African Science Frontiers Initiatives Research Journal | ASFIRJ

Received: 25 April 2025 | Revised: 11 August 2025 | Accepted: 03 November 2025 | Published: 13 November 2025

ORIGINAL ARTICLE

Factors associated with psychological distress in mothers and girls in Kenya: A baseline analysis

MONICAH NYAMBURA[1], CATHERINE KAIMENYI[1, 2], DENNIS K. MURIITHI[2], THOMAS GORDON[1], DEBORAH A. GUST[1]

AFFILIATIONS:
[1]PATHWAYS Leadership for Progress 1503 Hartman Dr. Lilburn GA 30047, USA
[2]Chuka University, P.O. Box 109 60400, Chuka, Kenya

CORRESPONDENCE:
Miss Monicah Nyambura
PATHWAYS Leadership for Progress 1503 Hartman Dr. Lilburn GA 30047, USA
Email: mqnyambura@gmail.com

ABSTRACT

BACKGROUND:
Psychological distress may be an indicator of mental health, can lead to reduced life functioning, and is not well studied in African countries.

OBJECTIVE:
The aim of this analysis was to quantify psychological distress using the Kessler-6 (K-6) scale, which is a screener for psychological distress, and identify socio-cultural factors among low-income Kenyan mothers/guardians (mothers) and their daughters (girls).

METHODS:
We analyzed baseline data from mothers and girls participating in a longitudinal study in nine counties in Kenya. The specific problem the longitudinal project sought to address was early onset of sexual activity. Inclusion criteria for mothers included: age between 27-64 years, had daughters in primary school class 8 or secondary school form 1 (9th grade), family income less than 2400KSH/month, and no plans to move in the next 4 years. Inclusion criteria for girls included: age between 13-20 years at the start of study, not married, not pregnant, in primary school class 8 or secondary school form 1 and mother was willing to take part. A chi-square test was used to assess differences.

RESULTS:
There was no significant difference between the mean psychological distress or K-6 score (7.1) of the mothers and the girls (6.7). County and ethnicity were significantly associated with mothers' high and moderate psychological distress; county was significantly associated with girls' moderate psychological distress. Additionally, odds of psychological distress were greater for mothers who ever experienced forced sex (high psychological distress only) and who disagreed that girls are treated with respect by family members. No attitude factors were significantly associated with girls' high or moderate psychological distress, although agreement with, "I can talk to my mother about sex" approached a significant association with moderate psychological distress.

CONCLUSION:
As psychological distress and disorders can negatively impact disease incidence and treatment, a public health focus on prevention through social, educational, and economic interventions is warranted.

KEYWORDS:
Mothers, girls, forced sex, psychological distress, Kessler-6, sex education

INTRODUCTION

Psychological distress is defined as "a set of painful mental and physical symptoms that are associated with normal fluctuations of mood in most people."[1] The stress-vulnerability model, also known as the diathesis stress model, posits that stress can trigger mental health disorders in susceptible individuals. Thus, in some cases, psychological distress can be the start of a mental health disorder, such as major depressive disorder, an anxiety disorder, or some other mental health condition.[2]

Worldwide, approximately 970 million people or one in eight individuals, live with a mental disorder.[3] Importantly, one in seven 10-19-year-olds experiences a mental disorder.[4] The social and economic consequence of untreated mental disorders is large but not always obvious. People with severe mental health conditions die on average 10 to 20 years earlier than the general population, mostly due to preventable physical diseases.[5] Moreover, mental disorders are associated with increased school drop-out[6] and adverse effects on workplace performance.[7]

Psychological distress is currently understudied in African countries. However, several studies have been conducted in various contexts. One study evaluating the Kessler 10 Psychological Distress Scale across four African countries—Ethiopia, Kenya, Uganda, and South Africa—verified its cross-cultural applicability and reliability.[8] Other studies have assessed determinants of psychological distress. Results suggest that both individual and socio-cultural variables impact psychological distress; including female gender, lower education and lower socioeconomic status,[9] lack of social support [10] and stressful life events.[11] For instance, in a study of young Kenyan women, psychological distress was significantly more likely among women who reported a history of forced sex, who were concerned about recent food insecurity, and who self-reported a sexually transmitted infection.[12] Among men and women in Ghana, approximately 20% of men and women reported their psychological distress as moderate or severe. The prevalence varied according to gender, marital status, education, wealth, religion, and self-reported poor health status. In addition, among women in relationships, those who reported having experienced physical abuse, who reported having high levels of partner control, and who were more accepting of existing gender inequality, had greater odds of reporting psychological distress.[13]

It is well documented that mental health issues can affect physical health.[14] The co-occurrence of psychological and physical illness has been found globally in rich, middle-income, and low-income countries, such as Kenya.[15] The prevalence of common mental disorders (e.g, mixed anxiety/depression, panic disorder, generalized anxiety disorder) was 10.8% in a Kenyan household survey, with higher rates of mental disorders among persons who were older and persons with poor physical health.[16] This is especially important in the case of HIV given the high prevalence of HIV in eastern and southern Africa; approximately 20.8 million in 2022.[16] In sub-Saharan Africa, adolescent girls and young women (aged 15-24 years) were more than three times as likely to be infected with HIV than males of the same age in 2022.[17.] It is clear that the consequences of early sexual behavior among girls include not only unplanned pregnancies and termination of education, but serious sexually transmitted diseases like HIV.

Given that psychological distress has not been well studied in high burden HIV sub-Saharan African settings, the present analysis of baseline data was carried out to add to this literature and to help elucidate factors that may impact psychological distress with Kenyan girls. This is especially important in the context of their higher risk for HIV infection. The present paper is based on baseline results from a longitudinal study to assess an innovative intervention to reduce early sexual behavior with Kenyan girls. Briefly, the intervention included offering microloans to mothers to help generate income to assist with girls' school fees as well as mentoring and pregnancy monitoring for girls. The aim of this baseline analysis was to quantify psychological distress and identify socio-cultural factors among low-income Kenyan mothers and their daughters. Specifically, the objectives were to

determine: 1) if differences existed between the average Kessler-6 (K-6) psychological distress scores reported by mothers and girls, 2) if differences existed in the level of psychological distress among participants living in the nine counties and 3) factors associated with the K-6 psychological distress score for mothers and girls separately.

