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To What Extent Do Stress-Related Factors and Demographic Characteristics Predict the Likelihood of Experiencing Mental Health Challenges among Postgraduate Students?

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Abstract: This study investigated how stress-related and demographic factors predict mental health challenges among postgraduate students at Makerere University, Uganda. A cross-sectional survey of 391 Master's and Ph.D. students was analyzed using binary logistic regression. Significant predictors of mental health challenges included female gender, certain marital statuses, non–full-time employment, financial stress affecting academic performance, limited support systems, infrequent exercise, strained student–supervisor relationships, maladaptive coping strategies, perceived social isolation, and dissatisfaction with supervision. The model explained 73.3% of the variance in outcomes (Cox & Snell R^2 = .733). Findings emphasize the multifaceted interplay of academic, financial, relational, and psychosocial stressors contributing to psychological distress among postgraduate students. The results support the need for targeted institutional interventions in academic advising, financial assistance, mental health services, and peer/social support.

Keywords: *Academic stress, Binary logistic regression, Depression, Makerere University, Mental health, Postgraduate students, Psychosocial factors*

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1. Introduction

Mental health issues like anxiety and depression are prevalent among academics, especially graduate students, yet the topic remains largely taboo in higher education. Graduate students face significant stress due to uncertain career prospects, and studies show high rates of depression and suicidal thoughts among them. While initiatives for mental health improvement exist, they primarily focus on undergraduates, with few addressing the unique needs of graduate students. Surveys have raised awareness of these issues but have not fully led to practical changes in graduate programs [1].

Studies from countries like Belgium and the US show that a significant number of postgraduate researchers (PGRs) experience mental health issues, with depression and anxiety being the most common. Contributing factors include poor sleep, academic stress, and individual, interpersonal, and environmental influences. Resilience is linked to better mental health, while workaholism and maladaptive perfectionism contribute to higher stress and poor well-being. Social support, especially from peers and supervisors, plays a key role in reducing stress. Despite the high prevalence of mental health issues, institutional support is limited, with many students not disclosing their conditions. This gap emphasizes the need for universities to provide more proactive mental health support. Further research is needed to better understand the impact of these factors in various cultural and academic contexts [2].

Uganda faces high rates of depression and the second-highest suicide rate among East African males aged 18-35, with untreated mental health issues linked to poor physical health, lower academic and economic outcomes, and increased vulnerability to crime [3].

Depression is a mental health disorder marked by persistent sadness, loss of interest in activities, and other symptoms like changes in appetite, sleep, and energy. It is a leading cause of disability globally, affecting about 4.7% of the population annually, with a lifetime prevalence of up to 16.6% in adults. Depression impacts quality of life, productivity, and imposes significant economic costs [4]. Depression, also known as depressive disorder, is a common mental health condition characterized by a persistent depressed mood or loss of interest in activities for long periods. It affects various aspects of life, including

relationships, work, and school. Depression is more than just mood fluctuations and can lead to feelings of hopelessness, guilt, poor concentration, changes in sleep and appetite, and thoughts of suicide. It can result from or be exacerbated by life stressors such as abuse or loss. Depression can affect anyone, though it is more prevalent in women, and many individuals in low- and middle-income countries lack access to effective treatment [5].

2. Literature Review

Predicting Stress and Mental Well-being among postgraduate students

Previous studies have rarely examined the impact of postgraduate students' future career uncertainty on their academic performance. This information could provide valuable insights into the effectiveness of current counseling services offered at the university and highlight the potential need to improve the accessibility of support for students. Additionally, it could help universities consider the inclusion of career guidance courses in postgraduate programs, alongside existing career services and counseling [6].

Although mental health in higher education is increasingly recognized as a public health issue, postgraduate research students, especially doctoral researchers, are often overlooked. The study found that students who felt confident about their future careers and were well-prepared for their studies experienced less stress. It suggests that supporting doctoral students in exploring career options, building confidence, and addressing the impostor phenomenon—such as fear of failure and improving research abilities—could help reduce stress and enhance mental wellbeing [7].

