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The Effect of Simplified Kundalini Yoga Practices on Perceived Stress among Medical Students

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Abstract

Medical students experience high levels of stress due to rigorous academic demands, frequent examinations, and patient care responsibilities. Persistent stress can lead to anxiety, depression, and burnout, adversely impacting their well-being and academic performance. Simplified Kundalini Yoga (SKY) has been recognised as a potential intervention for stress management. This study aimed to evaluate the effectiveness of SKY practices in reducing perceived stress among first-year medical students. A quasi-experimental study was conducted among 132 first-year medical students (control: n=66, experimental: n=66) at Government Erode Medical College Hospital, School of Nursing. Participants were screened using the Perceived Stress Scale (PSS), and those with moderate stress were included. The experimental group underwent a structured 24-week SKY program, while the control group received no intervention. Stress levels were assessed at baseline (pre-test), after 12 weeks (post-test 1), and after 24 weeks (post-test 2). Data were analysed using ANCOVA and Bonferroni t-tests. The control group exhibited no significant change in stress levels ($p>0.05$), whereas the experimental group showed a significant reduction in PSS scores after SKY intervention (pre-test: 24.47 ± 2.66, post-test 1: 17.18 ± 2.32, post-test 2: 14.05 ± 2.33, $p<0.001$). Stress reduction was more pronounced among male students and those aged 19 years. SKY practices significantly reduced perceived stress among medical students, demonstrating their potential as an effective, non-pharmacological stress management tool. Integrating SKY into medical curricula may enhance students' resilience and mental well-being.

Keywords: *Academic Stress, Mental Well-being, Mindfulness, Perceived Stress Scale (PSS), Simplified Kundalini Yoga (SKY), Stress Management, Yoga Intervention*.

Introduction

The rigorous demands of medical education place significant stress on students, impacting their mental and emotional well-being [1-3]. Medical students frequently experience heightened stress levels compared to their peers in other disciplines, stemming from heavy workloads, demanding academic schedules, and the emotional burden of patient care, even during the early stages of training [4]. This persistent stress can manifest as anxiety, depression, and burnout, significantly affecting their academic performance and overall quality of life [5]. The unique challenges faced by medical students, including extensive curricula, frequent

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examinations, and the fear of failure, often lead to reduced leisure activities and sleep, exacerbating their stress [6-7]. The consequences of unmanaged stress can be severe, leading to tension, anxiety, sleep disturbances, impaired concentration, and even apathy, creating a need for effective stress management strategies tailored to this population [8-9]. Yoga, a practice that integrates physical postures, breathing techniques, and meditation, has shown promise in managing stress among healthcare workers and may offer a valuable tool for medical students. Simplified Kundalini Yoga, a specific form of yoga, could provide a readily accessible and efficient method for medical students to mitigate stress and enhance their overall well-being [10]. Studies indicate that yoga can improve self-regulation and self-compassion, key factors in managing stress and promoting mental health [11].

Medical students face high stress levels due to their demanding academic, extracurricular, and patient care responsibilities. This environment disrupts their daily lives, leading to psychological morbidity like interpersonal difficulties, mental health disorders, and suicidal thoughts. Medical students face excessive assignments, peer competition, time management issues, demanding professional commitments, extensive curricula, frequent exams, and fear of failure.

Medical students often experience higher stress levels than their non-medical counterparts. This study aims to investigate the impact of SKY practices on perceived stress, compare post-test changes between control and experimental groups, and correlate study variables with selected sociodemographic variables.

Materials and Methods

The study aimed to investigate the effects of Simplified Kundalini Yoga on first-year medical students aged 18-22 years in the Erode district. The participants were recruited from the Government Erode Medical College Hospital and, School of Nursing. The study involved screening for stress levels using a perceived stress scale, with highly stressed students referred to the psychiatric department. Moderately stressed students were considered for the study.

The target population for the research study comprised first-year students, both male and female, aged 18-22 years, not taking any medication, willing to give informed consent, and having no other illness. Exclusion criteria included individuals with prior experience practising yoga, only first-year students eligible to participate, unwilling to provide written informed consent, and those who have experienced any illness within the past month requiring medical treatment or medication.