METHODS

Screening and baseline data collection for a longitudinal intervention study to reduce sexual activity among girls were collected over a two-year period, from 2019 to 2020. There was an approximately 7-month delay in initiating data collection in the last county (Homa Bay) due to school closures resulting from the COVID-19 pandemic. Mother/guardian (henceforth referred to as mothers) and daughter (henceforth referred to as girls) pairs who resided in nine counties in Kenya served as participants. The counties were selected based upon the home residence of scholars/alumni in the PATHWAYS Leadership for Progress scholarship program (Trans Nzoia, Kisii, Kisumu, Nairobi, Kilifi, Bomet, Kakamega, Nakuru, and Homa Bay). These scholars/alumni served to introduce the study to community leaders (e.g. women's groups) who then helped mobilize mothers. Convenience sampling was used and recruitment was achieved without incentives.

Mothers who agreed to participate were asked if study staff could make contact with their daughters (girls) in order to obtain assent. Both mothers and girls had to be willing to be interviewed termly, to be able to understand and read English or Swahili, comprehend study procedures, and provide signed informed consent. Also, the girls had to be willing to take a pregnancy test termly. Pregnancy testing was completed in a private location with just one female study staff recording the results. No pregnancies were recorded at baseline. HIV testing was not conducted. All prospective participants over 18 years of age underwent a standard informed consent procedure. The informed consent described the purpose of the study, the procedures to be followed, and the possible benefits and risks of participation. For potential participants younger than 18 years of age and not an emancipated minor, the study details were explained to at least one parent/guardian for parental permission and then to the minor for assent. The study was approved by the Maseno University Ethics Review Committee MUERC/00493/17. Women and girls received transport reimbursement in accordance with local reimbursement practices. A study benefit included coverage in the National Health Insurance Fund (NHIF) for their family for the duration the girls were in the study.

Inclusion criteria

Inclusion criteria for mothers were the following: age between 27-64 years, had daughters in primary school class 8 or secondary school form 1, family income less than 2400KSH/month, and no plans to move in the next 4 years. Inclusion criteria for girls were the following: age between 13-20 at the start of study, not married, not pregnant, in primary school class 8 or secondary school form 1 (9^{th} grade) (at the start of the study), and mother was willing to take part. Any mother or girl not meeting any of the above criteria was excluded from the study. Also, those meeting criteria but not providing consent or assent were excluded. It is of note that since girls do not start schooling at a prescribed age in this population and girls of different ages usually share a class, it was easier to base their inclusion on class enrolment as opposed to age. This ensured that the girls enrolled were sharing classes, peers and friends thus reducing contamination across classes and peer groups. Home verification was carried out to assure that the home structure of the mother and girl matched the reported monthly income as the focus was on lower income mothers and girls. No participants were found to have homes that did not match their reported income.

Procedure

All mothers and girls who were consented/assented completed an in-depth interview questionnaire. Question domains for the mothers included demographic characteristics, sexual history, attitudes about girls, and the K-6 psychological distress scale. For girls, the domains were generally the same with the exception of a question on their recent grades in school and talking to their mother about sex. Prior to the start of the study, study staff

enlisted a small group of mothers and girls to provide feedback on the clarity of the questions and question responses using "think aloud interviewing" and "probing". Changes were made to questions based upon feedback. No changes were needed to make the K-6 questions clearer. The questionnaires were available in two local languages (English and Swahili). Participants were able to select the language of their choice for the questionnaire administration. Study staff were trained prior to data collection on the understanding of the intent of each question.

Measures

The dependent variable was the K-6 psychological distress score. We included the K-6 psychological distress scale in our questionnaire of Kenyan girls and mothers because mental health problems have been shown to be a risk factor for HIV infection [18] and reductions in labor force participation. [19] The K-6 scale [20] is used for the World Health Organization (WHO) World Mental Health Survey initiative. [21] While anxiety and depression symptoms are included in the K-6 scale, it is classified as measuring nonspecific distress as opposed to a clinical diagnosis of a specific mental disorder. [20] The K-6 has been used in sub-Saharan African countries and generally deemed a reliable tool for assessing psychological distress in most settings. [22-26] Questions were asked about how the person has been feeling during the past 30 days and how often they felt that way, that is, During the last 30 days, how often did you feel … nervous, … hopeless, … fidgety, … so depressed that nothing could cheer you up, … that everything was an effort, … worthless? The scale discriminates with precision between community cases and non-cases of Diagnostic and Statistical Manual of Mental Disorders-IV disorders such as anxiety and mood disorders. [20] For our analysis, K-6 psychological distress scale responses ranged from 0 (none of the time) to 4 (all of the time). To calculate the final total score, we summed across these six items for a scale score ranging from 0 to 24. The total scores were grouped into three categories (low/no distress: 0–4; moderate distress: 5–12; high distress: 13–24) based on previously identified thresholds for moderate as well as severe psychological distress. [20-21, 27]

Independent variables for mothers included county, age group, ethnicity, religion, income earned in last 3 months, ever experienced forced sex, and agreement/disagreement with the following statements: "Girls are treated with respect by family members", "Girls are treated with respect by community members", "I can talk to my daughter about sex", and "It is hard for my daughter to stay in school because of school fees". Independent variables for girls included county, age group, ethnicity, religion, current class in school, average grade for last term, and agreement/disagreement with the following statements: "It is fine for girls to ask for money in exchange for sex if she selects the boy", "Education is wasted on girls", "Girls are treated with respect by family members", "Girls are treated with respect by community members", "I can talk to my mother/guardian about sex", and "I want to graduate from university".

Analyses

Data for this analysis were confined to the baseline data. The analysis used descriptive and inferential statistics techniques. Evidence of multicollinearity among the predictors was tested based on the adjusted Generalized Variance Inflation Factors. Values were all well below thresholds of concern. Categorical variables were summarized using frequency counts and percentages. A Pearson's chi-square test was used to assess any differences in measures across counties as well as to assess associations between the independent and dependent variables. Multinomial logistic regression was attempted to determine factors independently associated with mothers' and girls' psychological distress. Selection of predictor variables into a multivariable model and subsequent backward elimination was directed by the chi-square test using 0.25 level of significance as a cutoff. When the response for a categorical variable was less than 5, the variable was not included in the model (e.g. Disagree with the statement, "I want to graduate from university"). Variables that had few responses to one option were removed from the univariable and multivariable model due to abnormal results. Due to several variables in this category (few responses) for both the mothers' and girls' data, a multivariable model could not be determined. Therefore, only

univariable results (odds ratios which indicate the strength and direction of the association) based upon the chi-square test results are presented. Data analysis was done using R statistical software version 4.2.0.

