

## Risk of Burnout in Front-Line Health Care Workers When Combating Covid-19: A Prospective Cross-Sectional Study

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### ABSTRACT

Specialist resident education is a level of professional development to improve the professional qualifications of specialist doctors, which is a tough and stressful process. Medical personnel who treat patients exposed to COVID-19 experience *burnout*. This study was to determine the risk of burnout in anesthesiology residents and intensive care as a frontline during the COVID-19 pandemic era. The research design was an observational analytic study that was cross-sectional towards residents who served in the Special Isolation Room of Dr. Soetomo Surabaya. The sample in this study used total sampling and obtained 35 respondents. The statistical test used multiple linear regression. Each research subject was given an online Maslach *Burnout* Inventory (MBI) questionnaire assessment of the Maslach *Burnout* Inventory (MBI) questionnaire given before serving in the Special Isolation Room (Pre-RIK), post-assignment (Post-RIK) in the Special Isolation Room and post Self Isolation (Post-ISOMAN). *Burnout* study in resident Anesthesiology and Intensive Care at Dr. Soetomo in the prevention of COVID-19 in Pre-RIK showed that 3 people had a *burnout* of 9.37% and 32 people had no *burnout* at 90.63%. At Post-RIK there were 3 *burnouts* (9.37%) and 32 people (90.63%) without *burnout*. In Post-ISOMAN there was 1 *burnout* (2.85%) and without *burnout* of 34 people (97.15%). In the study, it was found that resident receipts in 2019 experienced more burnout, compared to resident at the end of the year.

**Keywords:** anesthesiologist resident; *burnout*; COVID-19; MBI

### INTRODUCTION

Residents who undergo education in developing countries experience more severe conditions than in developed countries. Physician burnout has reached epidemic levels with an estimated prevalence of between 30% and over 54%. Burnout is a consequence of prolonged and excessive stress, which occurs when the ability is deemed unable to meet demands (Barello et al., 2020). The subsequent burnout is characterized by a triad of emotional exhaustion, decreased sense of accomplishment, and depersonalization. Compared with the general population, physicians had twice the risk of burnout, and 1.4-2.3 times the relative risk of suicide for male and female physicians, respectively (Sumner & Kinsella, 2021).

Compared with other physicians, anesthesiologists have been to have higher risk run into burnout, substance abuse, and death from suicide. What is more worrying is that the risk of burnout was highest during the resident's education. (Spence et al., 2018). Compared with anesthesiologists, anesthesiologist residents had twice the incidence of substance abuse and three times the incidence of suicide. (Fry et al., 2015)

This has significant implications not only for the personal well-being and the next generation of professional anesthesiologists but also for patient care and safety. (De Oliveira et al., 2013)

The world was shocked by the COVID-19 outbreak, namely Coronavirus disease 2019, which was first announced in Wuhan, China on November 17, 2019, then spread to various countries in the world (Sultana et al., 2020). On March 11, 2020, WHO declared COVID-19 a pandemic. In Indonesia, COVID-19 was first discovered and officially announced by the President of the Republic of Indonesia on March 2, 2020, and since then the coronavirus has spread to various provinces in Indonesia (Prabowo et al., 2020).

Some of the factors that influence burnout among residents include gender, age, marital status, level of education, personality, and occupational stressors (Sumner & Kinsella, 2021). Based on the background above, this study has a purpose to observe risk factors of burnout toward front-line health workers to combat COVID-19 in Dr. Soetomo Hospital. The practical implication of this study is to help in giving an evaluation of burnout condition in front-line health workers so that it will avoid any further victims of health workers' death.

## MATERIALS AND METHOD

The study design is a cross-sectional observational analytic study. To analyze *burnout*, it was measured using the *Maslach Burnout Inventory*, as well as with Tempa T research in the Isolation Room Special Hospital Dr. Soetomo Surabaya.

The research was conducted from July to October 2020, after approval by the ethics committee of Hospital Dr. Soetomo Surabaya. The population for this study are residents of Anesthesiology and Intensive Therapy that work in the Isolation Room Special Hospital, Dr. Soetomo Surabaya (Duan et al., 2019).

