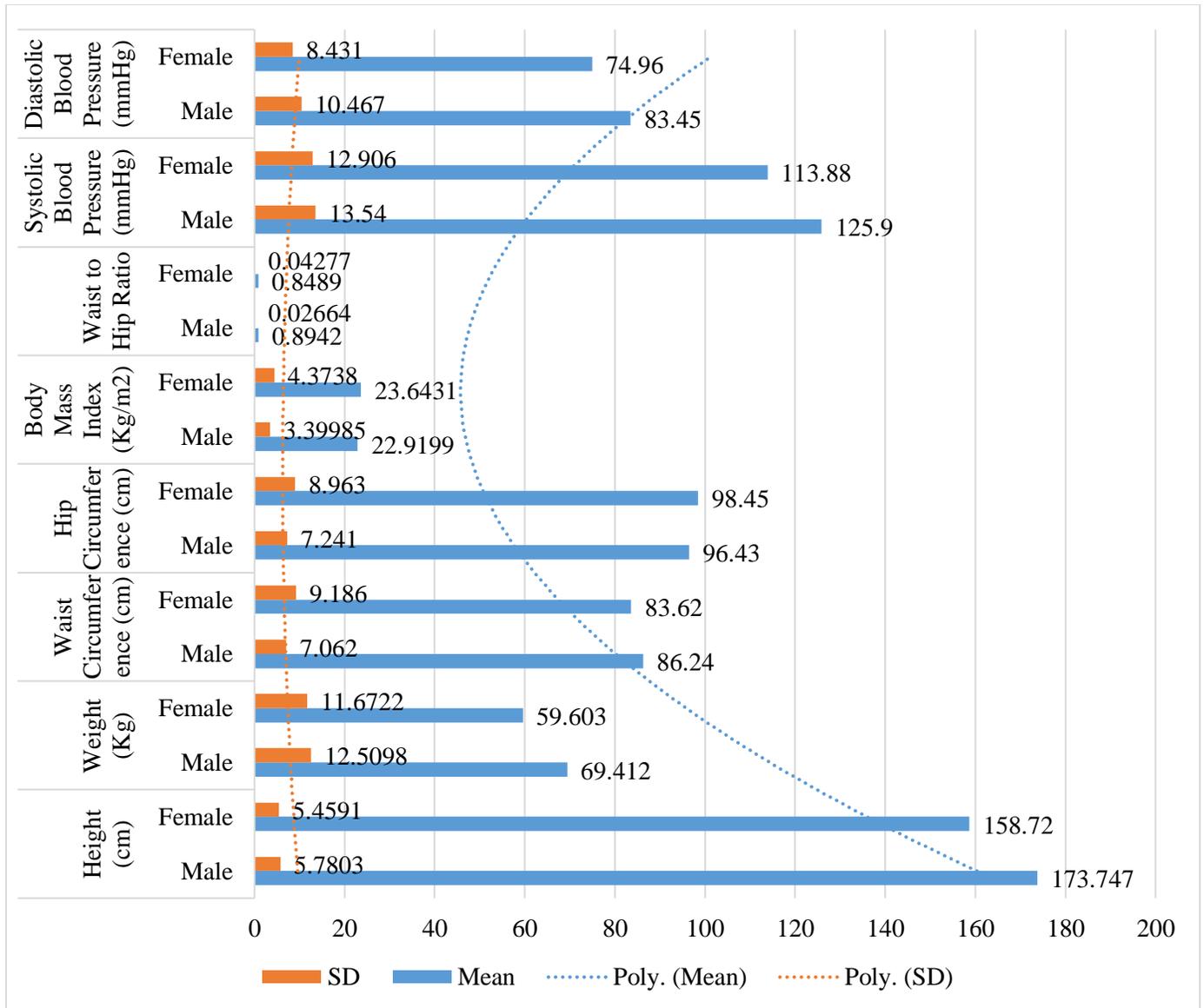


Table – II: Prevalence of general and central obesity in male and female students

Group		Male		Female		Total	
		No	%	No	%	No	%
BMI Group	Underweight	2	2.1	8	6.9	10	4.7
	Normal Weight	55	56.7	52	44.8	107	50.2
	Overweight	17	17.5	22	19	39	18.3
	Obese - I	20	20.6	23	19.8	43	20.2
	Obese - II	3	3.1	11	9.5	14	6.6
WHR Group	Non-Obese	66	68	64	52.2	130	61
	Obese	31	32	52	44.8	83	39