RESULTS

Three hundred and thirteen mothers and 325 girls in nine counties in Kenya were enrolled after undergoing study screening. The number is not the same because some mothers had multiple girls who were enrolled. Most mothers identified as being Protestant (63%) and as earning between 2001-5000 KSh (37%) and 5001-10,000 KSh (36%) in last 3 months. Most girls enrolled were between 14 and 16 years of age (69%) and in either primary class 8 (30%) or secondary form 1 (70%) with a reported average grade of C (64%) in the last term. Other descriptive information can be found in Tables 1 and 2.

Table 1. Sociodemographic, sexual risk, and psychological distress characteristics of mothers (mothers/guardians) living in nine counties in Kenya, 2019-2020

Characteristic	Bomet N = 35	Homabay N = 39	Kakamega N = 35	Kilifi N = 34	Kisii N = 35	Kisumu N = 34	Nairobi N = 35	Nakuru N = 32	Trans Nzoia N = 25	Total N=304	p-value
Age Group (years)											
26-35	8 (23%)	16 (41%)	10 (29%)	6 (18%)	16 (46%)	12 (35%)	13 (37%)	9 (28%)	6 (24%)	96(32%)	<0.05*
36-45	9 (26%)	11 (28%)	14 (40%)	20 (59%)	14 (40%)	12 (35%)	17 (49%)	11 (34%)	14 (56%)	122(40%)	
46-55	12 (34%)	5 (13%)	5 (14%)	6 (18%)	2 (5.7%)	5 (15%)	5 (14%)	10 (31%)	3 (12%)	53(17%)	
56 and above	6 (17%)	7 (18%)	6 (17%)	2 (5.9%)	3 (8.6%)	5 (15%)	0 (0%)	2 (6.3%)	2 (8.0%)	33(11%)	
Ethnic group/tribe											
Kikuyu	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (2.9%)	20 (63%)	1 (4.0%)	22(7%)	<0.05*
Kisii	0 (0%)	0 (0%)	1 (2.9%)	0 (0%)	35 (100%)	0 (0%)	4 (11%)	2 (6.3%)	1 (4.0%)	43(14%)	
Luo	0 (0%)	39 (100%)	4 (11%)	0 (0%)	0 (0%)	33 (97%)	19 (54%)	0 (0%)	15 (60%)	110 (36%)	
Luhya	0 (0%)	0 (0%)	30 (86%)	0 (0%)	0 (0%)	1 (2.9%)	6 (17%)	2 (6.3%)	7 (28%)	46 (15%)	
Kalenjin	35 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	7 (22%)	0 (0%)	42 (14%)	
Mijikenda	0 (0%)	0 (0%)	0 (0%)	32 (94%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	32 (11%)	
Others	0 (0%)	0 (0%)	0 (0%)	2 (5.9%)	0 (0%)	0 (0%)	5 (14%)	1 (3.1%)	1 (4.0%)	9 (3%)	

Religion											
Roman Catholic	11 (31%)	5 (13%)	9 (26%)	1 (2.9%)	6 (17%)	13 (38%)	8 (23%)	4 (13%)	8 (32%)	65 (21%)	<0.05*
Protestant	24 (69%)	33 (85%)	23 (66%)	18 (53%)	12 (34%)	20 (59%)	19 (54%)	28 (88%)	15 (60%)	192 (63%)	
Muslim	0 (0%)	0 (0%)	2 (5.7%)	14 (41%)	0 (0%)	0 (0%)	4 (11%)	0 (0%)	0 (0%)	20 (7%)	
Others (SDA & TA)#	0 (0%)	1 (2.6%)	1 (2.9%)	1 (2.9%)	17 (49%)	1 (2.9%)	4 (11%)	0 (0%)	2 (8.0%)	27 (9%)	
Income in the last 3 months (^Ksh)											
<= 2,000	6 (17%)	5 (13%)	15 (43%)	20 (59%)	15 (43%)	7 (21%)	1 (2.9%)	3 (9.4%)	0 (0%)	72 (24%)	<0.05*
2,001-5,000	18 (51%)	16 (41%)	14 (40%)	10 (29%)	11 (31%)	8 (24%)	16 (46%)	10 (31%)	10 (40%)	113 (37%)	
5,001-10,000	10 (29%)	18 (46%)	6 (17%)	3 (8.8%)	7 (20%)	18 (53%)	15 (43%)	19 (59%)	14 (56%)	110 (36%)	
>=10,001	1 (2.9%)	0 (0%)	0 (0%)	1 (2.9%)	2 (5.7%)	1 (2.9%)	3 (8.6%)	0 (0%)	1 (4.0%)	9 (3%)	
Highest education level											
No Education	23 (66%)	14 (36%)	23 (66%)	18 (53%)	5 (14%)	18 (53%)	13 (37%)	9 (28%)	10 (40%)	133 (44%)	<0.05*
Primary Complete	10 (29%)	24 (62%)	7 (20%)	14 (41%)	19 (54%)	14 (41%)	16 (46%)	19 (59%)	12 (48%)	135 (44%)	
Secondary Complete	2 (5.7%)	1 (2.6%)	5 (14%)	2 (5.9%)	11 (31%)	2 (5.9%)	6 (17%)	4 (13%)	3 (12%)	34 (12%)	
Ever experienced forced sex											
Yes	0 (0%)	1 (2.6%)	1 (2.9%)	1 (2.9%)	1 (2.9%)	2 (5.9%)	2 (5.7%)	3 (9.4%)	2 (8.0%)	13 (4%)	>0.05
No	35 (100%)	38 (97.4%)	34 (97.1%)	33 (97.1%)	34 (97.1%)	32 (94.1%)	33 (96.3%)	29 (90.6%)	23 (92%)	291 (96%)	
Girls are treated with respect by community members											
Agree	34 (97%)	39 (100%)	33 (94%)	29 (85%)	35 (100%)	33 (97%)	33 (94%)	31 (97%)	24 (96%)	266 (88%)	
Disagree	1 (2.9%)	0 (0%)	2 (5.7%)	5 (15%)	0 (0%)	1 (2.9%)	2 (5.7%)	1 (3.1%)	1 (4.0%)	38 (12%)	
I can talk to my daughter about sex											
Agree	33 (94%)	37 (95%)	33 (94%)	30 (88%)	32 (91%)	34 (100%)	34 (97%)	27 (84%)	25 (100%)	291(96%)	>0.05
Disagree	2 (5.7%)	2 (5.1%)	2 (5.7%)	4 (12%)	3 (8.6%)	0 (0%)	1 (2.9%)	5 (16%)	0 (0%)	13 (4%)	