The subjects in this study were residents of Anesthesiology and Intensive Therapy FK Unair Dr. Soetomo Surabaya, who was willing to be a respondent. Each research subject was given an online questionnaire on characteristic data, the *Maslach Burnout Inventory (MBI) questionnaire* to determine the incidence and rate of *burnout*. Besides, research subjects will also fill out a questionnaire for Personality Types A and B from (Matsuo et al., 2020).

The sample size in this study is the populations size minus one (1). In the process of removing one sample, the simple random sampling technique was used. The sample size in this study 35 (Wardhana, 2020). Criteria for the inclusion of a sample that is no excuse to get information on research and research purposes (*listed in the information for consent*) and are willing to follow (*signed informed consent*). Sample were also included residents of Anesthesiologia and Intensive Therapy which in charge of a special isolation room Hospital Dr. Soetomo Surabaya (Tziomalos et al., 2017).

This study used participants of PPDS Anesthesiology and Intensive Therapy at the Faculty of Medicine, Airlangga University, Dr. Soetomo Surabaya totaling 35 people as research subjects. Each research subject is a resident of PPDS Anesthesiology and Intensive Therapy FK Unair RSUD Dr. Soetomo who served in the Isolation Room Special divided into 3 shifts where shift first consists of 3 PPDS, each shift guard has a duration of action for 12 hours, then rest 24 hours, after 2 weeks of work to isolate independently during 1 week and do a swab. If the result is negative, the resident returns to the general stage (Movlavi & Salehi, 2019).

Each research subject was given an online questionnaire on characteristic data, the *Maslach Burnout Inventory (MBI) questionnaire* to determine the incidence and level of *burnout* and salivary cortisol sampling in the morning when he was assigned to a special isolation room.

The *Maslach Burnout Inventory (MBI) questionnaire assessment* was given before serving in the Special Isolation Room (Pre-RIK), post-assignment (Post-RIK) in the Special Isolation Room, and after the Independent Isolation (Post-ISOMAN) (Gu et al., 2019).

The dependent variable for this study is *burnout*. The independent variables are Gender, Age, Marital Status, Level of Education, Personality Job Stressors, resilience, and *kopin*. Data were collected and processed in the form of distribution tables and then analyzed using the Multiple Linear Regression statistical test (Zemojtel-Piotrowska et al., 2018).

## RESULT OF THE STUDY

Based on socio-demographic data, it is known that the research subjects were on average 30 years old, of which the youngest was 24 years and the oldest was 36 years. The male gender in the research subject amounted to 30 people

or 85.7% and 5 women or 14.3%. Marital status obtained 24 people or 68.6% and subjects who were single were 11 people or 31.4%.

**TABLE 1:** Socio-Demographic Overview of Research Subjects

Variable	N=35
<b>Marital status</b>	
Single	11 (31.4%)
Married	24 (68.6%)

**TABLE 2:** Description of Total MBI A, B, and C in the Pre-RIK, Post-RIK and Post-ISOMAN groups

Variable	RIK Task Stage		
	Pre-RIK N = 35	Post-RIK N = 35	Post-ISOMAN N = 35
<b>Total MBI A</b>			
Low levels of emotional exhaustion	25 (71.4%)	28 (80%)	31 (88.5%)
Moderate emotional exhaustion	7 (20%)	4 (11.4%)	2 (5.7%)
High levels of emotional exhaustion	3 (8.5%)	3 (8.5%)	2 (5.7%)
<b>Total MBI B</b>			
Low level of work fatigue	11 (31.4%)	14 (40.0%)	12 (34.2%)
Moderate fatigue	14 (40.0%)	13 (37.1%)	15 (42.8%)
High level of work fatigue	10 (28.5%)	8 (22.8%)	8 (22.8%)
<b>Total MBI C</b>			
Low personal achievement	20 (57.1%)	23 (65.7%)	21 (60.0%)
Moderate personal accomplishments	9 (25.7%)	8 (22.8%)	7 (20.0%)
High personal achievement	6 (17.1%)	4 (11, 4%)	7 (20.0%)

The results of MBI part A in pre-RIK for the low category were 25 people or 71%, for the moderate category it was 7 people or 20% and the high category was 3 people or 8.5%. In post-RIK, the results obtained for the low category were 28 people or 80%, for the moderate category it was 4 people or 11.4%, and for the high category it was 3 people or 8.5%. In Post-ISOMAN, the results obtained for the low category were 31 people or 88.5%, for the medium category were 2 people or 5.7%, and for the high category were 2 people or 5.7%.

