



## Analysis of Physiological and Psychological Workload Using the Cardiovascular Load Method and Rating Scale Mental Effort in Members Police Satreskrim Polresta Gorontalo City

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### ABSTRACT

Members of the Criminal Investigation have a tough task in dealing with physical and mental demands during investigations and investigations, thus contributing to the emergence of a high workload. The purpose of the study was to analyze physiological and psychological workload using the Cardiovascular Load and Rating Scale Mental Effort methods in members of the Gorontalo City Police Satreskrim Police.

This type of research uses a descriptive research design, where data was collected through measuring workers' pulse from the CVL method and data from the RSME questionnaire on 35 samples of members of the Gorontalo City Police Satreskrim.

The results of the CVL and RSME analysis for the physiological and psychological workload level of 35 members, showed that the physiological load of 25 members needed to be improved (30% to 60%) while 10 members did not experience fatigue (30%). At the level of Psychological workload, there were 4 members with a large effort (86-100), 9 members with a very large effort (101-114) and 22 members with a very large effort (115-150).

The results of the calculation of physiological and psychological workload were proposed to increase the number of workers because they experienced a high workload. Police institutions are advised to conduct periodic evaluations to manage the physiological and psychological workload of satreskrim members, so that they remain optimal.

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### INTRODUCTION

The duties of the National Police are not easy jobs, coupled with various job demands that emphasize time, energy, and thoughts in it. The work faced by members of the National Police is essentially full of stress because they are always dealing with complex social problems. The great demands on the mental, emotional and physical abilities of the police are often stressful as a result of the workload that exists for members of the National Police (Alfian, 2020).

Members of the criminal investigation team have quite heavy duties and obligations compared to other implementing elements, namely as the main technical element of operations in the police. The Criminal Investigation Unit is a technical unit of the National Police function that carries out its duties to enforce the law by carrying out Investigation and Investigation (Riandy & Ernawati, 2024). Members of the Criminal Investigation Unit must also be prepared to face unexpected situations such as life and death, shooting or being shot, and sometimes members also have to see a member's co-worker injured or even stretched to death while on duty in the field. Based on these circumstances, it tends to make the police have to carry out tasks with targets that are heavy enough that they can cause stress. The police must always be ready and vigilant in any conditions, this can contribute to the emergence of a high workload (Wahyuning, 2024).

Based on the "What Cops Want in 2024" survey involving 2,833 police officers, several findings related to physical and mental health were found, namely 55% expressed dissatisfaction with the availability

of mental health resources, 43% of respondents reported that excessive workload contributes to poor work-life balance and stress levels in the police and almost 25% feel unable to work anymore due to fatigue or pressure is so heavy that it can be the biggest obstacle in maintaining or improving the health of the police (Police1, 2024).

Crime Statistics Data, in 2021 there were around 247,218 criminal cases that occurred in Indonesia, in 2022 the total number of crime cases increased to 276,507 and in 2023 the Indonesian Police (Polri) recorded that there were 288,472 crimes that occurred, it can be seen that the number of crimes increased by 4.33% compared to the previous year (BPS, 2023). From this data, it can be concluded that the more the number of criminal cases in Indonesia, the higher the level of workload borne by police members, especially in the criminal justice unit.

Based on crime case reports in 2023, the Gorontalo City Police recorded as many as 655 cases that occurred. This figure increased by 9% compared to 2022 which was only 597 cases. Meanwhile, for the Gorontalo Police there are 502 cases, the Pohuwato Police 410 cases, the Boalemo Police 240 cases, the Bone Bolango Police 268 cases and the North Gorontalo Police 197 cases (Gorontalo City BPS, 2023). Overall, it can be seen that the Gorontalo City Police occupies the top percentage of total criminal cases with a high level of workload.

The criminal police officer on duty at the Gorontalo City Police explained that the workload that has become the responsibility of the criminal police when handling the case is indeed quite heavy, both physically and psychologically.