It is hard for my daughter to stay in school because of lack of school fees											
Agree	32 (91%)	25 (64%)	17 (49%)	16 (47%)	13 (37%)	29 (85%)	25 (71%)	19 (59%)	17 (68%)	285 (94%)	<0.05*
Disagree	3 (8.6%)	14 (36%)	18 (51%)	18 (53%)	22 (63%)	5 (15%)	10 (29%)	13 (41%)	8 (32%)	19(6%)	
Education is wasted on girls											
Agree	0 (0%)	1 (2.6%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (9.4%)	0 (0%)	193 (63%)	<0.05*
Disagree	35 (100%)	38 (97%)	35 (100%)	34 (100%)	35 (100%)	34 (100%)	35 (100%)	29 (91%)	25 (100%)	111 (37%)	
Psychological distress K-6 score											
High	2 (5.7%)	0 (0%)	0 (0%)	5 (15%)	2 (5.7%)	0 (0%)	6 (17%)	8 (25%)	0 (0%)	95 (31%)	<0.05*
Low	9 (26%)	3 (7.7%)	18 (51%)	6 (18%)	20 (57%)	14 (41%)	8 (23%)	7 (22%)	10 (40%)	23 (8%)	
Moderate	24 (69%)	36 (92%)	17 (49%)	23 (68%)	13 (37%)	20 (59%)	21 (60%)	17 (53%)	15 (60%)	186 (61%)	

Note: A Pearson's chi-square test was used to assess the association between two categorical variables (community with each of the 10 characteristics).
The sum does add to 313 due to missing values. The percentage in each cell was computed using the total number of non-missing records as the denominator.
To calculate the final total psychological distress Kessler-6 (K-6) score, we summed across the six items for a scale score ranging from 0 to 24. The total scores were grouped into three categories (low/no distress: 0–4; moderate distress: 5–12; high distress: 13–24) based on previously identified thresholds for moderate as well as severe psychological distress.
SDA=Seventh Day Adventist; TA=Traditional African religions; ^KSh=Kenya shillings; * significant p-value

Table 2. Sociodemographic, sexual risk, and psychological distress characteristics of girls (daughters) living in nine counties in Kenya, 2019-2020

Characteristic	Bomet N = 33	Homabay N = 27	Kakamega N = 24	Kilifi N = 37	Kisii N = 32	Kisumu N = 33	Nairobi N = 34	Nakuru N = 32	Trans Nzoia N = 27	Total N=279	p-value
Age Group (years)											
11-13	6 (18%)	2 (7.4%)	1 (4.2%)	1 (2.7%)	11 (34%)	5 (15%)	8 (24%)	8 (25%)	2 (7.4%)	44(16%)	<0.05*
14-16	24 (73%)	21 (78%)	15 (63%)	26 (70%)	21 (66%)	22 (67%)	25 (74%)	20 (63%)	19 (70%)	193(69%)	
17-20	3 (9.1%)	4 (15%)	8 (33%)	10 (27%)	0 (0%)	6 (18%)	1 (2.9%)	4 (13%)	6 (22%)	42(15%)	
Ethnic group/tribe											
Kikuyu	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	21 (66%)	2 (7.4%)	23(8%)	<0.05*
Kisii	0 (0%)	0 (0%)	0 (0%)	0 (0%)	31 (97%)	1 (3.0%)	4 (12%)	1 (3.1%)	1 (3.7%)	38(14%)	
Luo	0 (0%)	27 (100%)	1 (4.2%)	0 (0%)	0 (0%)	31 (94%)	21 (62%)	0 (0%)	15 (56%)	95(34%)	
Luhya	0 (0%)	0 (0%)	23 (96%)	0 (0%)	0 (0%)	1 (3.0%)	4 (12%)	1 (3.1%)	8 (30%)	37(13%)	
Kalenjin	33 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	9 (28%)	0 (0%)	42(15%)	
Mijikenda	0 (0%)	0 (0%)	0 (0%)	37 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	37(13%)	
Others	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (3.1%)	0 (0%)	5 (15%)	0 (0%)	1 (3.7%)	7(3%)	
Religion											
Roman Catholic	10 (30%)	3 (11%)	3 (13%)	1 (2.7%)	1 (3.1%)	11 (33%)	6 (18%)	4 (13%)	8 (30%)	47(17%)	<0.05*
Protestant	23 (70%)	24 (89%)	20 (83%)	20 (54%)	31 (97%)	22 (67%)	20 (59%)	28 (88%)	17 (63%)	205(73%)	
Muslim	0 (0%)	0 (0%)	1 (4.2%)	16 (43%)	0 (0%)	0 (0%)	3 (8.8%)	0 (0%)	0 (0%)	20(7%)	
Others (SDA & TA)[#]	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5 (15%)	0 (0%)	2 (7.4%)	7(3%)	
Current class in school											
Primary class 8	7 (21%)	9 (33%)	9 (38%)	5 (14%)	15 (47%)	26 (79%)	3 (8.8%)	3 (9.4%)	8 (30%)	85(30%)	<0.05*
Secondary Form 1	26 (79%)	18 (67%)	15 (63%)	32 (86%)	17 (53%)	7 (21%)	31 (91%)	29 (91%)	19 (70%)	194(70%)	
Average grade for the last term of school											
A	0 (0%)	1 (3.7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1(0.4%)	<0.05*
B	1 (3.0%)	7 (26%)	3 (13%)	10 (27%)	9 (28%)	5 (15%)	9 (26%)	2 (6.3%)	3 (11%)	49(18%)	
C	28 (85%)	12 (44%)	13 (54%)	20 (54%)	21 (66%)	26 (79%)	21 (62%)	22 (69%)	15 (56%)	178(64%)	
D	4 (12%)	7 (26%)	8 (33%)	7 (19%)	2 (6.3%)	2 (6.1%)	4 (12%)	8 (25%)	7 (26%)	49(18%)	
E	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (7.4%)	2(0.7%)	
It is fine for girls to ask for money in exchange for sex if she selects the boy											
Agree	2 (6.1%)	1 (3.7%)	0 (0%)	1 (2.7%)	3 (9.4%)	0 (0%)	0 (0%)	1 (3.1%)	1 (3.7%)	9(3%)	>0.05
Disagree	31 (94%)	26 (96%)	24 (100%)	36 (97%)	29 (91%)	33 (100%)	34 (100%)	31 (97%)	26 (96%)	270(97%)	