The results of the assessment of the MBI questionnaire section B showed that the Pre-RIK results were obtained for the low category of 11 people or 31.4%, the medium category was 14 people or 40%, and the high category 10 people or 28.5%. In the Post-RIK stage, the results obtained for the low category were 14 people or 40%, the medium category was 13 people or 37.1% and the high category was 8 people or 22.8%. In the Post-ISOMAN stage, the results obtained for the low category were 12 people or 34.2%, the medium category was 15 people or 42.8% and the high category was 8 people or 22.8%.

The results of the MBI section C in the Pre-RIK showed that the low category was 20 people or 57.1%, the moderate category was 9 people or 25.7%, and the high category was 6 people or 17.1%. Post-RIK personal achievement results were obtained in the low category of 23 people or 65.7%, the medium category of 8 people or 22.8%, and the high category of 4 people or 22.8%. The results of Post-ISOMAN's achievement showed that the low category was 21 people 60%, the moderate category was 7 people or 20%, and the high category was 7 people or 20%.

**TABLE 3:** Description of PPDS Stressors on *Burnout* in the Pre-RIK Stage

Variable	Impression	
	<i>Burnout</i>	<i>Not Burnout</i>
<b>Job Stressor</b>		
Reporting & Communication (N = 16)	2 (14.3%)	14 (87.5%)
CRRT (N = 9)	1 (10.0%)	9 (90.0%)
Echocardiography (N = 1)	0 (0%)	1 (100%)
Intubation (N = 4)	0 (100%)	4 (100%)
ABP (N = 1)	0 (0%)	1 (100%)
Using Hazmat (N = 1)	0 (100%)	1 (100%)
Heat and Well (N=1)	0 (0%)	1 (100%)
None (N = 1)	0 (0%)	1 (100%)

Data stressor PPDS against *burnout* at Pre-RIK obtained the data which the stressor reporting and communications reported 16 PPDS in which 14 or 87.5% of people in the group do not *burnout* and 2 or 14.3% in the *burnout*, followed by CRRT in the group do not *burnout* as much 9 people, Echocardiography 1 person, intubation 4 people, using hazmat 1 person, heat and stifling 1 person, and all reported in the no *burnout* group.

In the image data stressor PPDS against *burnout* on the Post-CMP obtained the data which the stressor reporting and communications reported 16 people of which 14 or 87.5% of people in the group do not *burnout* and 2 or 14.3% in the *burnout*, followed by CRRT in the group do not *burnout* as much 9 people, Echocardiography 1 person, intubation 4 people, using hazmat 1 person, heat and stifling 1 person, and all reported in the no *burnout* group.

In the PPDS stressor image data on *burnout* in Post-ISOMAN, data was obtained where reporting and communication stressors were reported by 16 people, followed by CRRT in the non-*burnout* group of 10 people, Echocardiography 1 person, intubation 4 people, using 1 hazmat 1 person, heat and 1 people, and everything was reported in the no *burnout* group.

**TABLE 4:** Overview of PPDS Stressors on *Burnout* in the Post-RIK Stage

Variable	Impression	
	<i>Burnout</i>	<i>Not Burnout</i>
<b>Job Stressor</b>		
Reporting & Communication (N = 16)	2 (14.3%)	14 (87.5%)
CRRT (N = 9)	1 (10.0%)	9 (90.0%)
Echocardiography (N = 1)	0 (0%)	1 (100%)

Intubation (N = 4)	0 (100%)	4 (100%)
ABP (N = 1)	0 (0%)	1 (100%)
Using Hazmat (N = 1)	0 (100%)	1 (100%)
Heat and Well (N = 1)	0 (0%)	1 (100%)
None (N = 1)	0 (0%)	1 (100%)

**TABLE 5:** Overview of PPDS Stressors on *Burnout* in the Post-ISOMAN Stage

Variable	Impression	
	<i>Burnout</i>	<i>Not Burnout</i>
<b>Job Stressor</b>		
Reporting & Communication (N = 16)	0 (0%)	16 (100%)
CRRT (N = 9)	0 (0.0%)	10 (100%)
Echocardiography (N = 1)	0 (0%)	1 (100%)
Intubation (N = 4)	0 (00%)	4 (100%)
ABP (N = 1)	0 (0%)	1 (100%)
Using Hazmat (N=1)	0 (00%)	1 (100%)
Heat and Well (N = 1)	0 (0%)	1 (100%)
None (N = 1)	0 (0%)	1 (100%)

In the data analysis, the relationship between the characteristics of the subjects that include gender, age, marital status, years of acceptance PPDS, personality, work stressors, on the incidence of *burnout* in the Post-ISOMAN obtained relationship between duration of Education against *burnout* Post-ISOMAN, those in first year (2019) experienced more *burnout*, compared to the last year.

