

## PREVALENCE OF METABOLIC SYNDROME (METS) AMONG CIVIL SERVANTS IN JAMBI CITY: USING NCEP/ATP III CRITERIA

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### ABSTRACT

**Background:** The incidence of Metabolic Syndrome (MetS) is an important health problem because it was associated with an increase in cardiovascular disease as the main cause of death. The prevalence of MetS in the world at age > 20 years was 24%, age 50 years was 30% and age > 60 years was 40%, while in Indonesia was 17.5% and one of groups that has most risk factors for MetS is the civil servant (ASN). This study aims to obtain a description of the MetS incidence among ASN in Jambi City.

**Method:** A descriptive quantitative study carried out on 108 ASN from six selected government agencies in Jambi city through multistage random sampling technique. Data collection through physical examination to measure of 5 MetS criteria according to the NCEP ATP-III, namely central obesity, blood sugar, blood pressure, triglycerides, and HDL. Determination of the incidence of MetS if the subject has 3 of the 5 criteria.

**Result:** The results of the analysis obtained that the incidence of MetS to 60.2%, and 3 of MetS indicators that have risk majority namely central obesity (74.1%), blood pressure (66.7%), and HDL (63%).

**Conclusion:** It recommendation to prevent and control risk factors that affect the incidence of MetS through improving communication-information-education (IEC) for ASN to raise awareness and develop Posbindu in the workplace to early detection of MetS risk factors.

**Keywords:** Metabolic syndrome, civil servant, jambi city

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### INTRODUCTION

Non-Communicable Diseases (NCD) is a big challenge for the world because it kills around 41 million people every year or equivalent to 71% of all global deaths. More than 15 million NCD deaths are premature deaths because they attack the age of 30 to

69 years, 77% of them occur in low-middle income countries. Some of the biggest contributors to premature death due to NCDs include impaired heart and blood vessel function (cardiovascular) and Diabetes Mellitus<sup>1</sup>.

The results of the Basic Health

Research show that the prevalence trend of PTM, especially cardiovascular disease and DM has continued to increase over the past five years, including other diseases, Stroke from 7 per mile (2013) to 10.9 per mile (2018), Hypertension of the population aged 18 years and older. above from 25.8% (2013) to 34.1% (2018), type II DM from 6.9% (2013) to 10.9% (2018)<sup>2</sup> . and as previously described, risk factors to include blood pressure , blood sugar, body mass index, diet, physical activity, smoking and alcohol<sup>3</sup>. The risk component that appears simultaneously in the majority of patients

with cardiovascular disease and diabetes is called the Metabolic Syndrome (MetS).

Metabolic syndrome (MetS) is a set of risk factors that are directly related to the occurrence of arteriosclerotic cardiovascular disease and type 2 diabetes mellitus. Although the criteria for MetS globally have not been standardized, MetS has been widely used with different criteria, including the WHO criteria, the National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III), and the International Diabetes Federation (IDF)<sup>4</sup>.

**Table 1. Metabolic syndrome diagnostic criteria (5),(4),(6)**

<b>Component</b>	<b>WHO's Criteria</b>	<b>NCEP-ATP III Criteria</b>	<b>IDF Criteria</b>
<i>Resistensi insulin</i>	<i>Decreased insulin sensitivity Plus 2 of the following criteria</i>	<i>None, but has 3 of the following 5 criteria</i>	<i>None</i>
<i>Central obesity</i>	<i>Waist-to-hip ratio Male :&gt; 0.90, Female :&gt; 0.85 or BMI &gt; 30 kg/m<sup>2</sup></i>	<i>Abdomen Circumference: Boy :&gt; 102 cm Woman : &gt; 88 cm</i>	<i>Increased LP (population specific) plus two of the following criteria</i>
<i>Hyper-triglyceridemia</i>	<i>150 mg/dL, or HDL-C: Male :&lt; 35 mg/dL Female : &lt; 39mg/dL</i>	<i>150 mg/dL, or HDL-C: Male :&lt; 40 mg/dL Women : &lt; 50 mg/dL</i>	<i>150 mg/dL or on medication. HDL-C: Male :&lt; 40 mg/dL Female : &lt; 50 mg/dL or on medication</i>
<i>Hipertention</i>	<i>BP 140/90 mmHg or history of antihypertensive therapy</i>	<i>TD ≥ 130/85 mmHg</i>	<i>TD sistolik &gt; 130 mmHg TD diastolik &gt; 85 mmHg or in treatment</i>
<i>Hyper-glycemia</i>	<i>Impaired glucose tolerance, impaired fasting glucose, or DM</i>	<i>Fasting blood glucose 110 mg/dL (including diabetics)</i>	<i>GDP 110 mg/dL (including diabetics)</i>
<i>Micro-albuminuria</i>	<i>Urinary albumin to creatinine ratio 30 mg/g or albumin excretion rate 20 mcg/min</i>	<i>None</i>	<i>None</i>