Participants were provided with a comprehensive description of the study and asked to provide written informed consent. Confidentiality and privacy were maintained at all times. The experimental design was quasi-experimental and interventional, with two equal groups of 66 individuals each randomly assigned to the subjects (n = 66). The experimental group underwent Simplified Kundalini Yoga practice, including Introspection, Simplified Kundalini meditation, Simplified physical exercises, and Kayakalpa Yoga activities.

The dependent variables were subjected to post-tests at twelve (Posttest -1) and twenty-four weeks (Posttest -2). The effect of the various treatments was determined by comparing the means for each variable. ANCOVA was used to determine statistical significance, with a fixed 0.05 level used in each case to test for significance.

The independent variables were simplified Kundalini Yoga training, which included simplified physical exercises for health, simplified Kayakalpa yoga exercises, simplified Kundalini meditation for and simplified introspection. For 24 weeks, the medical experimental group received the

Simplified Kundalini Yoga program. In this section, describe the methods followed and respond to the question of how the problem was studied.

Results

The study assessed the demographic and associated factors of medical students in control (n=66) and experimental (n=66) groups before Simplified Kundalini Yoga (SKY) intervention. Table 1 presents the demographic characteristics of medical students in the control (n=66) and experimental (n=66) groups. Gender distribution was similar (Male: 39.39% vs. 42.42%, Female: 60.61% vs. 57.58%, χ^2=0.13, p=0.72). Age distribution showed no significant difference (χ^2=0.98, p=0.81), with most students aged 18-19 years. Weight (χ^2=3.25, p=0.35) and height (χ^2=3.97, p=0.26) distributions were comparable. SBP (χ^2=0.63, p=0.43) and DBP (χ^2=0.12, p=0.73) showed no significant variations. Respiratory rate differences were also non-significant (χ^2=3.10, p=0.54). Most students were from nuclear families (72.73% vs. 78.79%, χ^2=0.66, p=0.41) and urban areas (45.45% vs. 56.06%, χ^2=1.48, p=0.22). Monthly family income varied but was not significantly different (χ^2=6.48, p=0.09). All demographic variables were statistically non-significant (p>0.05), confirming comparable baseline characteristics. In this section, respond to the question What have you found.

Table 2 represents the associated factors of study participants. None of the students reported smoking or alcohol consumption. Psychological issues were similar (13.64% vs. 12.12%, χ^2=0.07, p=0.80). Screen time usage (2-3 hrs/day: 22.73% vs. 28.79%, χ^2=2.69, p=0.44) and stress due to academics (50.00% vs. 48.48%, χ^2=0.03, p=0.86), personal health (25.76% vs. 31.82%, χ^2=0.59, p=0.44), and financial issues (42.42% vs. 34.85%, χ^2=0.80, p=0.37) were statistically non-significant. Overall, no significant differences (p>0.05) were observed in demographic or associated factors, ensuring both groups were comparable before the SKY intervention.

Table 3 presents the comparison of stress scores among medical students in control and experimental groups across three assessments: pretest, posttest-1 (after 12 weeks of SKY practice), and posttest-2 (after 24 weeks of SKY practice). In the control group, the stress scores remained nearly unchanged from pretest (24.54 ± 2.63) to posttest-1 (24.33 ± 2.42) and posttest-2 (24.21 ± 1.80), with a mean difference of 0.33. The repeated measures ANOVA showed no significant difference (F=0.43, p=0.65). In the experimental group, a significant reduction in stress scores was observed after SKY practice. The pretest mean score (24.47 ± 2.66) decreased substantially in posttest-1 (17.18 ± 2.32) and further in posttest-2 (14.05 ± 2.33), with an overall mean reduction of 10.42. This decrease was highly significant (F=83.82, p=0.001). These results indicate that Simplified Kundalini Yoga significantly reduced perceived stress among medical students over 24 weeks, while no significant change was observed in the control group. The result should be essential for discussion.

Table 4 and Figure 1 present the multiple comparisons of perceived stress scores (PSS) in the experimental group using the Bonferroni t-test. The repeated measures ANOVA showed a highly significant reduction in PSS scores across the assessments (F = 83.82, p = 0.001). The Bonferroni t-test further confirmed a significant decrease: From pretest (24.47 ± 2.66) to posttest-1 (17.18 ± 2.32), the mean difference (MD) was 7.29 (p = 0.001). From pretest to posttest-2 (14.05 ± 2.33), the MD was 10.42 (p = 0.001). These findings confirm that Simplified Kundalini Yoga (SKY) significantly reduces perceived stress levels among medical students, with greater reductions observed over time.