**TABLE 6:** Relationship of Subject Characteristics to *Burnout* Incidence in Pre-RIK

Variable	Impression		
	<i>Burnout</i>	<i>Not Burnout</i>	p-Value
<b>Gender</b>			1,000
<b>Age</b>			0.574
<b>Marital status</b>			0.998
<b>PPDS Receipt Year</b>			
2019 year	0 (0.0%)	14 (100%)	0.997
2018 year	1 (10.0%)	9 (90.0%)	0.997
2017 year	1 (25.0%)	3 (75.0%)	0.997
2016 year	1 (14.3%)	6 (85.7%)	0.997
<b>Personality</b>			0.996
<b>Job Stressor</b>			
Reporting & Communication (N = 16)	2 (14.3%)	14 (87.5%)	1,000
CRRT (N = 9)	1 (10.0%)	9 (90.0%)	1,000
Echocardiography (N = 1)	0 (0%)	1 (100%)	1,000

Intubation (N = 4)	0 (100%)	4 (100%)	1,000
ABP (N = 1)	0 (0%)	1 (100%)	1,000
Using Hazmat (N = 1)	0 (100%)	1 (100%)	1,000
Heat and Well (N = 1)	0 (0%)	1 (100%)	1,000

**TABLE 7:** Relation of Subject Characteristics to *Burnout* Incidence in Post-RIK

Variable	Impression		p-Value
	<i>Burnout</i>	Not <i>Burnout</i>	
<b>Gender</b>			0.998
<b>Age</b>			1,000
<b>Marital status</b>			0.999
<b>PPDS Receipt Year</b>			
2019 year	0 (0.0%)	14 (100%)	0.998
2018 year	1 (10.0%)	9 (90.0%)	0.997
2017 year	1 (25.0%)	3 (75.0%)	0.997
2016 year	1 (14.3%)	6 (85.7%)	0.997
<b>Personality</b>			0.997
<b>Job Stressor</b>			
Reporting & Communication (N = 16)	2 (14.3%)	14 (87.5%)	1,000
CRRT (N = 9)	1 (10.0%)	9 (90.0%)	1,000
Echocardiography (N = 1)	0 (0%)	1 (100%)	1,000
Intubation (N = 4)	0 (100%)	4 (100%)	1,000
ABP (N = 1)	0 (0%)	1 (100%)	1,000
Using Hazmat (N = 1)	0 (100%)	1 (100%)	1,000
Heat and Well (N = 1)	0 (0%)	1 (100%)	1,000

**TABLE 8:** Relationship Characteristics of the Subjects of Genesis *Burnout* on Post-ISOMAN

Variable	Impression		p-Value
	<i>Burnout</i>	Not <i>Burnout</i>	
<b>Gender</b>			0.679
<b>Age</b>			0.337
<b>Marital status</b>			0.492
<b>PPDS Receipt Year</b>			
2019 year	0 (0.0%)	14 (100%)	0.042
2018 year	1 (10.0%)	9 (90.0%)	0.249
2017 year	1 (25.0%)	3 (75.0%)	0.997

2016 year	1 (14.3%)	6 (85.7%)	0.997
<b>Personality</b>			0.997
<b>Job Stressor</b>			
Reporting & Communication (N = 16)	2 (14.3%)	14 (87.5%)	1,000
CRRT (N = 9)	1 (10.0%)	9 (90.0%)	1,000
Echocardiography (N = 1)	0 (0%)	1 (100%)	1,000
Intubation (N = 4)	0 (100%)	4 (100%)	1,000
ABP (N = 1)	0 (0%)	1 (100%)	1,000
Using Hazmat (N = 1)	0 (100%)	1 (100%)	1,000
Heat and Well (N = 1)	0 (0%)	1 (100%)	1,000