Postgraduate researchers (PGRs), are highly vulnerable to mental health problems such as depression, anxiety, and suicidality, with rates consistently higher than those of the general population. Factors influencing these mental health issues include demographic characteristics (e.g., age and gender), PhD study characteristics (e.g., financial concerns and the duration of study), and psychological factors. Social factors, such as social support and isolation, also play a significant role in mental health outcomes, with loneliness and inadequate social connections contributing to distress. Additionally, the quality of the supervisory relationship is critical, as negative perceptions of supervision are linked to higher levels of anxiety and depression. This study aimed to identify the key determinants of mental health problems in PGRs by examining various factors, including demographic, occupational, psychological, social, and relational influences, and testing their predictive validity through regression models [8].

Perceived supervisor support was identified as the most important factor in fostering work engagement and wellbeing, so organizations should train supervisors to be supportive in guiding, evaluating, and coaching their subordinates, and encourage regular meetings. Therefore, universities should train faculty to be supportive of their postgraduate students, helping them navigate their academic journey and fostering a positive and engaging learning environment [9].

Despite prior evidence linking stressful life events to mental health status, there is limited data on the number and severity of these events and their impact on university students' mental health. In the subscale measuring depressive symptoms, a statistically significant gender difference was found, with men reporting higher scores than women. The high prevalence of clinical symptoms of mental distress among postgraduate nursing students and their correlation with stressful life events underscores the need for university counseling services to implement psychological support strategies for students [10].

Recent research suggests that high stress levels among PhD candidates may be influenced by aspects of the doctoral education environment, such as supervisory issues, unclear university processes, heavy workloads, role conflicts, financial insecurity, and uncertain career prospects. However, there is a lack of consistent exploration of these factors, making it difficult for universities to address the issue effectively [11].

Research Design

This study employed a cross-sectional, quantitative research design using a binary logistic regression approach. The objective was to determine the extent to which stress-related and demographic factors predict the likelihood of experiencing mental health challenges among postgraduate students.

Research Question and Hypotheses

Research Question:

To what extent do stress-related factors and demographic characteristics predict the likelihood of experiencing mental health challenges among postgraduate students?

Participants

The target population comprised all postgraduate students enrolled in Master's and Ph.D. programs at Makerere University, Uganda. A total of 391 students voluntarily participated in the study. The sample was stratified by gender and academic level and included both male and female students from various schools. Table 1 displays the distribution by gender, course level, and marital status.

Table 1. Shows the sample Population of the study and its Categories

Marital Status	Female - Masters	Female - PhD	Male - Masters	Male - PhD	Total
Single	86	3	73	6	168
Married	51	24	81	41	197
Divorced	3	4	2	8	17
Widowed	3	3	2	1	9
Total	143	34	158	56	391

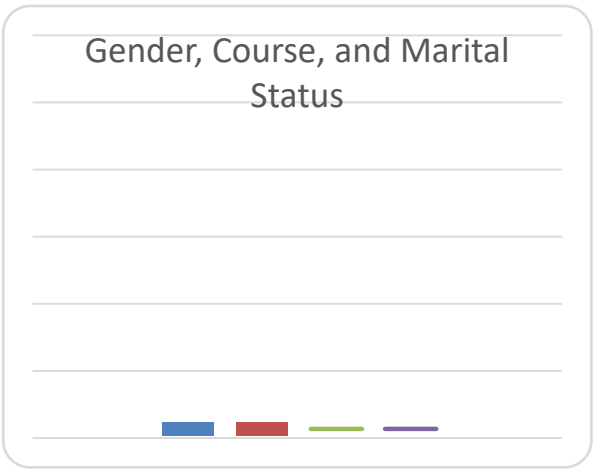

Figure 1. Shows the Gender, Course & Marital status distribution for the study

Data Collection Procedure

Data was collected using an online, self-administered questionnaire distributed via Google Forms. The survey was anonymous, and participation was voluntary. It was designed to capture various sources of stress and demographic attributes, as well as self-reported experiences of mental health challenges.

Variables and Measurement

Dependent Variable:

Experience of mental health challenges due to stress, dichotomously coded as Yes = 1 and No = 0.