Table 5 compares the perceived stress scale (PSS) scores between the control and

experimental groups at different time points. In the pretest, there was no significant difference between the control group (24.54 ± 2.63) and the experimental group (24.47 ± 2.66) (t = 0.14, p = 0.89), indicating comparable baseline stress levels. However, after 12 weeks of Simplified Kundalini Yoga (SKY) practice, the experimental group showed a significant reduction in stress levels (17.18 ± 2.32) compared to the control group (24.33 ± 2.42), with a mean difference of -7.15 (t = 16.35, p = 0.001). This trend continued after 24 weeks, where the experimental group's stress levels further decreased (14.05 ± 2.33), while the control group remained nearly unchanged (24.21 ± 1.80), resulting in a mean difference of -10.16 (t = 26.59, p = 0.001). These findings suggest that SKY practice significantly reduces perceived stress among medical students, with sustained improvement over time, whereas no significant changes were observed in the control group.

Table 6 presents the association between stress reduction scores and various demographic variables among medical students in the experimental group. Gender-based analysis revealed that male students experienced a significantly higher reduction in stress scores (11.39 ± 3.49) compared to female students (9.61 ± 3.18), with a statistically significant difference (t = 2.01, p = 0.05). Age-wise comparisons indicated that students aged 19 years exhibited the highest stress reduction (12.14 ± 3.50), whereas those above 19 years showed the least reduction (9.09 ± 2.55), with a significant association (F = 3.18, p = 0.05).

Regarding family type, nuclear family students (10.35 ± 3.77) and joint family students (10.64 ± 3.46) had similar stress reduction, showing no significant difference (t = 0.21, p = 0.83). Similarly, place of living (urban vs. rural) did not significantly impact stress reduction (t = 0.08, p = 0.93). Monthly family income also showed no significant association with stress reduction (F = 1.54, p = 0.21). However, students who experienced personal health-related stress (t = 2.01, p = 0.05), financial issues (t = 1.96, p = 0.05), and gender differences (t = 2.01, p = 0.05) showed significant associations with stress reduction. Those with financial stress had a lower reduction score (8.91 ± 4.02) compared to students without financial issues (11.00 ± 3.39). Meanwhile, family-related stress had no significant impact on stress reduction (t = 0.11, p = 0.75).

Overall, these findings suggest that Simplified Kundalini Yoga (SKY) is effective in reducing stress among medical students, with variations based on gender, age, health, and financial concerns.

Table 1. Medical Students' Demographic Variables

Demographic variables		**Control (n=66)**		**Experimental (n=66)**		**Chi-square test**
		n	**%**	**n**	**%**	
Gender	Male	26	39.39%	28	42.42%	$\chi 2$=0.13 p=0.72 (NS)
	Female	40	60.61%	38	57.58%	
Age	18 years	21	31.82%	22	33.33%	$\chi 2$=0.98 p=0.81 (NS)
	19 years	22	33.33%	26	39.39%	
	20 years	17	25.76%	13	19.70%	
	21 years	6	9.09%	5	7.58%	
Weight (Kg)	41-50 kg	10	15.15%	15	22.73%	$\chi 2$=3.25 p=0.35(NS)
	51-60 kg	18	27.27%	12	18.18%	
	61-70 kg	19	28.79%	24	36.36%	