**DISCUSSION**

Based on the results of observations of the stages of RIK and *burnout* activities, data on Pre-RIK incidence of *burnout* occurred in 3 people or 8.57%, followed by no *burnout* as many as 32 people. In Post-RIK, the incidence of *burnout* occurred in 3 people or 8.57%, followed by no *burnout* by 32 people. In Post-ISOMAN, the incidence of *burnout* occurred in 1 person or 2.85% and 34 people did not *burnout*. Based on these data it can be concluded that the incidence of *burnout* in this study sample was very small. This is related to the role of the department of anesthesia and intensive therapy to anticipate the workload due to the pandemic COVID-19 (Sumner & Kinsella, 2021).

The strategies applied such as the PPDS Anesthesiology and Intensive Therapy Dr. Soetomo was given more rest time than before the pandemic. This can be seen from the decrease in the incidence of *burnout* where when the residents were given time to "rest" at the ISOMAN stage, the *burnout* incidence rate was only 2.85% compared to the Pre-RIK and Post-RIK events which reached 8.57%.

This is in line with the research conducted by Dimitriu et al where changing the rotation in work from 14 consecutive days to 7 days and giving weekend breaks has the effect of *reducing burnout* (Dimitriu et al., 2020). The amount of workload is considered not to have a consistent relationship with *burnout*, but working hours have a consistent relationship with *burnout*, for example, residents find it difficult to manage schedules and rapid patient turnover has a relationship with *burnout* (Hu et al., 2020).

When viewed based on the level of education, it was found that PPDS participants based on the year of acceptance of *burnout* in the Pre-RIK stage, there was 1 person or 14.3% *burnout* in the 2019 admission year and the non-*burnout* group was 6 people, 85.7%. In the Post-RIK stage, data was obtained where the incidence of *burnout* in the year PPDS 2019 was received was 1 person or 14.3% and the group did not *burnout* 6 people or 85.7%.

In the Post-ISOMAN stage, data was obtained where the incidence of *burnout* in the year PPDS 2019 received 1 person or 14.3% *burnout* and the group did not *burnout* 6 people or 85.7%. In the PPDS acceptance in 2018 at the pre-RIK stage, 1 person or 7.1% *burnout* and 13 people or 92.9% did not get *burnout*. In Post-RIK, 1 person has 7.1% *burnout* and 13 people have no 92.9% *burnout*.

At Post-ISOMAN, none of them experienced *burnout*.

PPDS received in 2017 at the Pre-RIK stage did not find any *burnout* incidents.

In Post-RIK, no *burnout* incident has been found. At Post-ISOMAN, none of them experienced *burnout*. PPDS acceptance in 2016 in the Pre-RIK stage, there was an incidence of *burnout* in 1 person or 25% and 75% of 3 people there was no *burnout*. In Post-RIK, there was an incidence of *burnout* in 1 person or 25% and 75% of 3 people there was no *burnout*. At Post-ISOMAN, none of them experienced *burnout*.

In the Post-ISOMAN analysis, there was a relationship between the length of education and *burnout*. The first year of frontline health workers are experiencing *burnout*, compared to the year-end, due to the non accustomed with the busy schedule of the hospital during pandemic (Vassos et al., 2019). Study by Tan et al. is almost similar to research that has been carried out where the incidence of *burnout* syndrome was higher in PPDS participants who underwent their first year of education (Tan et al., 2020).

Based on the data obtained, it was found that personality type A in the Pre-RIK stage obtained 3 PPDS or 14.3% *burnout* where the group did not experience *burnout* of 18 PPDS or 85.7%. In personality type B, in the Pre-RIK stage, there was no PPDS who experienced *burnout*. At the Post-RIK stage, there were 3 PPDS or 14.3% *burnout*, where the group did not experience *burnout* of 18 PPDS or 85.7%.

In personality type B, at the Post-RIK stage, there was no PPDS who experienced *burnout*. In the Post-ISOMAN stage, 1 PPDS or 4.8% occurred *burnout* where the group did not experience *burnout* by 20 people or 95.2%. In personality type B, at the Post-ISOMAN stage, there were no PPDS who experienced *burnout*. From the analysis of the relationship between personality and the incidence of *burnout* in Pre-RIK, Post-RIK, and Post-ISOMAN, it was found that there was no statistical relationship between personality and the incidence of *burnout*.