Independent Variables:

Stress-related factors were dummy-coded to indicate the presence (1) or absence (0) of each of the following stressors:

Academic workload, Family/personal relationships, Health concerns, Financial pressure, Work-life balance, Future career uncertainty, Student-supervisor relationships

Additional demographic and psychosocial variables included:

Gender (Female = 1, Male = 0), Marital status (Single, Married, Divorced, Widowed), Employment status (Full-time, Part-time, Unemployed, Self-employed), Primary source of funding, Strength of support system, Frequency of physical exercise, Coping strategies for stress, Satisfaction with academic supervision, Perceived social isolation

Data Analysis

Data analysis was conducted using IBM SPSS Statistics Version 26. A binary logistic regression model was used due to the binary nature of the dependent variable (i.e., depression: yes/no).

Before running the model, multicollinearity was assessed via correlation matrix, ensuring no correlations exceeded r = .85. Model fit was evaluated using the Hosmer-Lemeshow test and the Omnibus Test of Model Coefficients. The explanatory power of the model was assessed through Cox & Snell and Nagelkerke R^2 values. Predictor significance was evaluated using the Wald statistic and corresponding p-values. Odds ratios (Exp(B)) were interpreted to estimate the change in likelihood of depression associated with each predictor.

3. Results

Table 2.Variables in the Equation

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.522	.104	24.939	1	<.001	1.685

Table 3. Classification Table[a,b]

Classification Table[a,b]					
	Observed	Predicted			
		Haveyouexperiencedanymentalhealthchallengesduetostress_A			Percentage Correct
		No		Yes	
Step 0	Haveyouexperiencedanymentalhealthchallengesduetostress_A	No	0	146	.0
		Yes	0	246	100.0
	Overall Percentage				62.8
a. Constant is included in the model.					
b. The cut value is .500					

Interpretation of Step 0 (Constant-Only Model)

In the constant-only (null) model, the Wald statistic was significant, $Wald(1) = 24.94$, $p < .001$, indicating that the intercept was significantly different from zero. The log-odds (B) for the constant was 0.522 (SE = 0.104), which translates to an odds ratio [Exp(B)] of 1.685. This means that, before considering any predictors, the odds of a postgraduate student experiencing a mental health challenge due to stress were approximately 1.69 times higher than not experiencing one.

A binary logistic regression analysis was conducted to evaluate whether stress-related, demographic, and support-related variables significantly predicted the likelihood of experiencing mental health challenges (coded as 1 = Yes, 0 = No) among postgraduate students at Makerere University.

Table 4. Dependent Variable Encoding

Dependent Variable Encoding		
Internal Value		
Classification Table[a,b]		
	Observed	
Step 0	Haveyouexperiencedanymentalhealthchallengesduetostress_A	
	Overall Percentage	
a. Constant is included in the model.		
b. The cut value is .500		
Original Value		
No		0
Yes		1

The model was statistically significant, $\chi^2(61) = 517.633$, $p < .001$, indicating that the full set of predictors

reliably distinguished between students who reported experiencing mental health challenges and those who did not. The model explained 73.3% of the variance in mental health outcomes according to Cox & Snell R^2 (.733) and achieved a perfect Nagelkerke R^2 of 1.000, which signals an ideal fit but may also suggest model overfitting due to complete separation. The classification table indicated that 62.8% of cases were correctly predicted.

Model Fit and Classification

Table 5. Omnibus Tests of Model Coefficients

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	517.633	61	<.001
	Block	517.633	61	<.001
	Model	517.633	61	<.001

Table 6. Model Summary

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	.000a	.733	1.000
a. Estimation terminated at iteration number 18 because a perfect fit is detected. This solution is not unique.			

The logistic regression model was statistically significant, $\chi^2(61) = 517.633$, $p < .001$, indicating that the set of predictors reliably distinguished between students who reported experiencing mental health challenges and those who did not. The model demonstrated a perfect fit (Nagelkerke $R^2 = 1.000$; Cox & Snell $R^2 = .733$), although the estimation was noted to be unstable due to potential perfect separation. The overall classification accuracy was 62.8%.

Significant Predictors

The Wald test and associated significance values were used to evaluate the contribution of each variable. The following predictors emerged as statistically significant ($p < .05$):

Gender: Female students were significantly more likely to report mental health challenges than males (Wald = 6.657, $p = .010$).