	71-80 kg	19	28.79%	15	22.73%	
Height (cm)	151-155 cm	13	19.70%	13	19.70%	$\chi 2$=3.97 p=0.26 (NS)
	156-160 cm	18	27.27%	28	42.42%	
	161-165 cm	24	36.36%	16	24.24%	
	166-170 cm	11	16.67%	9	13.64%	
Type of Family	Nuclear family	48	72.73%	52	78.79%	$\chi 2$=0.66 p=0.41 (NS)
	Joint family	18	27.27%	14	21.21%	
Place of living	Urban	30	45.45%	37	56.06%	$\chi 2$=1.48 p=0.22 (NS)
	Rural	36	54.55%	29	43.94%	
Monthly family income	Lower	13	19.70%	20	30.30%	$\chi 2$=6.48 p=0.09 (NS)
	Lower Middle	12	18.18%	19	28.79%	
	Upper Class	22	33.33%	12	18.18%	
	Upper Middle	19	28.79%	15	22.73%	

p>0.05 not significant NS= not significant

Table 2. Medical Students and It's Associated Factors

		group				**Chi-square test**
		Control (n=66)		**Experimental (n=66)**		
		n	**%**	**n**	**%**	
Total sleeping hours per day	3 -5 hrs/day	16	24.24%	10	15.15%	$\chi 2$=2.00 p=0.37 (NS)
	5 - 7 hrs /day	45	68.18%	52	78.79%	
	7 - 9 hrs/day	5	7.58%	4	6.06%	
	More than 9 hrs /day	0	0.00%	0	0.00%	
Are academic-related issues causing stress in the last 3 months	Yes	33	50.00%	32	48.48%	$\chi 2$=0.03 p=0.86 (NS)
	No	33	50.00%	34	51.52%	
Own health-related issues have caused stress in the last 3 months	Yes	17	25.76%	21	31.82%	$\chi 2$=0.59 p=0.44(NS)
	No	49	74.24%	45	68.18%	
Health / Illness of a person close to me, related issues caused stress in the last 3 months	Yes	20	30.30%	15	22.73%	$\chi 2$=0.97 p=0.32 (NS)
	No	46	69.70%	51	77.27%	
Conflict/strain in close relationship-related issues has caused stress in the last 3 months	Yes	23	34.85%	15	22.73%	$\chi 2$=2.37 p=0.12 (NS)
	No	43	65.15%	51	77.27%	
Financial issues have caused stress in the last 3 months	Yes	28	42.42%	23	34.85%	$\chi 2$=0.80 p=0.37 (NS)
	No	38	57.58%	43	65.15%	
Family-related issues have caused stress in the last 3 months	Yes	28	42.42%	31	46.97%	$\chi 2$=0.28 p=0.60(NS)
	No	38	57.58%	35	53.03%	

p>0.05 not significant NS= not significant

Table 3. Comparison of Stress Score During Pretest, Posttest1(After 12 Weeks Sky Practice) and Posttest2(After 24weeks Sky Practice) in Medical Students

Domain	***Assessments***						**Mean Difference**	**Repeated measures ANOVA F-test**
	Pretest		***Posttest-1***		***Posttest-2***			
	Mean	***SD***	***Mean***	***SD***	***Mean***	***SD***		
Control	24.54	2.63	24.33	2.42	24.21	1.80	0.33	F=0.43p=0.65 (NS)
Experimental	24.47	2.66	17.18	2.32	14.05	2.33	10.42	**F=83.82p=0.001*** (S)**

**** very high significant at P≤0.001 S= significant p> 0.05 not significant NS= not significant*

Table 4. Multiple Comparison Perceived Stress Score During Pretest, Posttest1(After 12 Weeks of Sky Practice) and Posttest2 (After 24 Weeks of Sky Practice) using Bonferroni T-test in Medical Students Experimental Group

	Assessment	**Experimental group**		**ANOVA repeated test score**		**Bonferroni t-test**		
		Mean	**SD**	**F value**	**P value**	**Comparison**	**MD**	**P value**
PSS	Pretest	24.47	2.66	**F=83.82**	**p=0.001*** **			
	Posttest1	17.18	2.32			Pretest vs Posttest1	7.29	0.001
	Posttest2	14.05	2.33			Pretest vs Posttest2	10.42	0.001

