

Risk Factors of Posttraumatic Stress Symptoms among Healthcare Workers during Covid-19 Pandemic in Regional General Hospital of Baubau City, Southeast Sulawesi

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ABSTRACT

The COVID-19 pandemic can cause posttraumatic stress symptoms for health workers. This study aims to determine the risk factors for posttraumatic stress in health workers at the Baubau City Hospital, Southeast Sulawesi during the COVID-19 pandemic. The research design used a cross sectional study. A total of 227 health workers with symptoms of posttraumatic stress participated in the study. Data was collected using an anonymous online self-report questionnaire. The research took place between 26 September 2020-19 January 2021 at the Baubau City Hospital. The study used The COVID-19-PTSD Questionnaire, a modified Indonesian version, to assess symptoms of posttraumatic stress in health workers. The results showed 24.23% of health workers with severe symptoms of posttraumatic stress and 75.77% of health workers with mild symptoms of posttraumatic stress. The results of the multivariate analysis showed that the risk factors associated with severe symptoms of posttraumatic stress were not working or being isolated (p-value = 0.040, OR = 16.464 (95% CI = 1,141-237,667)), feeling avoided by family members and friends (p-value = 0.023, OR = 3.287 (95% CI = 1.180-9.152)) and a high level of fear of COVID-19 (p-value = 0.001, OR = 14.605 (95% CI = 2.899-73.581)). Health workers with a high level of fear of COVID-19, not currently working or being isolated, and feel avoided by family members and friends because work is prone to experiencing severe symptoms of posttraumatic stress. Psychological intervention and support from family members and friends may be helpful.

Keywords: *symptoms, stress, trauma, health workers, COVID-19, avoidance, isolation, fear*

INTRODUCTION

COVID-19 is a respiratory disease caused by SARS-Cov-2 (The Severe Acute Respiratory Syndrome Coronavirus 2). The COVID-19 outbreak was first reported in Wuhan City, Hubei Province, China at the end of 2019 until an increase in COVID-19 cases was so fast and wide that the World Health Organization designated COVID-19 as a global health emergency or Public Health Emergency of International Concern (PHEIC) on January 30, 2020⁴¹.

The COVID-19 pandemic was then determined by the World Health Organization on March 11, 2020 after the reported increase in COVID-19 cases that occurred in several countries other than China, which spread throughout the world⁴¹. On August 16, 2020, 215 countries in the world reported 21,294,854 cases of COVID-19 and 761,779 deaths, in ASEAN 3,040,168 cases and 59,875 deaths⁴². COVID-19 cases in Indonesia reached 139,549 cases and 6,150 deaths²⁴. The Southeast Sulawesi COVID-19 Task Force reported 1,202 cases of COVID-19 in Southeast Sulawesi and 18 deaths. The city of Baubau is the second highest area of COVID-19 cases in Southeast Sulawesi with 221 cases³⁰.

The existence of cases of COVID-19 that continues to increase can cause the workload of health workers to increase more than normal, they are at high risk of contracting while caring for patients⁴⁰ and there is a risk of health workers dying from being infected with COVID-19³⁴ can trigger symptoms of post-traumatic stress. During the 2003 SARS outbreak, the H7N9 epidemic, the COVID-19 outbreak in Wuhan and during this pandemic, some studies show that age^{28,37,43,45}, gender^{4,5,12,16,18,23,33,35,37,37}^{44,45}, marital status^{4,28,45}, education level^{20,45}, employment^{4,36,37}, work experience^{4,37,45}, family members who are suspect or confirmed to suffer from COVID-19^{14,45}, friends or coworker who suspect or confirmed suffering from COVID-19^{14,43}, work placement^{32,43,45}, place of stay^{4,45}, feelings of avoidance of family members and friends^{2,22,45}, comorbid⁴⁵, and fear of COVID-19^{3,11} can contribute to post-traumatic stress symptoms in health workers.

The lack of health personnel in reaching psychological services, the lack of mental health interventions and evaluations for health workers, and the impact of post-traumatic stress symptoms that are not immediately addressed can affect the performance of health workers in providing services. To overcome this, this research is expected to help prevent and overcome the symptoms of post-traumatic stress in health workers by analyzing risk factors related to symptoms of post-traumatic stress during the COVID-19 pandemic among health workers who work at the General Hospital of Baubau City as referral hospital for COVID-19 patients in Baubau City, Southeast Sulawesi.

METHODS

This research was conducted at Baubau City General Hospital, Southeast Sulawesi during the COVID-19 pandemic. The study was conducted over 10 months between March 21, 2020 and January 19, 2021. Research design: this study uses cross-sectional study design. During the COVID-19 pandemic 377 health workers were asked to participate in this study. They work as doctors, nurses, midwives and medical technicians at Baubau City General Hospital and their education criteria are at least 3 diplomas. Sample population size is determined using $N = Z\alpha^2P(1 - P) / d^2$ ($N-1$)+(Z $\alpha^2P(1 - P)$), where $\alpha = 0.05$, $Z\alpha = 1.96$, $d = 0.05$, and $p = 0.5$. The total number of participants who completed the questionnaire and showed posttraumatic stress symptom as many as 277 participants. The amount has exceeded the minimum sample size selected non randomly.

A characteristic questionnaire of anonymous respondents. The Indonesian version of The Modified COVID-19-PTSD Questionnaire was used in research to assess posttraumatic stress symptoms in health workers. The COVID-19-PTSD Questionnaire has a 19-item and 5-point scale (0 = not at all; 1 = a little bit; 2 = moderately; 3 = quite a bit; 4 = extremely) with sensitivity of 0.91 and specificity of 0.92, a cut-off score of 26 indicates posttraumatic stress disorder⁹. The Indonesian version of The Modified COVID-19-PTSD Questionnaire has Cronbach's alpha 0.897. In the Indonesian version of The Modified COVID-19-PTSD Questionnaire, a total score of ≥ 26 indicates severe symptoms and a score of 1-25 indicates mild symptoms. The Indonesian version of The Fear of COVID-19 Scale (The FCV-19s) is used to assess the fear of COVID-19 in HCWs health workers with Cronbach's alpha 0.811. The Fear of COVID-19 Scale has internal consistency ($\alpha = 0.82$) and test-retest reliability (ICC = 0.72), 7-item and five Likert scales (1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree) and ranges from 7 to 35¹. In the Indonesian version, a total score of > 21.8 indicates a high level of fear of COVID-19, a score of 11.9-21.8 indicates a moderate level of fear of COVID-19, and a score of < 11.9 indicates a low level of fear of COVID-19.