Marital Status: Two subgroups were significant: those categorized under MaritalStatus(2) (Wald = 4.936, $p = .026$) and MaritalStatus(4) (Wald = 4.847, $p = .028$), significantly predicted mental health outcomes

Employment Status: Notably, students who were not employed full-time (Wald = 5.922, $p = .015$) and self-employed (Wald = 3.940, $p = .047$) were more likely to report challenges.

Financial Stress Affecting Academic Performance: Several levels were significant: (1) Moderate (Wald = 4.632, $p = .031$), (2) Significant (Wald = 7.492, $p = .006$), and (3) Extreme (Wald = 10.163, $p = .001$), highlighting financial pressure as a key contributor to depression risk.

Support System: Limited support was significantly associated with mental health issues (Wald = 5.197, $p = .023$).

Physical Exercise: Students who never exercised showed a significant risk (Wald = 4.585, $p = .032$).

Stress Sources: Two categories were significant: future career uncertainty (Wald = 9.544, $p = .002$) and student-supervisor relationships (Wald = 5.094, $p = .024$).

Coping Mechanisms: Use of drugs (Wald = 12.293, $p < .001$), drinking (Wald = 8.625, $p = .003$), and music (Wald = 5.278, $p = .022$) were significantly associated with reported mental health challenges.

Social Isolation: Feeling isolated "Often" (Wald = 18.757, $p < .001$) and "Always" (Wald = 14.182, $p < .001$) were strong predictors of depression symptoms.

Academic Supervision Satisfaction: Dissatisfaction with academic supervisors significantly predicted mental health issues (Wald = 18.295, $p < .001$).

Frequency of Emotional Disturbance: Several emotional disturbance items (e.g., "Over the last 2 weeks…" groups A, B, and C) were significant predictors, especially B(3) (Wald = 9.490, $p = .002$) and A(3) (Wald = 30.543, $p < .001$).