MD= mean difference NS= not significant S= Significant p>0.05 not significant

**** p≤0.001 very high significant ** p≤0.01 highly significant * p≤0.05 highly significant*

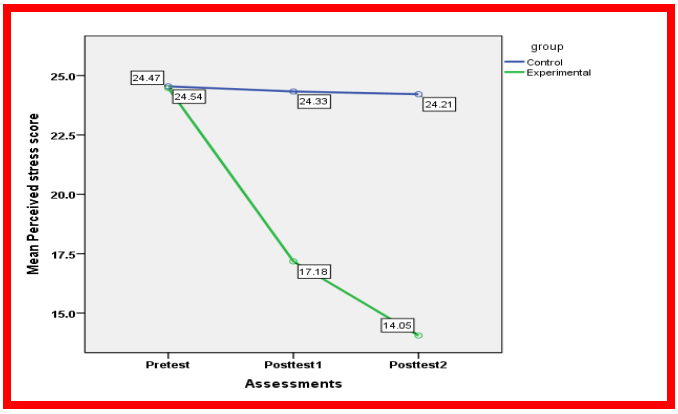

Figure 1. Effect of SKY Intervention on Perceived Stress Scores

Table 5. Comparison of Perceived Stress Scale between Control Group and Experimental Group in Medical Students

	Assessments	**Group**				**Mean difference**	**Student Independent T-test**
		Control group (n=61)		**Experimental group (n=57)**			
		Mean	**SD**	**Mean**	**SD**		
PSS score	Pretest	24.54	2.63	24.47	2.66	-0.07	t=0.14 p=0.89(NS)
	Posttest1	24.33	2.42	17.18	2.32	-7.15	**t=16.35 p=0.001*** (HS)**
	Posttest2	24.21	1.80	14.05	2.33	-10.16	**t=26.59 p=0.001*** (HS)**

**** very high significant at P≤0.001 S= significant p> 0.05 not significant NS= not significant*

Table 6. Association between Stress Reduction Score and Demographic Variables among Medical Experimental Students

Demographic variables		**Stress reduction score**						**n**	**One-way ANOVA F-test/t-test**
		Pretest		**Posttest**		**Reduction score**			
		Mean	SD	Mean	SD	Mean	SD		
Gender	Male	24.31	2.63	12.92	2.26	11.39	3.49	26	**t=2.01**
	Female	24.61	2.72	15.00	1.97	9.61	3.18	31	**p=0.05*(S)**
Age:	18 years	23.64	3.36	13.59	2.42	10.05	4.40	22	**F=3.18**
	19 years	25.22	2.17	13.03	2.44	12.14	3.50	23	**p=0.05*(S)**
	>19 years	24.45	1.57	15.36	2.06	9.09	2.55	12	
Type of Family	Nuclear family	24.42	2.60	14.07	2.54	10.35	3.77	43	t=0.21
	Joint family	24.64	2.92	14.00	1.62	10.64	3.46	14	p=0.83(NS)
Place of living	Urban	24.34	3.39	14.28	2.66	10.07	4.42	29	t=0.08
	Rural	24.61	1.64	13.82	1.96	10.79	2.71	28	p=0.93(NS)
Monthly family income	Lower	24.57	2.65	14.71	2.16	9.86	3.94	14	F=1.54
	Lower Middle	24.78	2.98	12.94	2.21	11.83	3.37	18	p=0.21(NS)
	Upper Class	24.90	1.29	14.50	2.59	10.40	3.20	10	
	Upper Middle	23.73	3.01	14.47	2.20	9.27	3.83	15	
Do you feel that you are currently suffering from any psychological problems? (E.g. anxiety, depression)	Yes	24.80	3.70	14.60	2.51	10.20	4.92	5	t=0.44
	No	24.44	2.59	14.00	2.33	10.44	3.58	52	p=0.88(NS)
Total sleeping hours per day	3 -5 hrs/day	25.00	2.65	14.56	2.51	10.44	3.91	9	F=0.39
	5 - 7 hrs /day	24.18	2.64	13.91	2.25	10.27	3.49	44	p=0.67(NS)
	7 - 9 hrs/day	26.50	2.38	14.50	3.32	12.00	5.66	4	
	More than 9 hrs /day	.	.	.	.	.	.	0	
Do u have any appearance worries	Yes	24.40	2.80	14.90	2.13	9.50	3.84	10	t=0.88
	No	24.49	2.66	13.87	2.36	10.62	3.64	47	p=0.38(NS)
Marks scored in recent academic tests (internal or university)	41 - 60%	23.64	3.38	14.24	2.45	9.40	4.32	25	F=1.81
	61 - 80%	24.93	1.59	13.78	2.17	11.15	2.46	27	p=0.17(NS)
	Less than 40%	26.20	2.17	14.60	2.88	11.60	4.98	5	
	More than 80%	.	.	.	.	.	.	0	
Are academic-related issues causing stress in the last 3 months	Yes	24.35	2.61	13.96	2.32	10.38	3.70	26	t=0.02
	No	24.58	2.74	14.13	2.38	10.45	3.70	31	p=0.98(NS)
Own health-related issues have caused stress in the last 3 months	Yes	23.94	2.56	13.76	2.19	10.18	3.54	17	**t=2.01**
	No	24.70	2.70	14.17	2.41	10.53	3.76	40	**p=0.05*(S)**