All questionnaires used in the survey were administered via mobile devices to 377 health workers who worked and did not work or were being isolated during the COVID-19 pandemic period at Baubau City General Hospital between September 26th, 2020 - December 16th, 2020. A total of 236 out of 377 health workers completed the questionnaire. Among 236 health workers, 227 health workers showed symptoms of posttraumatic stress and 9 health workers showed no symptoms of posttraumatic stress. A total of 227 health workers with posttraumatic stress symptom became the focus in this study (Figure 1). This univariate analysis illustrates the distribution and percentage of each variable. Bivariate analysis uses chi-square analysis and multivariate analysis using logistic regression. Stata 16 software package is used with 95% confidence interval ($\alpha = 0.05$). This study used a 10% OR change to build the model. A potential confounder is added to the model.

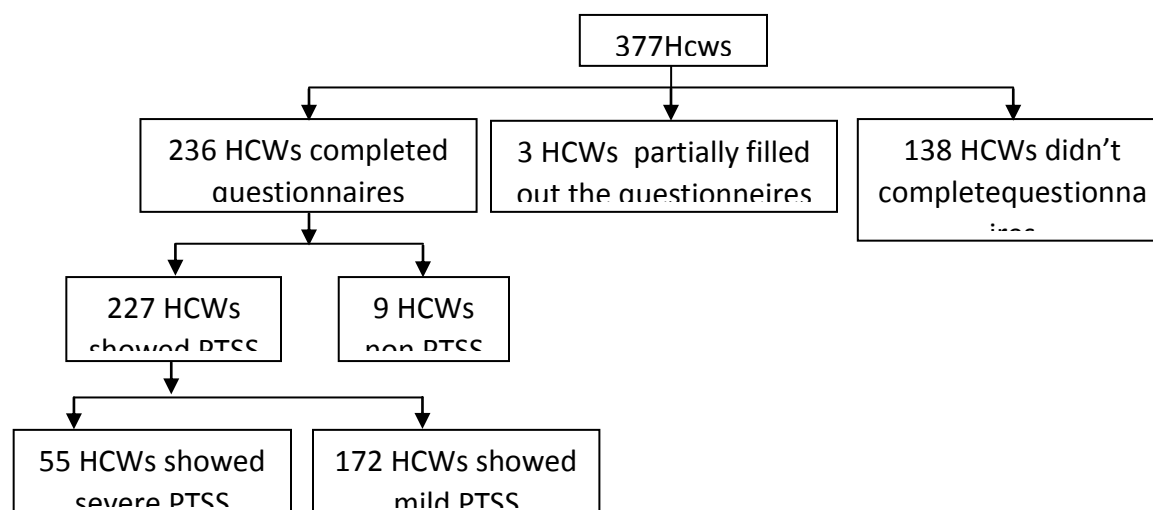


Figure 1. Summary of survey progress

RESULTS

Characteristics of Respondents

A total of 377 health workers with a minimum of 3 diploma educations were asked to participate in the study, consisting of 36 doctors (9.5%), 230 nurses (61%), 51 midwives (13.5%), 60 medical technicians (16%). From 236 health workers (62.59%) completed the survey, 9 health workers (3.8%) without symptoms of post-traumatic stress was not included in the research criteria so that only 277 health workers (96.2%) with the symptoms of post-traumatic stress studied (Fig. 1). A total of 277 respondents with post-traumatic stress symptoms completed the survey, 23 (10.13%) is a doctor, 138 (60.79%) are nurses, 40 (17.62%) are midwives, and 26 (11.45%) is a medical technician. The majority of respondents were women (77.53%), aged 30-49 years (49.34%), married (56.39%), had a D3-S1 education level (93.39%), worked as a nurse (60.79%), had less than 2 years of work experience (28.19%), do not have family members who are suspect or confirmed to suffer from COVID-19 (90.75%), have friends and workmates who suspect or confirmed suffering from COVID-19 (51.10%), stay at home with family members (72.25%), do not treat suspect patients or confirmed suffering from COVID-19 (49.78%), were unavoidable by family members and friends (64.76%), had no comorbid (97.36%), and had moderate COVID-19 fear levels (66.96%) (Table 1).

Dimensions of post-traumatic stress symptoms and related variables

The dimensions of post-traumatic stress symptoms that stood out in health workers were anxious arousal (95.59%; 1.56 ± 1.23), negative affect (89.87%; 1.27 ± 1.16) and avoidance (87.22%; 0.96 ± 1.05). Gender is associated with symptoms of intrusion ($p = 0.000$) and avoidance ($p = 0.013$). Meanwhile, fear of COVID-19 is associated with symptoms of intrusion ($p = 0.003$), avoidance ($p = 0.000$), anhedonia ($p = 0.002$), anxious arousal ($p = 0.000$), and dysphoric arousal ($p = 0.000$) (Table 2).

Severity of post-traumatic stress symptoms and related variables

Bivariate analysis shows that health workers with current work placement ($p = 0.041$) and fear of COVID-19 ($p = 0.000$) are more likely to experience symptoms of severe posttraumatic stress (Table 3). Work, housing, and work experience were the key variables in this study (Figure 2).