The prevalence of MetS has increase in the last two decades and has become a health problem in the world because high morbidity and mortality. Approximately 20 to 25% of the world's population suffers from

MetS as a risk factor for cardiovascular disease, stroke and diseases related to fatty deposits in the artery walls. A person with MetS is twice as likely to have heart disease, five times to have diabetes, and three times

to have a heart attack or stroke<sup>5</sup>. Several studies estimate the prevalence of MetS in Europe at 23%<sup>7</sup>, Canada 25%<sup>8</sup>, Australia 30.7%<sup>9</sup>, and Malaysia 32,2%<sup>10</sup>. Research by Bantas, et al (2012) on 13,262 urban residents found the prevalence of MetS was 17.5% with women (21.3%) and men (12.9%)<sup>11</sup>, Another study found the prevalence of MetS in Jakarta was 28.4%<sup>12</sup>, in Bali 18,2%<sup>13</sup>, dan in Makasar 39,5%<sup>14</sup>. One of the high-risk groups for MetS is the State Civil Apparatus (ASN)<sup>15</sup>. This study aims to obtain a descriptive description of the incidence of MetS in civil servant (ASN) in Jambi City.

## **METHOD**

This research was used a descriptive quantitative design to describe the incidence of MetS with 5 (five) indicators based on the NCEP ATP-III criteria, namely central obesity, blood sugar, blood pressure, triglycerides, and HDL. Data collection by physical examination and blood samples, namely central obesity by measuring abdominal circumference using a tape meter, blood pressure using a digital sphygmomanometer, fasting blood sugar levels using a glucometer, triglycerides and HDL-C using the Lipid-Pro test kit. The research sample was 108 Jambi City ASN employees from six government agencies using a multistage random sampling technique. The incidence of MetS was determined if the respondent has three of the five criteria for MetS.

## **RESULT**

The characteristics of respondents (table 2) shows the average age of respondents was 46.28 years (SD= 7.15 years) and most of them were 41-50 years old (41.7%). The majority of respondents are male (54.6%), Malay ethnicity (71.3%), Muslim (95.4%), married (94.4%), and D4/S1 (50 %). The average family income per month was Rp. 8,278,004 (SD= Rp. 4,745,167).

An overview of the measurement results of the 5 (five) criteria for MetS in respondents, namely an average abdominal circumference of 90.7 cm (SD = 12.14 cm) with the smallest abdominal circumference of 60 cm and the largest of 132 cm. The results of interval estimation concluded that 95% believed that the average respondent's abdominal circumference was between 88.4 cm and 93 cm. The average fasting blood sugar (GDP) is 108 mg/dl (SD = 50.39 mg/dl) with the lowest GDP value of 69 mg/dl and the highest 399 mg/dl. The results of interval estimation concluded that 95% believed that the average GDP of respondents was between 98.5 to 117.7 mg/dl. The average systolic blood pressure was 134.6 mmHg (SD = 18.65 mmHg), with the lowest systolic blood pressure of 88 mmHg and the highest of 179 mmHg. The interval estimation results concluded that it was 95% believed the systolic mean was 131.1 to 138.2 mmHg.

**Table 2. Respondent Characteristic**

<b>Characteristic</b>	<b>n (108)</b>	<b>(%)</b>
<i>Age (mean= 46,28 year)</i>		
- 29-30	3	(2.8)
- 31-40	22	(20.3)
- 41-50	45	(41.7)
- 51-58	38	(35.2)
<i>Seks</i>		
- Male	59	(54.6)
- Female	49	(45.4)
<b>Characteristic</b>	<b>n (108)</b>	<b>(%)</b>
<i>Ethnic</i>		
- Melayu	77	(71.3)
- Batak	4	(3.7)
- Minang	7	(6.5)
- Jawa	16	(14.8)
- Bugis	1	(0.9)
- Banjar	2	(1.9)
- Sunda	1	(0.9)
<i>Religi</i>		
- Islam	103	(95.4)
- Katolik	3	(2.8)
- Protestan	2	(1.9)
<i>Marital status</i>		
- Bachelor	3	(2.8)
- Married	102	(94.4)
- Divorced	3	(2.8)
<i>Education</i>		
- SLTP	1	(0.9)
- SLTA	15	(13.9)
- D1-D3	6	(5.6)
- D4/S1	54	(50.0)
- S2/S3	32	(29.6)
<i>Family income per month (mean = Rp 8.278.004,-)</i>		
- 2.000.000 – 5.000.000	34	(31.5)
- > 5.000.000 – 10.000.000	54	(50.0)
- > 10.000.000 – 20.000.000	18	(16.7)
- > 20.000.000	2	(1.8)