Financial issues have caused stress in the last 3 months	Yes	22.75	3.42	13.84	2.29	8.91	4.02	16	**t=1.96 p=0.05*(S)**
	No	25.15	1.97	14.15	2.37	11.00	3.39	41	
Family-related issues have caused stress in the last 3 months	Yes	24.61	2.73	13.96	2.24	10.64	3.46	28	t=0.11 p=0.75(NS)
	No	24.34	2.64	14.14	2.46	10.21	3.90	29	

Discussion

The findings of this study demonstrate that Simplified Kundalini Yoga (SKY) significantly reduces perceived stress among medical students. According to the results, the experimental group that participated in SKY practices exhibited a substantial decrease in stress levels over 24 weeks, as measured by the Perceived Stress Scale (PSS). This outcome aligns with several previous studies recognizing the detrimental impact of medical education on stress and mental well-being among medical students, where high stress levels correlate with increased risk of anxiety, depression, and burnout [12-14].

The impact of structured interventions like SKY in mitigating perceived stress is increasingly supported by evidence. Interventions involving yoga have been shown to foster emotional resilience and provide coping mechanisms for managing stress effectively [15-16]. For instance, El-Gilany et al. highlighted that excessive stress adversely affects students' academic performance and overall well-being, establishing the necessity for effective stress management intervention programs [16]. Similarly, Poyil et al. confirmed that yoga practices yield positive outcomes in reducing stress, further substantiating the efficacy of yoga-related interventions for healthcare professionals [15].

Comparison of PSS scores between control and experimental groups revealed a stark contrast, highlighting that while the control group's stress levels remained relatively constant, the experimental group's stress levels decreased significantly following SKY intervention. These results are corroborated by previous investigations illustrating similar benefits of yoga practices in promoting mental health across various demographics, including nursing students [10, 11, 16]. The retention of reduced stress levels suggests that regular practice of SKY fosters habitual strategies for stress management, which may assist students in navigating the challenges posed by their academic environment [17].

Interestingly, the study noted demographic variations in stress reduction scores. Male students demonstrated a more significant decrease in stress than their female counterparts, echoing findings from prior research indicating higher levels of perceived stress among female medical students [18, 19]. Furthermore, age also appeared to play a role, with students aged 19 exhibiting the highest reductions in stress. These variations underscore the necessity for tailored interventions sensitive to the unique stress profiles and responses of different demographic groups, as highlighted in the literature [20].

Moreover, the significant associations found between stress reduction and both personal health-related stressors and financial issues warrant attention. Students experiencing these stressors had lower reductions in stress scores, highlighting a critical area for potential intervention. Programs that integrate financial planning and health management alongside yoga practices could enhance stress resilience among medical students facing such challenges [21].

Conclusion

In conclusion, the findings underscore the profound benefits of incorporating Simplified Kundalini Yoga practices as a therapeutic

intervention in medical education. Not only does this practice significantly lower perceived stress, but it also provides students with valuable tools for emotional regulation that can bolster their academic performance and promote overall mental health. Given the pervasive nature of stress within medical education, the integration of mindfulness and yoga practices like SKY should be considered a vital component of medical training curricula.

Conflict of Interest

There are no conflicts of interest.

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Ethical Statement

The study was approved by the institutional human ethics committee, Government Erode Medical College in Perundurai IEC/001/GEMC& H/2020, dated 31.07.2020. Informed written consent was obtained from all the study participants and only those participants willing to sign the informed consent were included in the study. The risks and benefits involved in the study and the voluntary nature of participation were explained to the participants before obtaining consent. The confidentiality of the study participants was maintained.

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