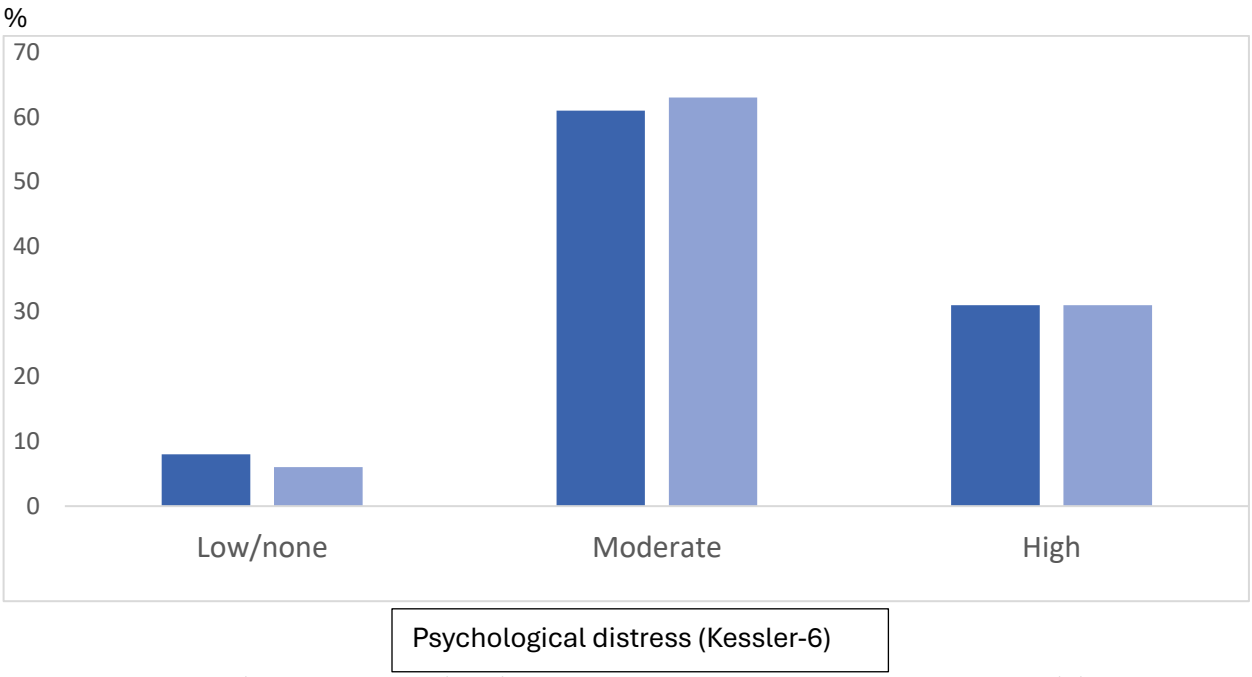
Education is wasted on girls^											
Agree	0 (0%)	0 (0%)	1 (4.2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1(0.4%)	>0.05
Disagree	33 (100%)	27 (100%)	23 (96%)	37 (100%)	32 (100%)	33 (100%)	34 (100%)	32 (100%)	27 (100%)	278(99%)	
Girls are treated with respect by family members											
Agree	33 (100%)	27 (100%)	22 (92%)	13 (35%)	32 (100%)	30 (91%)	34 (100%)	32 (100%)	25 (93%)	248(89%)	<0.05*
Disagree	0 (0%)	0 (0%)	2 (8.3%)	24 (65%)	0 (0%)	3 (9.1%)	0 (0%)	0 (0%)	2 (7.4%)	31(11%)	
Girls are treated with respect by community members											
Agree	30 (91%)	25 (93%)	21 (88%)	32 (86%)	31 (97%)	31 (94%)	32 (94%)	30 (94%)	22 (81%)	254(91%)	>0.05
Disagree	3 (9.1%)	2 (7.4%)	3 (13%)	5 (14%)	1 (3.1%)	2 (6.1%)	2 (5.9%)	2 (6.3%)	5 (19%)	25(9%)	
I can talk to my mother/guardian about sex											
Agree	26 (79%)	19 (70%)	16 (67%)	13 (35%)	21 (66%)	26 (79%)	21 (62%)	20 (63%)	9 (33%)	171(61%)	<0.05*
Disagree	7 (21%)	8 (30%)	8 (33%)	24 (65%)	11 (34%)	7 (21%)	13 (38%)	12 (38%)	18 (67%)	108(39%)	
I want to graduate from university^											
Agree	33 (100%)	26 (96%)	24 (100%)	37 (100%)	31 (97%)	33 (100%)	34 (100%)	32 (100%)	27 (100%)	277(99%)	>0.05
Disagree	0 (0%)	1 (3.7%)	0 (0%)	0 (0%)	1 (3.1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2(1%)	
Psychological distress K-6 score											
High	1 (3.0%)	1 (3.7%)	1 (4.2%)	2 (5.4%)	4 (13%)	0 (0%)	3 (8.8%)	1 (3.1%)	3 (11%)	86(31%)	<0.05*
Low	5 (15%)	4 (15%)	9 (38%)	22 (59%)	14 (44%)	12 (36%)	3 (8.8%)	10 (31%)	7 (26%)	16(6%)	
Moderate	27 (82%)	22 (81%)	14 (58%)	13 (35%)	14 (44%)	21 (64%)	28 (82%)	21 (66%)	17 (63%)	177(63%)	

Note: A Pearson's chi-square test was used to assess the association between two categorical variables (community with each of the 12 characteristics).
The sum does not add to 325 due to missing values. The percentage in each cell was computed using the total number of non-missing records as the denominator.
To calculate the final total psychological distress Kessler score, we summed across the six items for a scale score ranging from 0 to 24. The total scores were grouped into three categories (low/no distress: 0–4; moderate distress: 5–12; high distress: 13–24) based on previously identified thresholds for moderate as well as severe psychological distress.