Risk factors for post-traumatic stress symptoms

Multivariate analysis shows that it does not work or is being isolated (OR = 16,464; 95% CI = 1,141-237,667; $p = 0.040$), avoided by family members and friends (OR = 3,287; 95% CI = 1,180-9,152; $p = 0.023$), and has a high level of fear of COVID-19 (OR = 14,605; 95% CI = 2,899-73,581; $p = 0.001$) is associated with symptoms of severe posttraumatic stress. A risk factor that greatly affects the symptoms of severe posttraumatic stress is not working or being isolated, with OR = 16,464. 6-10 years of work experience is a protective factor against severe posttraumatic stress symptoms (OR = 0.315; 95% CI = 0.099-0.997; $p = 0.049$) (Table 4).

Table 1. Characteristics of respondents

Characteristics of respondents	No.	%
Age group (year)		
19-29	111	48,90
30-49	112	49,34
≥ 50	4	1,76
Sex		
Male	176	77,53
Female	51	22,47
Marital status		
Single	93	40,97
Married	128	56,39
Divorced	6	2,64
Education Level		
Diploma 3 – Bachelor degree	212	93,39
Master degree and higher level	15	6,61
Occupation		
Doctor	23	10,13
Nurse	138	60,79
Midwife	40	17,62
Medical technician	26	11,45
Work experience		
< 2 years	64	28,19
2-5 years	62	27,31
6-10 years	47	20,70
> 10 years	54	23,79
Family members suspected or confirmed COVID-19		
Yes	21	9,25
No	166	90,75
Friends or relatives suspected or confirmed COVID-19		
Yes	116	51,10
No	111	48,90
Residence		
Living in the inn/hotel, etc	164	72,25
Living in the home with family members	63	27,75
Current work placement		

Not treating suspected or confirmed COVID-19 patients	113	49,78
Treating suspected or confirmed COVID-19 patients	110	48,46
Off work or in isolation	4	1,76
Feel of family members and friends Avoidance		
Don't avoid	147	64,76
Unsure	46	20,26
Avoid	34	14,98
Comorbid		
Yes	6	2,64
No	221	97,36
Fear of COVID-19		
Low	46	20,26
Medium	152	66,96
High	29	12,78

Table 3. Percentage dimensions of post-traumatic stress symptoms

Variables	Dimension of posttraumatic stress symptom													
	INT		AV		NA		AN		EB		AA		DA	
	No. (%)	<i>P</i>	No. (%)	<i>p</i>	No. (%)	<i>p</i>	No. (%)	<i>p</i>	No. (%)	<i>P</i>	No. (%)	<i>p</i>	No. (%)	<i>p</i>
Age group (year)														
19-29	94(84.68)	0.358	85(76.58)	0.361	96(86.49)	0.229	86(77.48)	0.841	24(21.62)	0.207	107(96.40)	0.743	73(65.77)	0.188
30-49	101(90.18)		89(79.46)		104(92.86)		83(74.11)		36(32.14)		106(94.64)		61(54.46)	
≥ 50	3(75.00)		2(50)		4(100)		3(75)		1(25)		4(100)		3(75)	
Sex														
Male	37(72.5)	0.000	33(64.71)	0.013	44(86.27)	0.334	38(74.51)	0.811	12(23.53)	0.541	48(94.12)	0.559	33(64.71)	0.470
Female	161(91.48)		143(81.25)		160(90.91)		134(76.14)		49(27.84)		169(96.02)		104(59.09)	
Marital status														
Single	77(82.80)		70(75.27)		82(88.17)		71(76.34)		23(24.73)		90(96.77)		58(62.37)	
Married	116(90.63)	0.218	101(78.91)	0.768	117(91.41)	0.635	97(75.78)	0.866	36(28.13)	0.800	121(94.53)	0.629	75(58.59)	0.809
Divorced	5(83.33)		5(83.33)		5(83.33)		4(66.67)		2(33.33)		6(100)		4(66.67)	
Education Level														
Diploma 3 – Bachelor degree	186(87.74)	0.386	166(78.30)	0.297	189(89.15)	0.178	162(76.42)	0.394	56(26.42)	0.559	202(95.28)	0.390	127(59.91)	0.605
Master degree and higher level	12(80)		10(66.67)		15(100)		10(66.67)		5(33.33)		15(100)		10(66.67)	
Occupation														
Doctor	19(82.61)		13(56.52)		22(95.65)		15(65.22)		5(21.74)		22(95.65)		14(60.87)	
Nurse	121(87.68)	0.742	112(81.16)	0.067	127(92.03)	0.193	107(77.54)	0.326	39(28.26)	0.793	133(96.38)	0.825	82(59.42)	0.514
Midwife	34(85)		30(75)		33(82.50)		28(70)		9(22.50)		38(95)		22(55)	
Medical technician	24(92.31)		21(80.77)		22(84.62)		22(84.62)		8(30.77)		24(92.31)		19(73.08)	
Work experience														
< 2 years	54(84.38)		51(79.69)		56(87.50)		53(82.81)		18(28.13)		63(98.44)		38(59.38)	
2-5 years	55(88.71)	0.711	49(79.03)	0.762	56(90.32)	0.258	50(80.65)	0.119	17(27.42)	0.962	59(95.16)	0.362	44(70.97)	0.218
6-10 years	40(85.11)		37(78.72)		40(85.11)		31(65.96)		13(27.66)		43(91.49)		26(55.32)	
> 10 years	49(90.74)		39(72.22)		52(96.30)		38(70.37)		13(24.07)		52(96.30)		29(53.70)	
Family members suspected or confirmed COVID-19														
Yes	19(90.48)	0.639	17(80.95)	0.694	20(95.24)	0.392	17(80.95)	0.561	5(23.81)	0.740	20(95.24)	0.933	14(66.67)	0.535
No	179(86.89)		159(77.18)		184(89.32)		155(75.24)		56(27.18)		197(95.63)		123(59.71)	
Friends or relatives suspected or confirmed COVID-19														
Yes	105(90.52)	0.129	96(82.76)	0.054	108(93.10)	0.099	86(74.14)	0.557	30(25.86)	0.726	109(93.97)	0.221	68(58.62)	0.586
No	93(83.78)		80(72.07)		96(86.49)		86(77.48)		31(27.93)		108(97.30)		69(62.16)	