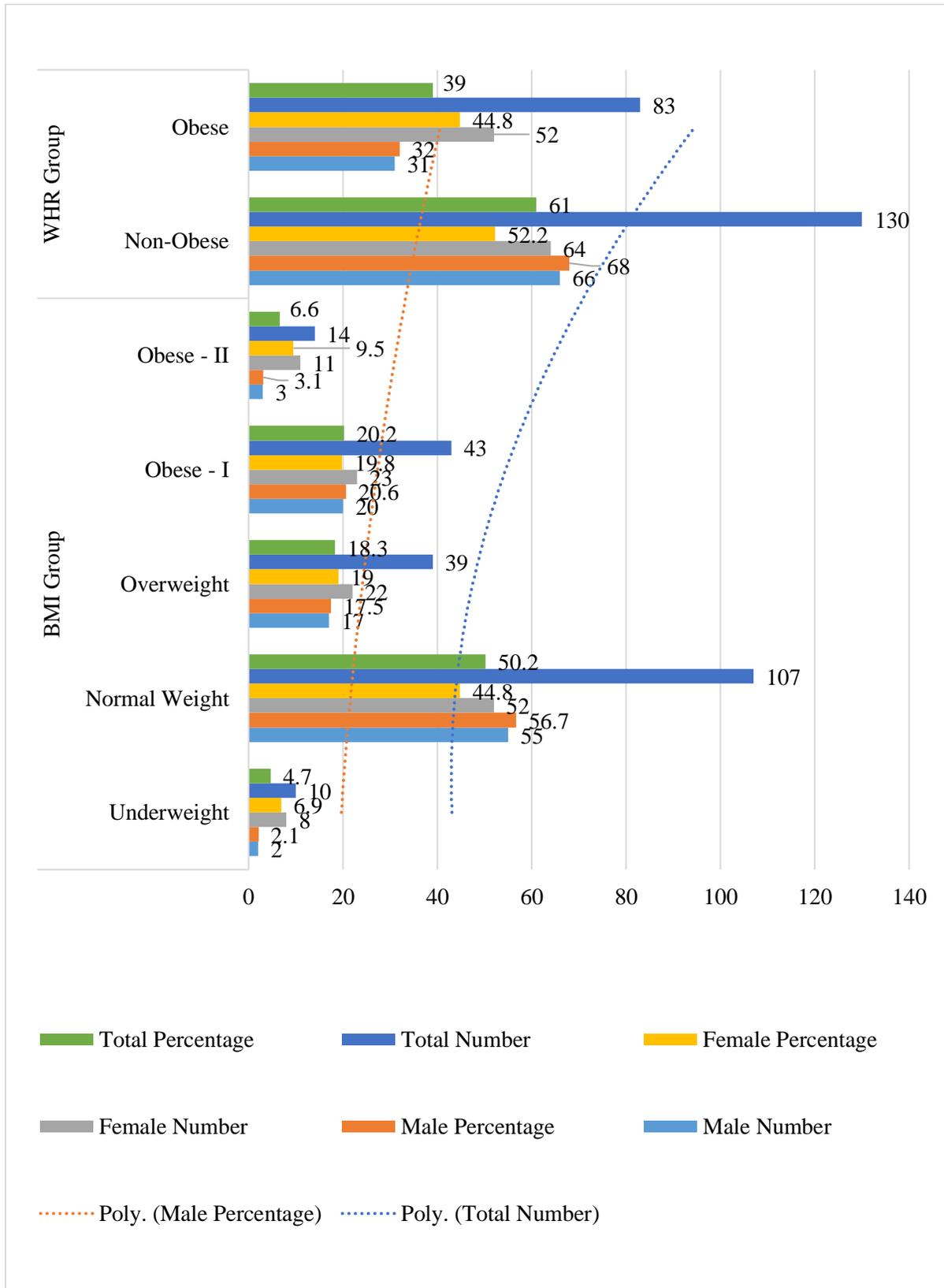
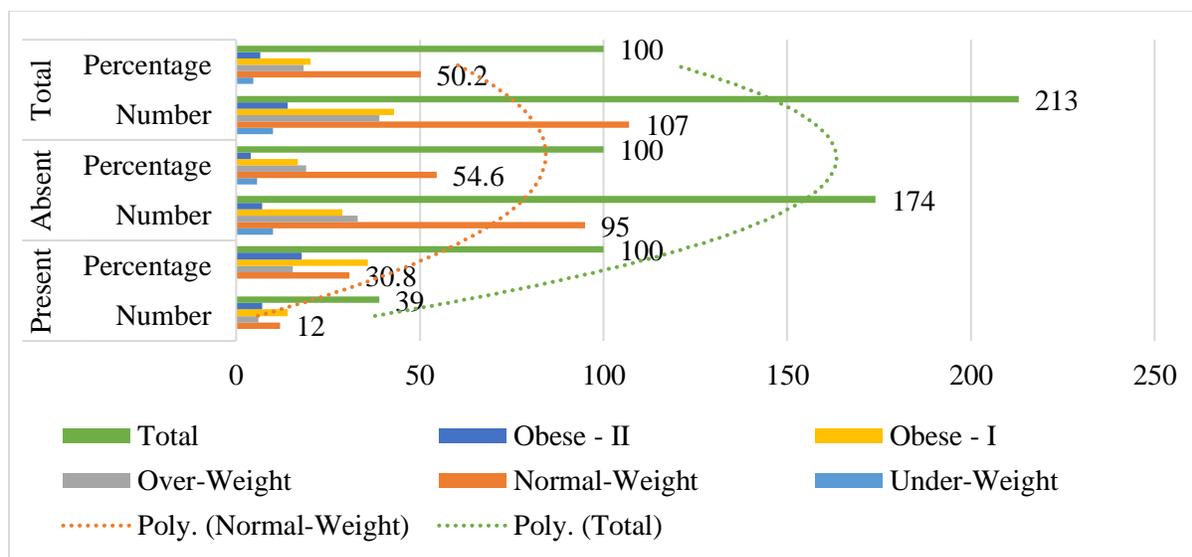