^ Variable was excluded from analysis due to insufficient numbers in one category. # SDA=Seventh Day Adventist; TA=Traditional African religions. * significant (p-value)

Differences between the average K-6 psychological distress scores reported by mothers and girls

Most mothers (61%) scored in the moderate range (5-12) of the K-6 psychological distress scale with 31% scoring in the high range (13-24) and 8% in the low range (0-4). The pattern was similar for girls with 63% scoring in the moderate range (5-12), 31% in the high range (13-24) and 6% in the low range (0-4) (Fig. 1). There was no significant relationship between mother's and daughter's K-6 psychological distress scores (r=0.05; p>0.05) and no significant difference between the mean K-6 score (7.1) of the mothers and the mean K-6 score of the girls (6.7) (T= -1.29; p>0.05).



Note: To calculate the final total psychological distress Kessler-6 (K-6) score, we summed across the six items for a scale score ranging from 0 to 24. The total scores were grouped into three categories (low/no distress: 0–4; moderate distress: 5–12; high distress: 13–24) based on previously identified thresholds for moderate as well as severe psychological distress.

Figure 1. Distribution of psychological distress (Kessler-6) scores of mothers (mothers/guardians) (dark) and daughters (girls) (lighter) living in nine counties in Kenya, 2019-2020.

Differences in psychological distress levels among nine counties

Mothers. There was a significant difference in the level of psychological distress among mothers living in nine counties (Table 1). Nakuru (25%) had the highest percent reporting high psychological distress, while Kisii (57%) and Kakamega (51%) had the highest percent reporting low psychological distress (Table 1).

Girls. There was a significant difference in the level of psychological distress among girls living in nine counties (Table 2). Kisii had the highest percent (13%) reporting high psychological distress, while Kilifi had the highest percent (59%) reporting low psychological distress (Table 2).

Factors associated with the K-6 psychological distress score for mothers and girls separately

Univariable analysis

Mothers. In terms of county, the odds of high psychological distress were less for mothers living in Homabay and Kakamega compared to Bomet; the odds of moderate psychological distress were less in Kakamega and Kisii compared to Bomet and the odds of moderate psychological distress were greater in

Homa Bay compared to Bomet. In terms of ethnicity, the odds of high psychological distress were less for mothers with Kisii, Luo and Luhya ethnicity compared to Kikuyu ethnicity and the odds of moderate psychological distress were less for mothers with Kisii and Luhya ethnicity compared to Kikuyu ethnicity. The odds of high psychological distress were greater for mothers who ever experienced forced sex and who disagreed that girls are treated with respect by family members (Table 3).

Table 3. Univariate analysis of psychological distress Kessler-6 score by demographic and other characteristics among mothers (mothers/guardians) living in nine counties in Kenya, 2019-2020.

Outcome	Characteristic	OR	95% CI	p-value
High	**County**			
	Bomet	Ref.	—	
	Homabay	0.00	0.00, 0.00	<0.001*
	Kakamega	0.00	0.00, 0.00	<0.001*
	Kilifi	3.75	0.54, 26.1	0.2
	Kisii	0.45	0.05, 3.72	0.5
	Kisumu	0.00	0.00, Inf	>0.9
	Nairobi	3.38	0.52, 21.7	0.2
	Nakuru	5.15	0.82, 32.3	0.081
	Trans Nzoia	0.00	0.00, Inf	>0.9
Moderate	**County**			
	Bomet	Ref	—	
	Homabay	4.50	1.10, 18.3	0.036*
	Kakamega	0.35	0.13, 0.98	0.045*
	Kilifi	1.44	0.44, 4.68	0.5
	Kisii	0.24	0.09, 0.69	0.008*
	Kisumu	0.54	0.19, 1.50	0.2
	Nairobi	0.98	0.32, 3.01	>0.9
	Nakuru	0.91	0.28, 2.93	0.9
	Trans Nzoia	0.56	0.19, 1.70	0.3
High	**Age group (years)**			
	26-35	Ref	—	
	36-45	0.68	0.24, 1.93	0.5
	46-55	0.52	0.12, 2.18	0.4
	56 and above	0.78	0.14, 4.35	0.8
Moderate	**Age group (years)**			
	26-35	Ref	—	
	36-45	0.83	0.46, 1.51	0.5
	46-55	0.84	0.41, 1.75	0.6
	56 and above	1.36	0.54, 3.43	0.5
High	**Ethnicity**			
	Kikuyu	Ref	—	
	Kisii	0.03	0.00, 0.31	0.003*
	Luo	0.04	0.00, 0.27	0.001*
	Luhya	0.02	0.00, 0.30	0.004*
	Kalenjin	0.15	0.02, 1.07	0.059