Residence													
Living in the inn/hotel, etc	53(84.13)		51(80.95)		53(84.13)		50(79.37)		16(25.40)		59(93.65)		40(63.49)
Living in the home with family members	145(88.41)	0.386	125(76.22)	0.444	151(92.07)	0.076	122(74.39)	0.433	45(27.44)	0.756	158(96.34)	0.376	97(59.15) 0.549
Current work placement													
Not treating suspected or confirmed COVID-19 patients	102(90.27)		90(79.65)		105(92.92)		86(76.11)		28(24.78)		108(95.58)		71(62.83)
Treating suspected or confirmed COVID-19 patients	92(83.64)	0.247	82(74.55)		95(86.36)	0.213	82(74.55)	0.503	32(29.09)	0.765	105(95.45)	0.910	62(56.36) 0.161
Off work or in isolation	4(100)		4(100)		4(100)		4(100)		1(25)		4(100)		4(100)
Feel of family members and friends Avoidance													
Don't avoid	128(87.07)		114(77.55)		131(89.12)		107(72.79)		44(29.93)		140(95.24)		90(61.22)
Unsure	41(89.13)	0.875	34(73.91)	0.670	42(91.30)	0.878	40(86.96)	0.139	11(23.91)	0.305	45(97.83)	0.682	28(60.87) 0.845
Avoid	29(85.29)		28(82.35)		31(91.18)		25(73.53)		6(17.65)		32(94.12)		19(55.88)
Comorbid													
Yes	5(83.33)		4(66.67)		6(100)		4(66.67)		3(50)		6(100)		4(66.67)
No	193(87.33)	0.772	172(77.83)	0.518	198(89.59)	0.405	168(76.02)	0.598	58(26.24)	0.195	211(95.48)	0.594	133(60.18) 0.749
Fear of COVID-19													
Low	20(68.97)		16(55.17)		23(79.31)		16(55.17)		5(17.24)		23(79.31)		11(37.93)
Medium	134(88.16)	0.003	116(76.32)	0.000	138(90.79)	0.114	114(75)	0.002	45(29.61)	0.341	148(97.37)	0.000	85(55.92) 0.000
High	44(5.65)		44(95.65)		43(93.48)		42(91.30)		11(23.91)		46(100)		41(89.13)
Total (%)	198(8.22)		176(77.53)		204(89.87)		172(75.77)		61(26.87)		217(95.59)		137(60.35)
Mean ±SD	0.96 ± 1.05		1.06 ± 1.15		1.27 ± 1.16		0.94 ± 1.05		0.26 ± 0.63		1.56 ± 1.23		0.77 ± 0.97

Note:

INT = intrusion, AV = avoidance, NA = negative affect, AN = anhedonia, EB = externalizing behavior, AA = anxious arousal, DA = dysphoric arousal

Mean and SD values of score of The Indonesian version of The Modified COVID-19-PTSD Questionnaire

Five points scale (0 = *not at all*; 1 = *a little bit*; 2 = *moderately*; 3 = *quite a bit*; 4 = *extremely*)

Table 4. Association of variables with posttraumatic stress symptom among HCWs identified by**Bivariate logistic regression analysis**

Variables	Severity of posttraumatic stress				<i>p</i> -value
	Mild		Severe		
	No.	%	No.	%	
Age group (year)					
19-29	81	72.97	30	27.03	0.621
30-49	88	78.57	24	21.43	
≥ 50	3	75.00	1	25.00	
Sex					
Male	132	75	44	25	0.615
Female	40	78.43	11	21.57	
Marital status					
Single	72	77.42	21	22.58	0.799
Married	96	75	32	25	
Divorced	4	66.67	2	33.33	
Education Level					
Diploma 3 – Bachelor degree	161	75.94	51	24.06	0.820
Master degree and higher level	11	73.33	4	26.67	
Occupation					
Doctor	18	78.26	5	21.74	0.155
Nurse	108	78.26	30	21.74	
Midwife	31	77.50	9	22.50	
Medical technician	15	57.69	11	42.31	
Work experience					
< 2 years	46	71.88	18	28.13	0.205
2-5 years	43	69.35	19	30.65	
6-10 years	40	85.11	7	14.89	
> 10 years	43	79.63	11	20.37	
Family members suspected or confirmed COVID-19					
Yes	13	61.90	8	38.10	0.120
No	159	77.18	47	22.82	
Friends or relatives suspected or confirmed COVID-19					
Yes	87	75	29	25	0.782
No	85	76.58	26	23.42	
Residence					
Living in the inn/hotel, etc	52	82.54	11	17.46	0.140
Living in the home with family members	120	73.17	44	26.83	
Current work placement					

Not treating suspected or confirmed COVID-19 patients	84	74.34	29	25.66	0.041
Treating suspected or confirmed COVID-19 patients	87	79.09	23	20.91	
Off work or in isolation	1	25	3	75	
Feel of family members and friends avoidance					
Don't avoid	117	79.59	30	20.41	0.187
Unsure	32	69.57	14	30.43	
Avoid	23	67.65	11	32.35	
Comorbid					
Yes	4	66.67	2	33.33	0.598
No	168	76.02	53	23.98	
Fear of COVID-19					
Low	27	93.10	2	6.90	0.000
Medium	122	80.26	30	19.74	
High	23	50	23	50	
Total	55	24.23	172	75.77	