Table – III: Prevalence of hypertension on the basis of obesity by BMI

BMI Group	Present		Absent		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Under-Weight	0	0	10	5.7	10	4.7
Normal-Weight	12	30.8	95	54.6	107	50.2
Over-Weight	6	15.4	33	19	39	18.3
Obese - I	14	35.9	29	16.7	43	20.2
Obese - II	7	17.9	7	4	14	6.6
Total	39	100	174	100	213	100

**Table – IV:** Correlation of BMI, WC and WHR with systolic-diastolic blood pressure

Details		Systolic Blood Pressure (mmHg) (N = 213)	Diastolic Blood Pressure (mmHg) (N = 213)
BMI Group	Pearson Correlation	0.375	0.351
	Sig (Two-Tailed)	0.000	0.000
Waist to Hip Ratio	Pearson Correlation	0.250	0.265
	Sig (Two-Tailed)	0.000	0.000
Waist Circumference (cm)	Pearson Correlation	0.372	0.374
	Sig (Two-Tailed)	0.000	0.000

DISCUSSION:

The prevalence of overweight and obesity is increasing in Pakistan. It is due to the lifestyle modalities, increased screen time, under or over nutrition and rare physical involvement of the people. The medical students are becoming the victims of obesity because they have no spare time for physical effort and they spend more time on their studies to secure their future.

Students of MBBs (1st year) and BDS participated in the study. Different parameters (BMI, WC, WHR) evaluated for a possible relationship of HTN with the corpulence. The students had an assessment in groups i.e. obese and

non-obese with reference to South Asian guidelines [17]. The measured parameters were also important to assess the risk factors for ischemic heart diseases and hypertension.

The results of NHSP (National Health Survey of Pakistan) showed overweight prevalence in 13.5% males and 19.6% females. The results of our study are similar to that of NHSP. However, the results for underweight are conflicting. We found 4.7% underweight medical students whereas the NHSP showed the underweight population as high as 25%. According to the research in hand, mean BMI values for males and females was

22.9kg/ m² 23.6kg/m² whereas according to the NHSP results the values were 20.9kg/m² and 21.7kg/m² for males and females respectively [18]. Another domestic research confirmed the incidences of obesity, overweight and underweight as 2.2%, 14% and 11% respectively. Shams et al in his study on female students [19] delivered the prevalence of underweight, overweight and obese females as 47(15%), 62(20%) and 78(25.4%) respectively. The differences in the numbers of obese categories owe to the lifestyle and eating habits of medical students. Large-scale studies can generalize the outcomes.

The prevalence of central obesity in medical students was very high in our research (39%). Based on WHR, the number of obese males and females were 31 (32%) and 52 (44.8%) respectively. Afzal et al in his study showed a 12.3% prevalence of obesity which is lower than the findings of our research. The study concluded that there is exists a strong association between obesity and HTN. The other studies have also confirmed the relationship between the HTN and CVD risk factors [21].

CONCLUSIONS:

The study delivered that overweight and obesity was prevailing among medical students. The research produced that high blood pressure was closely related to BMI, WC and WHR. Higher BMI students had a tendency of increased hypertension.

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