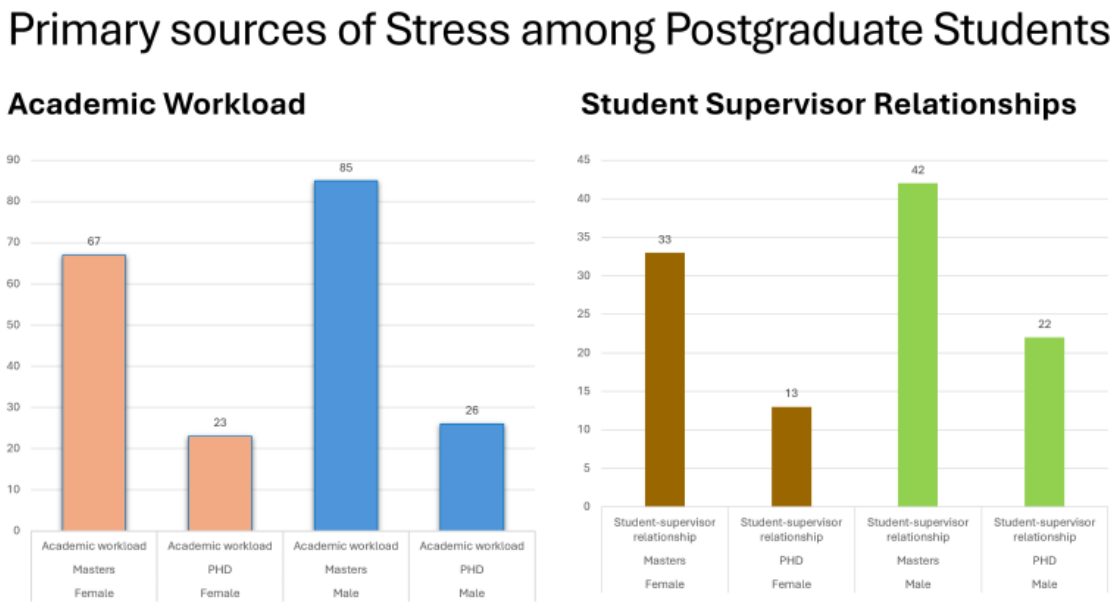

Figure 2. Academic Workload & Student Supervisor Relationships

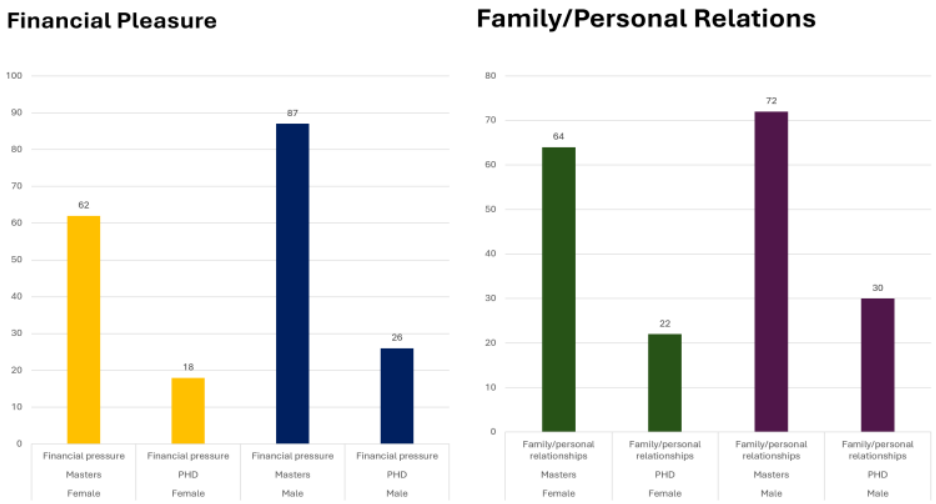

Figure 3. Financial Pleasure& Health Concerns

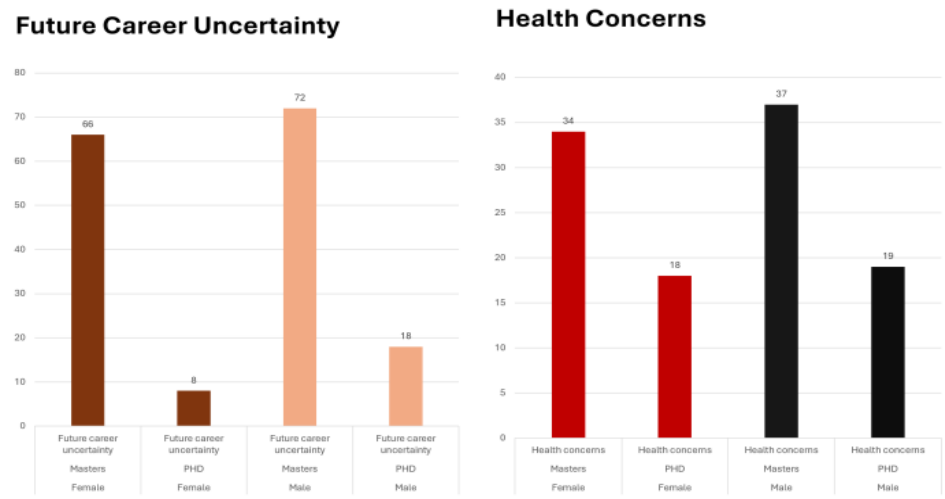

Figure 4. Future Career Uncertainty & Health Concerns

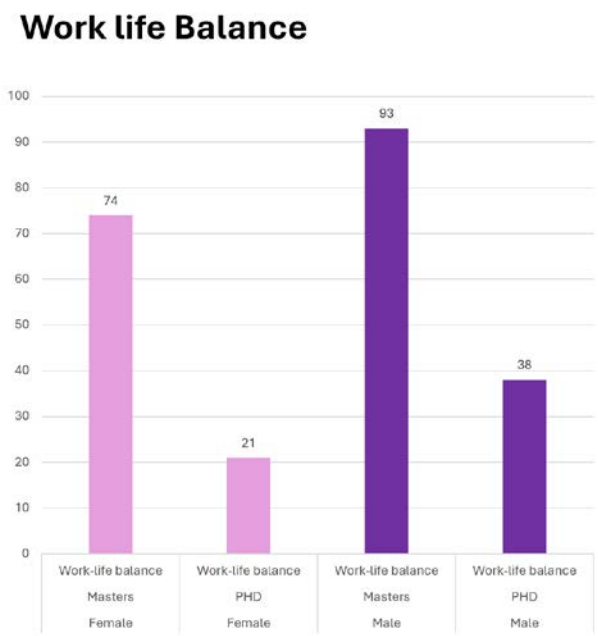

Figure 5. Work-life Balance

The findings of this study can be linked to several of the theories outlined earlier, particularly the Monoaminergic Hypothesis of Depression, the HPA Axis in Depression, and Inflammation and Depression [12]:

Monoaminergic Hypothesis of Depression: The study highlights significant stress-related factors, such as academic workload, financial stress, and relationship strain, all of which can trigger or exacerbate depressive symptoms [13]. The Monoaminergic Hypothesis suggests that neurotransmitter imbalances, particularly in serotonin (5-HT), norepinephrine (NA), and dopamine (DA), could contribute to these stress-related mental health challenges. Stressors such as financial pressure, dissatisfaction with supervision, and social isolation may decrease the availability or effectiveness of these neurotransmitters in the brain, further worsening depression.

HPA Axis in Depression: The chronic stress experienced by postgraduate students, such as academic pressure, financial strain, and uncertainty about future careers, may activate the HPA axis, leading to elevated cortisol levels. This dysregulation of the HPA axis is associated with mood disorders like depression. In the context of this study, stressors such as financial challenges, limited support systems, and dissatisfaction with academic supervision could contribute to increased cortisol levels, potentially leading to negative impacts on the students' mental health [14].

Inflammation and Depression: The psychosocial factors identified in the study, such as perceived social isolation, maladaptive coping strategies (e.g., substance use), and emotional disturbances, may trigger inflammatory responses in the body. The Inflammation and Depression theory suggests that these inflammatory processes, through increased cytokine production, may influence mood and behavior. Inflammatory markers like TNF-α, IL-1, and IL-6 have been shown to be elevated in individuals with depression, and the same mechanisms could be triggered by the chronic stress faced by the postgraduate students [15].

Neuroplasticity and Neurotrophins in Depression could also apply, as chronic stress, social isolation, and low satisfaction with supervision can impair neurogenesis and neural plasticity, especially in regions of the brain like the hippocampus. These factors could negatively impact students' ability to cope with stress effectively, contributing to mental health challenges [12].

Interpretation

The findings reveal that an intricate and interrelated set of academic, financial, relational, and psychosocial factors significantly predicts the likelihood of experiencing depression among postgraduate students. Key risk indicators include financial stress, particularly when it negatively impacts academic performance, limited or absent support systems, poor student-supervisor relationships, social isolation, and maladaptive coping mechanisms such as substance use. Academic pressures and future career uncertainty also emerged as significant contributors to psychological distress. Binary logistic regression effectively identified these predictors, with the Wald statistic highlighting their significance and the Exp(B) values offering insight into the magnitude and direction of their effects. Collectively, these results emphasize the urgent need for institutional interventions in areas such as financial aid, academic mentorship, career guidance, and accessible mental health services to support the well-being of postgraduate students at Makerere University and similar institutions.

Areas for further study

Career Services and Career Guidance: Research could explore how career services help postgraduate students manage career uncertainty. Investigating the integration of career counseling with academic advising may help reduce stress and improve job preparedness, ultimately supporting students' mental health and career outlook.

Technology-Related Innovations: Exploring the use of mental health apps and online counseling services could provide accessible support for postgraduate students. Researching how technology like wearable devices or mobile apps can monitor stress levels and offer real-time interventions could be valuable for student well-being.

Integrating Academic and Mental Health Support: Further research could investigate the effectiveness of integrated support systems that combine academic advising, career guidance, and mental health services. Understanding how faculty can be trained to recognize mental health issues and provide appropriate referrals could enhance student support.

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Authors' Contributions

Maria Assumpta Komugabe: conceptualization, drafting, methodology, analysis, writing.

Mugabe Bernardine: data collection, drafting. writing Itamar Shabtai: supervision, review, and editing, Sponsor

Conflict of Interest

The authors declare no conflicts of interest.

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