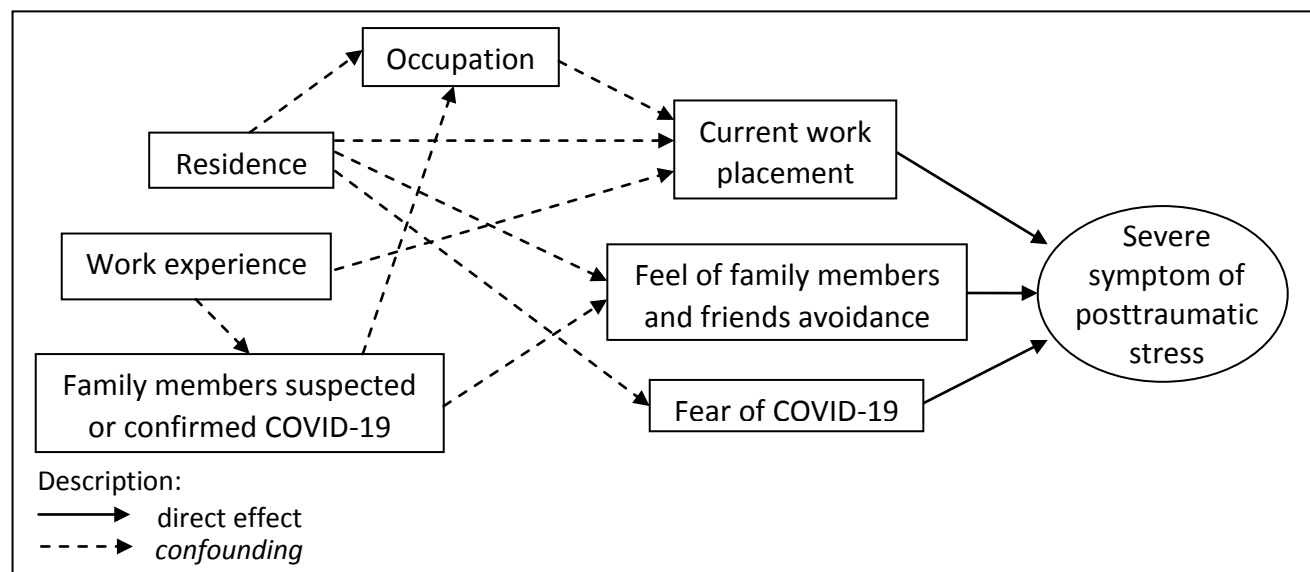


Figure2. Modeling scheme

Table 5. Risk factors for posttraumatic stress symptom Among HCWs identified by Multivariate logistic regression analysis

Variable	<i>P</i>	OR	95% CI
Occupation			
Doctor	Ref	Ref	Ref
Nurse	0.941	1.048	0.301-3.645
Midwife	0.803	0.822	0.176-3.844
Medical technician	0.134	3.053	0.709-13.142
Work experience			
< 2 years	Ref	Ref	Ref
2-5 years	0.786	0.875	0.333-2.298
6-10 years	0.049	0.315	0.099-0.997
> 10 years	0.180	0.491	0.174-1.388
Family members suspected or confirmed COVID-19			
No	Ref	Ref	Ref
Yes	0.085	2.854	0.864-9.431
Current work placement			
Not treating suspected or confirmed COVID-19 patients	Ref	Ref	Ref
Treating suspected or confirmed COVID-19 patients	0.991	1.005	0.385-2.625
Off work or in isolation	0.040	16.464	1.141-237.667
Residence			
Living in the inn/hotel, etc	Ref	Ref	Ref
Living in the home with family members	0.051	3.027	0.996-9.200
Feel of family members and friends			
Avoidance			
Don't avoid	Ref	Ref	Ref
Unsure	0.496	1.374	0.550-3.430
Avoid	0.023	3.287	1.180-9.152
Fear of COVID-19			
Low	Ref	Ref	Ref
Medium	0.113	3.505	0.745-16.496
High	0.001	14.605	2.899-73.581

DISCUSSION

Post-traumatic stress disorder is a profound public health burden²¹. Post-traumatic stress disorder becomes a public health problem that can affect individuals in every sector of society and be of concern to children and adults⁷. Especially for health workers who are a group that is at risk of experiencing symptoms of post-traumatic stress. In survivors, SARS-CoV-2 as a pathogenic agent can cause a full cascade of stress responses, SARS-CoV-2 and its receptor *angiotensin-converting enzyme 2* (ACE2) can have an impact on the endocrine stress system i.e. *hypothalamic-pituitary-adrenal* (HPA) *axis*, excessive or chronic activation of the *endocrine stress axis* or *HPA axis* can trigger and contribute to stress conditions in humans such as post-traumatic stress disorder³¹. Other studies show that during SARS outbreaks, SARS survivors who are health workers have stress levels similar to those of non-health workers, but health workers significantly show a high posttraumatic symptom level of¹⁷.

A cross-sectional survey conducted on health workers at Baubau City General Hospital showed that 55 (24.23%) and 172 (75.77%) Health workers are reported to experience severe symptoms and mild symptoms of posttraumatic stress. The dominant dimension of posttraumatic stress symptoms experienced by health workers is anxious arousal (95.59%), negative affect (89.87%) and avoidance (87.22%).

This study shows that health workers who are not working or are being isolated are very likely to experience severe symptoms of posttraumatic stress compared to those who work not treating suspect patients or confirmed COVID-19. Other studies report that health workers who are isolated or quarantined due to infection are at high risk of experiencing posttraumatic stress symptoms^{10,32,43}. On the other hand, isolation is done to provide appropriate treatment for patients in order to recover from the disease and limit the reach of patients with healthy people in order to prevent the spread of infectious diseases, but psychological problems such as posttraumatic stress disorder can arise and require special attention during the isolation period of¹³. In addition, the condition of isolated individuals causes daily activities to be disrupted, the response from the surrounding community, isolated, parting with family members at home becomes a factor that causes the occurrence of emotional mental disorders²⁶. Unlike patients from the general public, health workers who are isolated or quarantined are more at risk of severe symptoms of posttraumatic stress²⁷.