Based on the results of the initial measurement using the Cardiovascular Load (CVL) method, it is known that out of 5 workers, there are 4 workers who experience a high physiological workload, which is >30% with the category of need improvement, while for 1 worker is categorized as not fatigued. Meanwhile, for the results of the initial measurement related to psychological burden using the Rating Scale Mental Effort (RSME) method, it was found that as many as 5 members had a very high workload score, with the most dominant variables being Workload (BK), Work Performance (PK) and Work Mental Effort which all three had the same value of 19.1%, followed by the fourth variable, namely Work Difficulty (KK) of 16.8%, the fifth Work Fatigue (KLK) is 15.5% and the sixth Work Anxiety (KGK) is 13.6%.

Based on all descriptions of various physical and mental complaints experienced by members of the criminal investigation team, the researcher wanted to conduct an analysis to find out the amount of physiological and psychological workload in each Criminal Investigation unit in the Gorontalo City Police, using the Cardiovascular Load (CVL) method and the Rating Scale Mental Effort (RSME) is expected to provide more objective data so that it can formulate a more effective workload management strategy.

## METHOD

This research was carried out at the Gorontalo City Police, Tenda District, Hulonthalangi District, Gorontalo City. Precisely in the Criminal Investigation Unit (Satreskrim). The time for this research will be carried out from January-February 2025. This type of research uses an observational research design with a descriptive quantitative approach, using the Cardiovascular Load (CVL) and Rating Scale Mental Effort (RSME) methods.

The population of this study is all members of the Gorontalo City Police Satreskrim which is 35 workers with samples in this study using Total Sampling, where the entire population that is the object of the research is taken as a sample.

## RESULTS

### Characteristics of Respondents by Age

Table 1 Distribution of respondent frequencies based on age in Members of the Gorontalo City Police Satreskrim

Age	Sum	
	n	%
17 - 25	5	14,3
26 - 35	12	34,3
36 - 45	16	45,7
46 - 55	2	5,7
Total	35	100,0

Source: Primary Data, 2025

Table 1 shows that the respondents with the most age are at the age of 36 - 45 years, as many as 16 members (45.7%), while the least are at the age of 46 - 55 years, as many as 2 members (5.7%).

### Characteristics of Respondents by Gender

Table 2 Distribution of Respondent Frequencies by Gender in Members of the Gorontalo City Police Satreskrim

Gender	Sum	
	n	%
Men - men	32	91.4%
Woman	3	8.6%
Total	35	100,0

Source: Primary Data, 2025

Table 2 shows the respondents with the most gender, namely 32 members (91.4%) and 3 female members (8.6%).

### Characteristics of Respondents Based on Field of Work

Table 3 Distribution of respondent frequencies based on the field of work in Members of the Gorontalo City Police Satreskrim

Field of Work	Sum	
	n	%
Head of Criminal Investigation	1	2.9%
Criminal Investigation Authority	1	2.9%
Pama Reskrim	2	5.7%
P.S. Kaurmintu	1	2.9%
Baurmin Reskrim	1	2.9%
Bamin Ident	1	2.9%
Unit 1 Pidum	4	11.4%
Unit 2 Typing	6	17,1%
Unit 3 Tipiter	5	14.3%
Unit 4 PPA	5	14.3%
Unit 5 Jatanras	8	22.9%
Total	35	100,0

Source: Primary Data, 2025

Table 3 shows that the respondents with the most positions/work units in the Jatanras Unit are 8 members (22.9%), while the least are in the Head of Criminal Investigation, Wakasat Reskrim, P.S. Kaurmintu, Baurmin Reskrim and Bamin Ident, with a total of 1 member each (2.9%).

### Distribution of Physiological Workload Levels Based on Cardiovascular Load (CVL)

Table 4. Distribution of physiological workload levels based on %CVL in Members of the Gorontalo City Police Satreskrim

Category %CVL	Value Range	Sum	
		n	%
Doesn't happen to fatigue	< 30%	10	71,4%
Needsrepairs	30 to < 60%	25	28.6%
Total		35	100,0

Source: Primary Data, 2025

Table 4 shows that the majority of respondents have a physiological workload in the category that requires improvement (30 to < 60%) as many as 25 members, while the other 10 members are in the category of no fatigue (< 30%).