	Others	0.80	0.08, 8.47	0.9
Moderate	**Ethnicity**			
	Kikuyu	Ref	—	
	Kisii	0.10	0.02, 0.52	0.006*
	Luo	0.30	0.06, 1.38	0.12
	Luhya	0.20	0.04, 0.98	0.047*
	Kalenjin	0.33	0.06, 1.68	0.2
	Mijikenda	0.49	0.09, 2.76	0.4
	Others	0.20	0.02, 2.03	0.2
High	**Religion**			
	Roman Catholic	Ref	—	
	Protestant	3.47	0.74, 16.2	0.11
	Muslim	3.67	0.42, 31.7	0.2
	Others (#SDA & TA)	1.10	0.09, 13.6	>0.9
Moderate	**Religion**			
	Roman Catholic	Ref	—	
	Protestant	1.10	0.60, 2.02	0.8
	Muslim	1.07	0.35, 3.25	>0.9
	Others (# SDA & TA)	0.86	0.33, 2.21	0.8
High	**Income earned in last 3 months (KSh)**			
	<= 2,000	Ref	—	
	2,001-5,000	0.82	0.23, 2.88	0.8
	5,001-10,000	0.81	0.24, 2.76	0.7
	>=10,001	1.80	0.13, 24.2	0.7
Moderate	**Income earned in last 3 months (KSh)**			
	<= 2,000	Ref	—	
	2,001-5,000	0.73	0.37, 1.44	0.4
	5,001-10,000	0.56	0.29, 1.10	0.091
	>=10,001	1.10	0.20, 5.97	>0.9
High	**Education Level**			
	No Education	Ref	—	
	Primary Complete	2.50	0.88, 7.07	0.084
	Secondary Complete	1.27	0.23, 7.20	0.8
Moderate	**Education Level**			
	No Education	Ref	—	
	Primary Complete	0.92	0.54, 1.55	0.7
	Secondary Complete	1.03	0.46, 2.32	>0.9
High	**Ever experienced Forced sex**			
	No	Ref	—	
	Yes	19.8	2.09, 187	0.009*
Moderate	**Ever experienced Forced sex**			
	No	Ref	—	

	Yes	4.22	0.52, 34.2	0.2
High	**Girls are treated with respect by family members**			
	Agree	Ref	—	
	Disagree	10.8	2.47, 47.5	0.002*
Moderate	**Girls are treated with respect by family members**			
	Agree	Ref	—	
	Disagree	5.66	1.68, 19.1	0.005*
High	**Girls are treated with respect by community members**			
	Agree	Ref	—	
	Disagree	2.92	0.46, 18.6	0.3
Moderate	**Girls are treated with respect by community members**			
	Agree	Ref	—	
	Disagree	1.38	0.36, 5.32	0.6
High	**I can talk to my daughter about sex**			
	Agree	Ref	—	
	Disagree	2.92	0.46, 18.6	0.3
Moderate	**I can talk to my daughter about sex**			
	Agree	Ref	—	
	Disagree	2.50	0.70, 8.91	0.2
High	**It is hard for my daughter to stay in school because of lack of school fees**			
	Agree	Ref	—	
	Disagree	0.75	0.29, 1.89	0.5
Moderate	**It is hard for my daughter to stay in school because of lack of school fees**			
	Agree	Ref	—	
	Disagree	0.53	0.32, 0.87	0.013

Note: To calculate the final total psychological distress Kessler score, we summed across the six items for a scale score ranging from 0 to 24. The total scores were grouped into three categories (low/no distress: 0–4; moderate distress: 5–12; high distress: 13–24) based on previously identified thresholds for moderate as well as severe psychological distress.
Low psychological distress was the referent. # SDA=Seventh Day Adventist; TA=Traditional African religions. OR=odds ratio; CI=confidence interval *significant p-value

Girls. Four variables were not included in the univariate analysis due to low numbers for one of the options (Table 4). The odds of moderate psychological distress were less for girls living in Kilifi and Kisii compared to Bomet. One attitude variable, "I can talk to my mother/guardian about sex", approached significance in its association with moderate psychological distress (p=0.06).

Table 4. Univariate analysis of psychological distress by demographic and other characteristics among girls (daughters) living in nine counties in Kenya, 2019-2020.

Outcome	Characteristic	OR	95% CI	p-value
High	**County**			
	Bomet	Ref	—	
	Homabay	1.25	0.06, 26.9	0.9
	Kakamega	0.56	0.03, 10.9	0.7
	Kilifi	0.45	0.03, 6.06	0.6
	Kisii	1.43	0.13, 16.0	0.8
	Kisumu	0.00	0.00, Inf	>0.9
	Nairobi	5.00	0.34, 72.8	0.2
	Nakuru	0.50	0.03, 9.77	0.6
	Trans Nzoia	2.14	0.17, 27.1	0.6
Moderate	**County**			
	Bomet	Ref	—	
	Homabay	1.02	0.24, 4.26	>0.9
	Kakamega	0.29	0.08, 1.03	0.055
	Kilifi	0.11	0.03, 0.35	<0.001*
	Kisii	0.19	0.06, 0.62	0.006*
	Kisumu	0.32	0.10, 1.06	0.063
	Nairobi	1.73	0.38, 7.95	0.5
	Nakuru	0.39	0.12, 1.31	0.13
	Trans Nzoia	0.45	0.12, 1.65	0.2
High	**Age group (years)**			
	11-13	Ref	—	
	14-16	1.05	0.21, 5.36	>0.9
	17-20	0.36	0.03, 4.50	0.4
Moderate	**Age group (years)**			
	11-13	Ref	—	
	14-16	0.59	0.27, 1.29	0.2
	17-20	0.60	0.23, 1.57	0.3
High	**Girls are treated with respect by community members**			
	Agree	Ref	—	
	Disagree	1.90	0.35, 10.4	0.5

Moderate	**Girls are treated with respect by community members**			
	Agree	Ref	—	
	Disagree	1.42	0.54, 3.73	0.5
High	**I can talk to my mother/guardian about sex**			
	Agree	Ref	—	
	Disagree	0.89	0.31, 2.62	0.8
Moderate	**I can talk to my mother/guardian about sex**			
	Agree	Ref	—	
	Disagree	0.60	0.36, 1.02	0.060$^{\Delta}$

Note: To calculate the final total psychological distress Kessler score, we summed across the six items for a scale score ranging from 0 to 24. The total scores were grouped into three categories (low/no distress: 0–4; moderate distress: 5–12; high distress: 13–24) based on previously identified thresholds for moderate as well as severe psychological distress.
Four variables were not included in the univariate analysis due to low numbers for one of the options.
Low psychological distress was the referent. OR=odds ratio; CI=confidence interval;
* significant p-value; Δ p-value approached significance