This study also shows that feelings of avoidance of family members and friends are associated with severe symptoms of posttraumatic stress. Other research shows that more than a quarter of people believe that health workers should have restrictions on their freedom as health workers are not allowed to be in the general public, isolated from society and separated from their families, and more than a third of people state that they will avoid health workers for fear of contracting COVID-19³⁹. This is in line with previous research that shows that health workers are considered as a source of disease transmission so often get avoidance and stigmatization in society^{2,15}.

Other results showed that covid-19 fears were significantly associated with posttraumatic stress symptoms such as intrusion, avoidance, anhedonia, anxious arousal and dysphoric arousal.

In addition, health workers who have a high level of FEAR of COVID-19 are more at risk of having severe symptoms of posttraumatic stress than those with low levels of COVID-19 fear. Fear is part of the body's normal "fight or flight" response that helps us avoid potential dangers²⁵. The "fight or flight" response can cause the brain to stimulate the adrenal glands to produce 38 stress hormones. Other studies have shown that SARS-related fears are associated with *posttraumatic stress* symptoms in health workers who are recovering from SARS infection, they are reported to experience symptoms of post-traumatic stress intrusion and are more concentric to health problems and discrimination¹¹. They are afraid if he infects others especially to family members rather than fear if he is infected^{3,11}.

The study showed gender had a significant association with symptoms of intrusion and avoidance of posttraumatic stress and the majority experienced by women. Women in dealing with things tend to be detailed and if faced with a problem, they put more emphasis on feelings so that some of the information received can suppress their feelings as a result they are more prone to psychological problems than men^{6,8}. On the other hand, women have ovarian hormone levels that tend to fluctuate during the menstrual cycle so that changes in emotional stimulus occur, the presence of an increase in intrusive flashbacks can underlie specific susceptibility in women in experiencing psychological disorders^{19,29}.

Other results showed that 6-10 work experience became a protective factor against severe symptoms of posttraumatic stress in health workers. Other studies show that the limited skills, knowledge and self-regulation skills of health workers who have less than 3 years of work experience are at risk of post-traumatic stress disorder compared to those with 3-5 years of work experience³⁷ years.

Research limitations

The use of online questionnaires makes it difficult for researchers to control respondents when filling out questionnaires so that the answers given by respondents do not necessarily describe the actual state of the respondent. Some respondents were less familiar with using online questionnaires. Lack of interest in health workers to participate in surveys.

CONCLUSION

The fear level of COVID-19 is high, not working or being isolated and feeling avoided by family members and friends because their work as health workers can cause severe symptoms of posttraumatic stress. Not working or being isolated are the most influential risk factors compared to other risk factors. Psychological interventions and the support of family members and friends may be helpful.

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REFERENCES

1. Ahorsu, D. K., Lin, C., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The Fear of COVID-19 Scale : Development and Initial Validation. *International Journal of Mental Health and Addiction*. <https://doi.org/10.1007/s11469-020-00270-8>
2. Bai, Y. M., Lin, C. C., Lin, C. Y., Chen, J. Y., Chue, C. M., & Chou, P. (2004). Survey of stress reactions among health care workers involved with the SARS outbreak. *Psychiatric Services*, 55(9), 1055–1057. <https://doi.org/10.1176/appi.ps.55.9.1055>
3. Carmassi, C., Foghi, C., Dell, V., Cordone, A., Bertelloni, C. A., Bui, E., & Dell’Osso, L. (2020). PTSD symptoms in healthcare workers facing the three coronavirus outbreaks : What can we expect after the COVID-19 pandemic. *Psychiatry Research*, 292, 1–10. <https://doi.org/https://doi.org/10.1016/j.psychres.2020.113312>
4. Chong, M. Y., Wang, W. C., Hsieh, W. C., Lee, C. Y., Chiu, N. M., Yeh, W. C., Huang, T. L., Wen, J. K., & Chen, C. L. (2004). Psychological impact of severe acute respiratory syndrome on health workers in a tertiary hospital. *British Journal of Psychiatry*, 185(AUG.), 127–133. <https://doi.org/10.1192/bjp.185.2.127>
5. Dai, Y., Hu, G., Xiong, H., Qiu, H., & Yuan, X. (2020). Psychological impact of the coronavirus disease 2019 (COVID-19) outbreak on healthcare workers in China. *MedRxiv Preprint*, 2019(1095). <https://doi.org/10.1101/2020.03.03.20030874>
6. Djamahar, R. Dewahrani, Y. R., Octaviani, R. (2020). Relationship Between Self-Esteem and Negative Emotional State with Academic Procrastination in Final Level Students. *Indonesian Journal of Biology Education*, 3(1), 6-12.
7. Edwards, D. (2005). Post-traumatic stress disorder as a public health concern in South Africa. *Journal of Psychology in Africa*, 15(2), 125-134, retrieved February 11, 2021, from <https://www.ajol.info/index.php/jpa/article/view/30650>
8. Farooqi, Y. N., Ghani, R., Spielberger, C. D. (2012). Gender differences in test anxiety and academic performance of medical students. *International Journal of Psychology and Behavioral Sciences*, 2(2), 38-43. Soni, M., Curran, V.H., Kamboj, S.K. (2013). Identification of a narrow post-ovulatory window of vulnerability to distressing involuntary memories in healthy women. *Neurobiol. Learn. Mem*, 104, 32-38. <https://doi.org/10.1016/j.nlm.2013.04.003>
9. Forte, G., Favieri, F., Tambelli, R., & Casagrande, M. (2020). COVID-19 Pandemic in the Italian Population: Validation of a Post-Traumatic Stress Disorder Questionnaire and Prevalence of PTSD Symptomatology. *International Journal of Environmental Research and Public Health*, 17(4151), 1–14. <https://doi.org/10.3390/ijerph17114151>
10. Hawryluck, L., Gold, W. L., Robinson, S., Pogorski, S., Galea, S., & Styra, R. (2004). SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging Infectious Diseases*, 10(7), 1206–1212. <https://doi.org/10.3201/eid1007.030703>
11. Ho, S. M. Y., Kwong-Lo, R. S. Y., Mak, C. W. Y., & Wong, J. S. (2005). Fear of severe acute respiratory syndrome (SARS) among health care workers. *Journal of Consulting and Clinical Psychology*, 73(2), 344–349. <https://doi.org/10.1037/0022-006X.73.2.344>