### Distribution of Psychological Workload Levels Based on Rating Scale Mental Effort (RSME)

Table 5. Distribution of the frequency of psychological workload based on RSME in Members of the Gorontalo City Police Satreskrim

RSME Category	Value Range	Sum	
		n	%
The effort made is great	86 - 100	4	11.4%
The effort made was huge	101 - 114	9	25,7%
The effort made is very large	115 - 150	22	62.9%
Total		35	100,0

Source: Primary Data, 2025

Table 5 shows that respondents with the most psychological workload based on RSME were in the category of very large businesses (115-150) with a total of 22 members and the least in the category of businesses that were carried out large (86 - 100) with a total of 4 members.

### Proposal for Determining the Optimal Number of Workers Based on Physiological Workload

Table 6. Recapitulation of the physiological workload of each field of work in the Members of the Gorontalo City Police Satreskrim

No.	Field of Work	Total Burden Work	Frijust Ang-gout	Correspondence Workload (number members)	Load Categories Work
1.	Head of Criminal Investigation	27,96%	1	27,96%	No fatigue occurs
2.	Criminal Investigation Authority	29,02%	1	29,02%	No fatigue occurs
3.	Pama Reskrim	60,05%	2	30,02%	Repairs required
4.	P.S Kaurmintu	20,34%	1	20,34%	No fatigue occurs
5.	Baurmin Reskrim	28,71%	1	28,71%	No fatigue occurs
6.	Bamin Ident	44,26%	1	44,26%	Repairs required
7.	Unit 1 Pidum	136,36%	4	34,09%	Repairs required
8.	Unit 2 Typing	230,74%	6	38,45%	Repairs required
9.	Unit 3 Tipiter	196,66%	5	39,33%	Repairs required
10.	Unit 4 PPA	151,16%	5	30,23%	Repairs required
11.	Unit 5 Jatanras	338,03%	8	42,25%	Repairs required

Source: Data processed, 2025

Table 6 shows that the highest physiological workload category is found in unit 5 Jatanras with a total workload of 338.03% and an average workload of 42.25% (Improvement required), while the lowest is found in the positions of Head of Criminal Investigation, Wakasat Criminal Investigation and P.S Kaurmintu with a total workload and an average workload of < 30% respectively (No fatigue).

Based on the results of the recapitulation, recommendations were obtained for the addition of the number of physiological workload workers based on the field of work that requires improvement as follows:

Table 7 Recommendations for increasing the number of physiological workload workers in Members of the Gorontalo City Police Satreskrim

No..	Field of Work	Sum worker Recommendations	Average Recommended worklo	Category Workload
1.	Pama Reskrim	3	20,01%	No fatigue occurs
2.	Bamin Ident	2	22,13%	No fatigue occurs
3.	Unit 1 Pidum	5	27,27%	No fatigue occurs
4.	Unit 2 Typing	8	28,84%	No fatigue occurs
5.	Unit 3 Tipiter	7	28,09%	No fatigue occurs
6.	Unit 4 PPA	6	25,19%	No fatigue occurs
7.	Unit 5 Jatanras	12	27,66%	No fatigue occurs

Source: Data processed, 2025

The calculation of the physiological workload in the table above has been given a recommendation to increase the number of members in the section that experiences a workload that needs improvement, namely in the Pama Criminal Investigation section,

Bamin Ident, Unit 1 Pidum, Unit 2 Tipikor, Unit 3 Tipiter, Unit 4 PPA and Unit 5 Jatanras by adding 1 to 4 members in each of these sections.