In the image data stressor PPDS against *burnout* at Pre-RIK obtained the data which the stressor reporting and communications reported 16 PPDS in which 14 or 87.5% of people in the group do not *burnout* and 2 or 14.3% in the *burnout*, followed by CRRT in the group do not *burnout* as much 9 people, Echocardiography 1 person, intubation 4 people, using hazmat 1 person, heat 1 person, and all reported in the no *burnout* group.

In handling COVID-19 patients in special isolation rooms, of course, some stressors can trigger fatigue or *burnout* (Dimitriu et al., 2020). In this study, it was found that the highest stressors were reporting and communication which reached 87.5%. This is following research conducted by Zhang et al. regarding the handling of COVID-19 patients in intensive rooms where *burnout* is related to communication problems, especially with superiors who are the main person in charge (Zhang et al., 2020).

In the residency phase, the PPDS Anesthesiology and Intensive Therapy Dr. Soetomo has two roles, namely to provide services, and the professional education program participants. If this can lead to a problem where on one hand the participants' PPDS is still in the process of learning, so that mistakes and incompetence became things that should be tolerated. But, unlike the case of the task in the provision of services where such activities are required to not make errors in service efforts (Duarte et al., 2020).

In another study conducted by Barelo et al. that the relationship between doctors and nurses has a consistent role in job satisfaction. Several surveys have shown that the conflicted relationship between nurses, doctors, coworkers, colleagues, or superiors has a relationship with the risk of *burnout* (Barelo et al., 2020). This mismatch has triggered problems in communication between the doctor in charge of PPDS.

Problems related to communication are a big challenge in a pandemic, a policy is needed, especially for the residency education process, because this has an impact on the incidence of fatigue or *burnout* (Sumner & Kinsella, 2021). There is a need for efforts to find a middle ground in communication and reporting so that comfort in the education process and service provision can be carried out optimally, especially during a pandemic where this incident is an extraordinary event that has major implications.

This is also illustrated in a study conducted by Sultana et al., where interpersonal conflicts inpatient care between doctors, nurses, and the doctor in charge of the main responsible cause moral pressure (Sultana et al., 2020). The inability of a doctor in charge to act according to internal and external values is also associated with the incidence of *burnout*. The importance of demonstrating healthy and positive collaboration can reduce the incidence of *burnout* (Duarte et al., 2020).

In the PPDS stressor description data on *burnout* in Post-RIK, data was obtained where reporting and communication stressors were reported as 16 people, where 14 or 87.5% of people in the *burnout* group did not and 2 or 14.3% in the *burnout* group, followed by CRRT in the *burnout* group as many 9 people, Echocardiography 1 person, intubation 4 people, using hazmat 1 person, heat and stifling 1 person, and all reported in the no *burnout* group.

In the PPDS stressor image data on *burnout* in Post-ISOMAN, data was obtained where reporting and communication stressors were reported by 16 people, followed by CRRT in the non-*burnout* group of 10 people, Echocardiography 1 person, intubation 4 people, using 1 hazmat 1 person, heat and 1 person, and everything was reported in the no *burnout* group. Based on statistical analysis, there was no significant difference between job stressors and *burnout* events in PPDS Anesthesiology and Intensive Therapy. Soetomo at the Pre-RIK, Post-RIK and Post-ISOMAN stages.

## CONCLUSION

Based on the results of the study above, it can be concluded that the percentage of *burnout* on the front line of health workers in the Anesthesiology and Intensive Therapy at the Hospital Dr. Soetomo is 3 people (9.37%) and not *burnout* 32 people (90.63%). In Post-RIK, there were 3 people with a *burnout* of 9.37% and no *burnout* of 32 people or 90.63%. In Post-ISOMAN, there was 1 *burnout* or 2.85% and no *burnout* of 34 people or 97.15%. The risk factors that influence the incidence of *burnout* in PPDS Anesthesiology and Intensive Therapy at RSUD Dr. Soetomo in dealing with COVID-19 in a special isolation room based on data and statistical significance is that the PPDS reception year in 2019 experienced more *burnout*, compared to the last year's PPDS.

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