12. Huang, J., Han, M., Luo, T., Ren, A., & Zhou, X. (2020). *Mental health survey of 230 medical staff in a tertiary infectious disease hospital for COVID-19*. <https://doi.org/10.3760/cma.j.cn121094-20200219-00063>
13. Huremović, D. (2019). *Psychiatry of Pandemics: A Mental Health Response to Infection Outbreak*. Springer Nature, Switzerland.
14. Kang, L., Ma, S., Chen, M., Yang, J., Wang, Y., Li, R., Yao, L., Bai, H., Cai, Z., Xiang, B., Hu, S., Zhang, K., & Wang, G. (2020). Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain, Behavior, and Immunity*, xxx(March), 1–7. <https://doi.org/10.1016/j.bbi.2020.03.028>
15. Koh, D., Lim, M. K., Chia, S. E., Ko, S. M., Quan, F., Ng, V., Tan, B. H., Wong, K. S., Chew, W. M., Tang, H. K., Ng, W., Muttakin, Z., Emmanuel, S., Fong, N. P., Koh, G., Kwa, C. T., Tan, K. B. C., Fones, C. (2005). Risk Perception and Impact of Severe Acute Respiratory Syndrome (SARS) on Work and Personal Lives of Healthcare Workers in Singapore *What Can We Learn?*. *Medical Care*, 43(7), 676-682.
16. Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Network Open*, 3(3), e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976>
17. Lee, A. M., Wong, J. G. W. S., McAlonan, G. M., Cheung, V., Cheung, C., Sham, P. C., Chu, C., Wong, P., & Tsang, K. W. T. (2007). *Stress and Psychological Distress Among SARS Survivors 1 Year After the Outbreak*. 52(4), 233–240.
18. Lee, S. M., Kang, W. S., Cho, A.-R., Kim, T., & Park, J. K. (2018). Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Comprehensive Psychiatry*, 87, 123–127. <https://doi.org/10.1016/j.comppsy.2018.10.003>
19. Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., & Sun, L. (2020). Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry Research*, 287(112921), 1–7. <https://doi.org/10.1016/j.psychres.2020.112921>
20. Lung, F., Lu, Y., Shu, B., & Chang, Y. (2009). Mental Symptoms in Different Health Professionals During the SARS Attack: A Follow-up Study. *Psychiatr Q*, 80, 107–116. <https://doi.org/10.1007/s11126-009-9095-5>
21. Magruder, K.M., McLaughlin, K.A., Barbon, D.L.E. (2017). Trauma is a public health issue. *European Journal of psychotraumatology*, 8, 1-9, <http://doi.org/10.1080/20008198.2017.1375338>
22. Maunder, R. G., Lancee, W. J., Rourke, S., Hunter, J. J., Goldbloom, D., Balderson, K., Petryshen, P., Steinberg, R., Wasylenki, D., Koh, D., & Fones, C. S. L. (2004). Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosomatic Medicine*, 66(6), 938–942. <https://doi.org/10.1097/01.psy.0000145673.84698.18>
23. Maunder, R. G., Lancee, W. J., Balderson, K. E., Bennett, J. P., Borgundvaag, B., Evans, S., Fernandes, C. M. B., Goldbloom, D. S., Gupta, M., Hunter, J. J., Hall, L. M. G., Nagle, L. M., Pain, C., Peczeniuk, S. S., Raymond, G., Read, N., Rourke, S. B., Steinberg, R. J., Stewart, T. E., Coke, S. V., Veldhorst, G. G., Wasylenki, D. A. (2006). Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerging Infectious Diseases*, 12(12), 1924–1932.