### Proposal for Determining the Optimal Number of Workers Based on Psychological Workload

Table 8. Recapitulation of the psychological workload of each field of work in the Members of the Gorontalo City Police Satreskrim

No.	Field of Work	Total Burden Work	Fri just Ang-gout	Average Workload (number members)	Load Categories Work
1.	Head of Criminal Investigation	133,3	1	133,3	The efforts made are very Huge
2.	Criminal Investigation Authority	138,3	1	138,3	The efforts made are very Huge
3.	Pama Reskrim	288,3	2	144	The efforts made are very Huge

Source: Data processed, 2025

Table 8 shows that the highest psychological workload category is found in Bamin Ident with a total workload and an average workload of 143.3 (The effort carried out is very large), while the lowest is found in the 4 PPA units with a total workload of 538.2 and an average workload of 107.6 (The effort carried out is very large).

Based on the results of the recapitulation, recommendations for increasing the number of Psychological workload workers based on the field of work that experience very large efforts are as follows:

Table 9 Recommendations for increasing the number of psychological workload workers in each field of work in Members of the Gorontalo City Police Satreskrim

No.	Field of Work	Total Burden Work	Fri just Ang-gout	Average Workload (number members)	Load Categories Work
4.	P.S Kaurmintu	131,6	1	131,6	The efforts made are very Huge
5.	Baurmin Reskrim	136,6	1	136,6	The efforts made are very Huge
6.	Bamin Ident	143,3	1	143,3	The efforts made are very Huge
7.	Unit 1 Pidum	476,6	4	119,1	The efforts made are very Huge
8.	Unit 2 Typing	676,5	6	112,7	The efforts made are very big
9.	Unit 3 Tipiter	578,2	5	115,6	The efforts made are very Huge
10.	Unit 4 PPA	538,2	5	107,6	The efforts made are very big
11.	Unit 5 Jatanras	913,1	8	114,1	The efforts made are very big

Source: Data processed, 2025

The calculation of the psychological workload in the table above has been given a recommendation to increase the number of members in the sections that experience a very large workload, namely in the Pama Reskrim, Baurmin Reskrim, Bamin Ident, Unit 1 Pidum, Unit 2 Tipikor, Unit 3 Tipiter, Unit 4 PPA and Unit 5 Jatanras by adding one to 4 members in each section so that with the addition of the number of workers it will make the workload more optimal. Meanwhile, for the Head of Criminal Investigation, Wakasat Reskrim and P.S Kaurmintu which are single positions and cannot be added, what can be optimized is the support of resources around them.

## DISCUSSION

### Analysis of Physiological Workload Levels Based on Cardiovascular Load (CVL)

Based on the results of the study, it can be analyzed that of the 35 members of the Gorontalo City Police Satreskrim whose pulse rate measurements were carried out, as many as 25 members (28.6%) were included in the category of "needed improvement", which indicates an increase in physiological workload that requires evaluation or attention to be improved, so as not to increase to a higher level.

This is caused by the Working Pulse (DNK) produced by the 25 members >100 beats/minute which indicates that the members are experiencing high enough physical activity. These activities include arresting, examining and interrogating criminals. These results are in line with research conducted by (Samodra & Sudrazat, 2021) in students, who state that physiologically the pulse will change according to the environment or according to the level of training. The heavier the condition, the higher the pulse rate when doing activities.

Meanwhile, 10 members (71.4%) were included in the category of "no fatigue" or had a low physiological workload, so they did not experience severe fatigue. This is due to the Working Pulse (DNK) produced by the 10 members <100 beats/minute which indicates that the members are not experiencing high physical activity. Members who fall into this category are mostly part of members who are not directly tasked with dealing with criminals, due to the nature of their work which focuses more on coordination and administration, such as the Head of Criminal Investigation, Wakasat Reskrim, P.S Kaurmintu and Baurmin Reskrim, so they do not require a large amount of oxygen intake.

This is in connection with the theory from Gilbreth (1917) related to work efficiency, which states that administrative work relies more on mental than physical, so that the physical load received is relatively lower than that of operational tasks.