DISCUSSION

The World Health Organization states that "Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. It has intrinsic and instrumental value and is integral to our well-being".[28] We measured non-specific psychological distress in mothers and girls in nine counties in Kenya. Among mothers, nearly two-thirds had moderate and a third had high psychological distress as measured by the K-6 scale. The pattern was similar for girls, and there was no overall significant relationship between mother's and girls' K-6 psychological distress scores nor was there a difference in their average K-6 score. Unfortunately, there are not directly comparable studies. However, in a study of young women in Kenya (18-34 years of age), a slightly lesser percent (58%) had moderate and high (21%) psychological distress as measured by the K-6 scale.[12]

For mothers in our study, their disagreement with the statement that girls are treated with respect by family members was associated with both moderate and high psychological distress. As sons have historically been favored in Kenyan rural areas, [29] it may be that the tension caused by the difference in treatment towards sons and daughters contributes to psychological distress in the mother. Ever experiencing forced sex was also a factor associated with high psychological distress in mothers. Cultural roles and power inequity can impact on relationships making girls and young women more vulnerable to forced sex. [30] This kind of assault and the aftermath of trauma can have prolonged detrimental consequences carrying increased risk for poor mental health, substance use, and HIV risk behaviors. [31] In a study of women in a contraceptive study in Kisumu, forced sex was experienced by more than a third (34.6%) of the women and was significantly associated with moderate psychological distress.[12] Relatedly, lack of control over one's own sexuality has been associated with psychological distress.[32]

For girls, our study results showed that no attitude variables were significantly associated with high or moderate psychological distress. However, one variable is of note, "I can talk to my mother/guardian about sex". Although not statistically significant, there is a suggestive trend, thus it deserves mention. Not having a supportive adult to go to with questions about sex could cause distress in young adolescent girls. A focus group discussion analysis from Nairobi, Kenya found that adolescent girls generally believed their mothers were the best source of information

and support. In reality, however, most did not report good experiences in this regard due to communication challenges which included taboos, embarrassment, and parental lack of knowledge. [33] In a recent review, adolescents mostly found sexuality discussions with parents uncomfortable, preferring to consult with other family members. Parents acknowledged their lack of ability to engage with adolescents due to influences of cultural norms and religious beliefs.[34] One positive education intervention for parents is The Families Matter! Program (FMP). It is a 5-session, evidence-based behavioral intervention designed specifically for parents and other primary caregivers of children aged 9 to 12 years to help empower parents to communicate effectively with their children about sexuality and sexual risk reduction. [35]

There was a significant difference in the level of psychological distress among mothers and girls living in the nine counties. Nakuru and Kisii had the highest percent of mothers and girls respectively, reporting high psychological distress. While we did not collect important variables to be able to identify the reasons, one possibility for further investigation is that Nakuru has been highlighted as an area with high alcoholism among youth and men.[36] This may have impacted boys or men in the family causing additional distress to mothers. As for the girls, Kisii has been struggling with a contagion of child sexual abuse by relatives [37] as well as persistence of female genital mutilation. [38] As noted, further research into these risks for mental distress as well as others e.g. poverty, parental negligence and harmful traditional cultural practices, are needed as well as potential interventions. [39]

Our study had several limitations. First, convenience sampling was used, thus women and girls in our study may not be representative of women and girls in their respective counties. Second, some mothers who did not meet the family income requirement of earning less than 2400Ksh/month were enrolled. Third, important variables were not included such as alcohol/drug use, presence of a father in the household, sibling relationships, sexual abuse, and cultural practices. Fourth, logistic regression could not be completed due to the low number of responses to either the agree or disagree option for several attitude variables and thus limited statistical power and this likely impacted the robustness of the study results. Fifth, some results showed large confidence intervals indicating high variability in responses. Sixth, due to an approximately 7-month school closure due to the COVID-19 pandemic, the last county to join the study was delayed until December 2020. Seventh, our data is not current thus changes that have occurred regionally and nationally in the interim may affect the relevance of the findings. Finally, a small number of mothers had more than one daughter in the study. The strength of our study is that it reports on psychological distress in both mothers and girls in multiple counties in Kenya.

CONCLUSION

In conclusion, our multi-county study in Kenya found that most mothers and girls reported a moderate level of psychological distress. There were differences in psychological distress among counties though no difference between mothers and girls. Experiencing forced sex was associated with a high level of psychological distress in mothers as has been reported in other studies. Not agreeing that they could talk to their mother about sex approached significance in its association with moderate psychological distress in girls. Sex education and control of one's own sexual agency clearly are strong factors in enhancing female empowerment and mental health, thus parenting programs such as the FMP noted above would likely be beneficial.At the same time, context and cultural practices play a large role in gaining empowerment. As noted, communities varied in their average level of psychological distress. Further attention and research are warranted in this area. The recognition that young girls need a multi-pronged approach to provide them a path to a healthy and productive adulthood is becoming more accepted (e.g. Adolescent Girls Initiative–Kenya (AGI-K), [40] Together for Girls, [41] and the Girls Opportunity Alliance [42]).As schools can be a good platform for many empowering interventions that contribute to mental health and wellness for girls, we recommend that governments provide free schooling to all children at least through secondary school. During this time in

school, community health workers could offer semi-annual assessments and positive mental health programs, especially on World Mental Health Day, October 10th. Keeping girls in school is not wasted money, rather it is a wise investment. Educating girls and women has been shown to be one of the best ways to promote a country's economic growth. The Brookings Institution [43] reports that increasing the number of women with a secondary school education by 1% could increase a country's economic growth by 0.3%. As mental distress and mental disorders can negatively impact disease incidence and disease treatment, empowerment of girls and women is a critical component of public health.

ACKNOWLEDGMENTS

We extend our sincere appreciation to the study participants, PATHWAYS Leadership for Progress scholars and alumni as well as the community members who facilitated our data collection. In addition, we thank the members of the community engagement team and Auxillia Omwanda and Jackline Okello for their tireless efforts in recruiting study participants, as well as keeping the community informed of the study's progress. This manuscript is published with the permission of the Fanz Foundation and PATHWAYS Leadership for Progress.

CONFLICT OF INTEREST

None declared

FUNDING

The study was funded by a grant from the Fanz Foundation and funding from PATHWAYS Leadership for Progress.

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