<https://doi.org/10.3201/eid1212.060584>

24. Ministry of Health of the Republic Indonesia (2020). Situasi Terkini Perkembangan Coronavirus Disease (COVID-19) 16 Agustus 2020. Retrieved August 16, 2020. <https://infeksiemerging.kemkes.go.id/situasi-infeksi-emerging/situasi-terkini-perkembangan-coronavirus-disease-covid-19-16-agustus-2020>
25. National Institute of Mental Health. (2020). Post-Traumatic Stress Disorder. Retrieved January 12, 2021, from <https://www.nimh.nih.gov/health/topics/post-traumatic-stress-disorder-ptsd/index.shtml>
26. Nurjanah, S. (2020). Gangguan Mental Emosional pada Klien Pandemi COVID-19 di Rumah Karantina. *Jurnal Ilmu Keperawatan Jiwa*, 3(3), 329-334.
27. Reynolds, D. L., Garay, J. R., Deamond, S. L., Moran, M. K., Gold, W., Styra, R. (2008). Understanding, compliance and psychological impact of the SARS quarantine experience. *Epidemiol. Infect.* 136, 997-107. <https://doi.org/10.1017/S0950268807009156>
28. Sim, K., Chong, P. N., Chan, Y. H., & Soon, W. S. W. (2004). Severe acute respiratory syndrome-related psychiatric and posttraumatic morbidities and coping responses in medical staff within a primary health care setting in Singapore. *J Clin Psychiatry*, 65(8), 1120–1127. <https://doi.org/10.4088/jcp.v65n0815>
29. Soni, M., Curran, V.H., Kamboj, S.K., 2013. Identification of a narrow post-ovulatory window of vulnerability to distressing involuntary memories in healthy women. *Neurobiol. Learn. Mem.* 104, 32–38. <https://doi.org/10.1016/j.nlm.2013.04.003>
30. Southeast Sulawesi Provincial Health Office (2020). Info COVID-19 SULTRA. Retrieved August 16, 2020, from <https://dinkes.sultraprov.go.id/info-covid-19-sultra/>
31. Steenblock, C., Todorov, V., Kanczkowski, W., Eisenhofer, G., Schedl, A., Wong, M. L., Licinio, J., Bauer, M., Young, A. H., Gainetdinov, R. R., & Bornstein, S. R. (2020). Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the neuroendocrine stress axis. *Molecular Psychiatry*, 2. <https://doi.org/10.1038/s41380-020-0758-9>
32. Styra, R., Hawryluck, L., Robinson, S., Kasapinovic, S., Fones, C., & Gold, W. L. (2008). Impact on health care workers employed in high-risk areas during the Toronto SARS outbreak. *Journal of Psychosomatic Research*, 64(2), 177–183. <https://doi.org/10.1016/j.jpsychores.2007.07.015>
33. Sun, L., Sun, Z., Wu, L., Zhu, Z., Zhang, F., Shang, Z., Jia, Y., Gu, J., Zhou, Y., Wang, Y., Liu, N., & Liu, W. (2020). Prevalence and Risk Factors of Acute Posttraumatic Stress Symptoms during the COVID-19 Outbreak in Wuhan, China. *MedRxiv*, March, 2020.03.06.20032425. <https://doi.org/10.1101/2020.03.06.20032425>
34. Susilo, A., Rumende, C. M., Pitoyo, C. W., Santoso, W. D., Yulianti, M., Sinto, R., Singh, G., Nainggolan, L., Nelwan, E. J., Khie, L., Widhani, A., Wijaya, E., Wicaksana, B., Maksum, M., Annisa, F., Jasirwan, O. M., Yuniastuti, E., Penanganan, T., New, I., ... Cipto, R. (2020). Coronavirus Disease 2019: Tinjauan Literatur Terkini Coronavirus Disease 2019: Review of Current Literatures. *Jurnal Penyakit Dalam Indonesia*, 7(1), 45–67.
35. Tam, C. W. C., Pang, E. P. F., Lam, L. C. W., & Chiu, H. F. K. (2004). Severe acute respiratory syndrome (SARS) in Hongkong in 2003: Stress and psychological impact among frontline healthcare workers. *Psychological Medicine*, 34(7), 1197–1204. <https://doi.org/10.1017/S0033291704002247>

36. Tan, Y. B., Chew, N., Jing, M., & Lee, G. (2020). Psychological Impact of the COVID-19 Pandemic on Health Care Workers in Singapore. *Annals of Internal Medicine*, 1–3. <https://doi.org/10.7326/M20-1083>
37. Tang, L., Pan, L., Yuan, L., & Zha, L. (2017). Prevalence and related factors of post-traumatic stress disorder among medical staff members exposed to H7N9 patients. *International Journal of Nursing Sciences*, 4(1), 63–67. <https://doi.org/10.1016/j.ijnss.2016.12.002>
38. Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A. R., Updegraff, J. A. (2000). Biobehavioral Responses to Stress in Females: Tend-and-Befriend, non Fight-or-Flight. *Psychological Review*, 107(3), 411-429.
39. Taylor, S., Landry, C. A., Rachor, G. S., Paluszek, M. M., Asmundson, G. J. G. (2020). Fear and Avoidance of healthcare workers: An important, under-recognized form of stigmatization during the COVID-19 pandemic. *Journal of Anxiety Disorders*, 75, 1-6. <https://doi.org/10.1016/j.janxdis.2020.102289>
40. Temsah, M. H., Al-Sohime, F., Alamro, N., Al-Eyadhy, A., Al-Hasan, K., Jamal, A., Al-Maghlouth, I., Aljamaan, F., Al Amri, M., Barry, M., Al-Subaie, S., & Somily, A. M. (2020). The psychological impact of COVID-19 pandemic on health care workers in a MERS-CoV endemic country. *Journal of Infection and Public Health*, 13, 877–882. <https://doi.org/10.1016/j.jiph.2020.05.021>
41. World Health Organization. (2020a). WHO Timeline – COVID-19. Retrieved May 19, 2020, from <https://www.who.int/news-room/detail/27-04-2020-who-timeline---COVID-19>
42. World Health Organization. (2020b). Coronavirus disease (COVID-19) Situation Report – 209, retrieved January 29, 2021, from https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200816-covid-19-sitrep-209.pdf?sfvrsn=fdde1ca2_2
43. Wu, P., Fang, Y., Guan, Z., Fan, B., Kong, J., Yao, Z., Liu, X., Fuller, C. J., Susser, E., Lu, J., & Hoven, C. W. (2009). The psychological impact of the SARS epidemic on hospital employees in China: Exposure, risk perception, and altruistic acceptance of risk. *Canadian Journal of Psychiatry*, 54(5), 302–311. <https://doi.org/10.1177/070674370905400504>
44. Yin, Q., Sun, Z., Liu, T., Ni, X., Deng, X., Jia, Y., Shang, Z., Zhou, Y., & Liu, W. (2020). Posttraumatic stress symptoms of health care workers during the corona virus disease 2019. *Clinical Psychology and Psychotherapy*, 27(3), 384–395. <https://doi.org/10.1002/cpp.2477>
45. Zhu, Z., Xu, S., Wang, H., Liu, Z., Wu, J., Li, G., Miao, J., Zhang, C., Yang, Y., Sun, W., Zhu, S., Fan, Y., Hu, J., Liu, J., & Wang, W. (2020). COVID-19 in Wuhan: Immediate Psychological Impact on 5062 Health Workers. *MedRxiv*. <https://doi.org/10.1101/2020.02.20.20025338>
46. Bleyere, M. N. ., Oussou, J.-B. N. ., Amani , J. P. A. ., & Yapo, P. A. . (2020). Assessment of Haematological and Biochemical Parameters of Women at Childbirth and their Newborn in Abidjan, Côte d’ Ivoire. *Journal of Scientific Research in Medical and Biological Sciences*, 1(2), 91-108. <https://doi.org/10.47631/jsrmb.v1i2.44>