### **Psychological Workload Level Analysis Based on Mental Effort Scale (RSME) Rating**

Based on the results of the research, it can be analyzed that most of the members of the Gorontalo City Police Satreskrim experience a very high psychological workload. This is shown by the category of "very large effort" with an RSME value of 115 - 150, which includes as many as 22 (62.9%) members. This high workload is caused by the value of each variable, the majority of which show a very high level in the 22 members. In addition, when viewed from the field of work, almost all fields in the criminal investigation have representatives of members who fall into this category. However, the most experienced psychological workload is very high from the field of work of the administrative department. This is due to the demands of work under pressure from the report completion target, as well as the burden of complex administrative responsibilities in supporting the investigation and prosecution of cases.

These results are in line with research conducted by (Citra et al., 2024) to members of the police at the Surakarta Police, who stated that the police can experience changes in workload pressure which is often caused by excessive demands on work given by their superiors or colleagues.

Meanwhile, there were 9 (25.7%) members who were included in the category of "Very large efforts" with an RSME value range of 101 - 114, this also indicates a high level of psychological burden, although slightly lower than the previous category. This difference occurs because the values of each RSME variable vary, some high and some low, such as the variables Workload (BK) and Work Difficulty (KK) which overall have high average values, but several other variables show lower values. When viewed from their field of work, the most members found in this category come from Unit 2 Tipikor and Unit 3 Tipiter. This is due to the heavy tasks faced by members, such as the investigation process of corruption cases and certain cases that require high precision and in-depth analysis in resolving a case.

This result is in line with the theory from Grandjean (1993) which states that mental workload arises due to the demands of tasks that require concentration, attention, and decision-making.

The other 4 (11.4%) members are in the category of "Businesses that are done large" with an RSME value of 86 - 100. Although it is still classified as a fairly high level of psychological workload, the value is lower than the previous category. This difference is due to the variation in values of several variables that are predominantly lower. However, most members in this category have a fairly high Workload (BK) variable, but the other variable values do not support a high overall workload level.

Members included in this category come from Unit 2 Tipikor, Unit 4 PPA and Unit 5 Jatanras. In unit 4 PPA, there are 2 female members who fall into this category. Its existence in a predominantly male work environment can present its own challenges, especially in the psychological aspect. Although these three units have quite heavy tasks, the difference in the roles and responsibilities of each member in each unit can be a factor that affects the level of workload felt, thus contributing to the low value of the RSME produced.

According to Patton (1998), a situation that can cause stress to a person does not necessarily cause the same thing to others. Differences in reactions between individuals are often caused by psychological and social factors that can change the impact of stressors on individuals.

### **Proposal for Determining the Optimal Number of Workers Based on Physiological Workload**

Based on the results of the recapitulation of physiological workload in each previous field of work, it was found that there were several fields of work that had a fairly high workload and required an increase in the optimal number of workers. The Pama Criminal Investigation Section, Bamin Ident, Unit 1 Pidum and Unit 4 PPA were each given recommendations to increase the number of workers by 1 member so that their average workload that was initially "needed improvement" (>30%) then changed its category to "no fatigue" (<30%).

Meanwhile, for the field of work of Unit 2 Tipikor and Unit 3 Tipiter, it is recommended to increase the number of workers by 2 members, because their physiological workload is higher than the workload of the previous section and especially for Unit 5 Jatanras which has the highest physiological workload of 338.03% with an average of 42.25% is recommended at most to add 4 members. Because this unit focuses more on crimes that are direct and involve violence, such as robbery, theft, and murder, therefore, the more members available, the better the distribution of tasks and the speed of response in handling community reports and arresting criminals.

According to (Arisandy & Cantika, 2024) In order to meet the needs of the ideal organizational structure of the National Police of the Republic of Indonesia in carrying out its main duties and functions, a workload analysis is needed to determine the fulfillment of the needs of the ideal number of personnel

### **Proposal for Determining the Optimal Number of Workers Based on Psychological Workload**

Based on the results of the recapitulation of psychological workload in each previous field of work, it was found that there were several fields of work that had a fairly high workload and required an increase in the optimal number of workers. The Baurmin Criminal Investigation Section, Bamin Ident, Unit 1 Pidum and Unit 4 PPA were each given a recommendation to increase the number of workers to 1 member, while the Unit 2 Tipikor and Unit 3 Tipiter sections were given recommendations to increase the number of workers to

3 members and the Unit 5 Jatanras section was recommended to add 4 members. So that the average workload becomes more optimal.

Meanwhile, for the work field of the positions of Head of Criminal Investigation, Deputy Head of Criminal Investigation and P.S Kaurmintu show a very high psychological workload, this is because the position has the main responsibility in decision-making and operational coordination in the criminal investigation department, but this does not allow an increase in the number of workers because the nature of the position is a single position, therefore the solution can be optimized is the support of the surrounding resources.

These results are in line with research conducted by (Nailurridlo, 2023) for employees at UD HR Metal, which was obtained as a result of the calculation of mental and physical workloads that experienced overload, a proposal was made to increase the number of employees. The increase in the number of employees was carried out in the bending, painting, pearcing and stamping sections by adding 4 employees so that the number of employees can be optimal from the original 23 employees so that the total number of employees is 27 employees This addition is carried out to reduce the workload and increase the company's productivity.

## CONCLUSION

Based on the CVL method, the overall physiological workload level of 35 members of Satreskrim is in the category of no fatigue and repairs, out of 35 members, there are 25 members who need to be improved (workload value 30% to < 60%) and the other 10 members do not have fatigue (workload value < 30%). The average workload that experienced an improvement in the work field of the Pama Criminal Investigation section, Bamin Ident, Unit 1 Pidum, Unit 2 Tipikor, Unit 3 Tipiter, Unit 4 PPA and Unit 5 Jatanras as well as the workload that did not occur fatigue, namely the Criminal Investigation Division, the Deputy Criminal Investigation Officer and P.S Kaurmintu.

Based on the RSME method, the overall level of psychological workload of the 35 members of the criminal investigation is in the category of large, very large and very large businesses. There are 4 members with a large effort (value range 86 - 100), 9 members with a very large effort (value range 101 - 114) and 22 other members with a very large effort (value range 115 - 150). The average workload with the business category carried out is very large in the field of work of Unit 2 Tipikor, Unit 4 PPA and Unit 5 Jatanras and the workload with the business carried out is very large, namely the Criminal Investigation Division, Wakasat Reskrim, Pama Reskrim, P.S Kaurmintu, Baurmin Reskrim, Bamin Ident, Unit 1 Pidum and Unit 3 Tipiter.

Based on the results of the calculation of physiological workload, it was found that there were several fields of work that had a fairly high workload and required an optimal number of workers, namely Pama Reskrim, Bamin Ident, Unit 1 Pidum, and Unit 4 PPA each were recommended to add 1 member, Unit 2 Tipikor and Unit 3 Tipiter were recommended to add 2 members and Unit 5 Jatanras was recommended to add 4 members, So that the overall average workload is more optimal or in the "medium" category.

Based on the results of the calculation of the psychological workload, it can be known that several parts need to be added to the workforce, namely, the Baurmin Criminal Investigation section, Bamin Ident, Unit 1 Pidum and Unit 4 PPA each are recommended to add 1 member, Unit 2 Tipikor and Unit 3 Tipiter are recommended to add 3 members and the Unit 5 Jatanras section is recommended to add 4 members, so that the overall average workload becomes more optimal or in the "medium" category. Meanwhile, for the Head of Criminal Investigation, Deputy Head of Criminal Investigation and P.S Kaurmintu it is not possible to increase the number of workers because the nature of the position is a single position, so what can be optimized is the support of surrounding resources.

## SUGGESTION

For members of the satreskrim, researchers suggest that it is necessary to pay attention to the condition of the body in carrying out work tasks every day and must adjust the workload to their abilities so that they can increase work productivity and reduce the risk of burnout.

For the Police Institution, it is recommended that periodic evaluations be carried out to consider management strategies for the physiological and psychological workload of satreskrim members, so that they remain optimal

For future researchers who want to conduct further research, it is recommended to compare the physiological and psychological workload between prospective students (chassis) and police members who have served for a long time using the CVL and RSME methods or others.

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