Source: primary data

The average diastolic blood pressure was 86.4 mmHg (SD = 11.98 mmHg), the lowest systolic blood pressure was 59 mmHg and the highest was 114 mmHg. The interval estimation results concluded that 95% believed that the diastolic mean was 84.1 to 88.7 mmHg. The average triglyceride level was 151.2 mg/dl (SD= 84.45 mg/dl), with the lowest level being 50 mg/dl and the highest being 482 mg/dl. The

interval estimation results concluded that it was 95% believed that the average triglyceride level was 135.1 to 167.3 mg/dl. The average HDL-C level was 41.6 mg/dl (SD= 11.52 mg/dl), with the lowest level being 25 and the highest being 83 mg/dl. The interval estimation results concluded that 95% believed the average HDL-C level was 39.4 to 43.8 mg/dl.

**Table 3. Measurement of MetS criteria**

<i>MetS Criteria</i>	<i>Mean</i>	<i>SD</i>	<i>Min-Maks</i>	<i>95% CI</i>
<i>Central obesity</i>	90,7	12,14	60 -132	88,4 – 93,0
<i>Fasting blood sugar</i>	108,1	50,39	69 – 399	98,5 – 117,7
<i>Blood pressure:</i>				
- <i>systolik</i>	134,6	18,65	88 - 179	131,1 – 138,2
- <i>diastolik</i>	86,4	11,98	59 - 114	84,1 – 88,7
<i>Triglyserida</i>	151,2	84,45	50 - 482	135,1 – 167,3
<i>HDL-C</i>	41,6	11,52	25 – 83	39,4 – 43,8

*Source: primary data*

The results of the analysis found that the incidence of MetS was 60.2%, and the three indicators of MetS that the majority

had risk were central obesity (74.1%), blood pressure (66.7%), and HDL-C (63%).

**Table 4. Criteria and occurrence of MetS**

<i>MetS Criteria</i>	<i>n (108)</i>	<i>(%)</i>
<i>Incidence of MetS</i>		
- <i>MetS</i>	65	(60.2)
- <i>Non MetS</i>	43	(39.8)
<i>Central obesity</i>		
- <i>Risk</i>	80	(74.1)
- <i>No risk</i>	28	(25.9)
<i>Blood pressure</i>		
- <i>Risk</i>	72	(66.7)
- <i>No risk</i>	36	(33.3)
<i>Fasting blood sugar</i>		
- <i>Risk</i>	41	(38.0)
- <i>No risk</i>	67	(62.0)
<i>Triglyserida</i>		
- <i>Risk</i>	42	(38.9)
- <i>No risk</i>	66	(61.1)
<i>HDL-C</i>		
- <i>Risk</i>	68	(63.0)
- <i>No risk</i>	40	(37.0)

*Source: primary data*

## DISCUSSION

Definition of Metabolic Syndrome (MetS) in this study uses the NCEP-ATP III criteria with at least three of the five criteria as risk factors<sup>5,6</sup>. This study found that the majority of Jambi City ASN employees experienced the incidence of MetS (60.2%), and the 3 criteria for MetS that the majority had a risk were central obesity (74.1%), increased blood pressure (66.7%) and decreased HDL-HDL levels. C (63%). These finding indicate a high incidence of

MetS in ASN in Jambi City. This condition is in line with several previous studies which found a high prevalence of MetS (>50%) such as that of Tanrewali (2019)<sup>17</sup>, Wulandari and Isfandiari (2013)<sup>18</sup>, Puryaningtyas & Sarbini (2020)<sup>19</sup>. Several other studies found a lower proportion of MetS prevalence (<50%) such as those of Samodro, et al (2019)<sup>20</sup>, Sihombing & Tjandrarini (2015)<sup>21</sup>, Ibrahim, et al (2019)<sup>22</sup>, and Hasan, et al. (2019)<sup>14</sup>.

The high incidence of MetS among Jambi City ASN was of course considered very worrying as well as a challenge clinically and in public health related to the increased risk of PTM which was the main cause of death in Indonesia. PTM causes a person to become unproductive or less productive so that it becomes a burden on society and the government, besides that handling PTM takes a long time, is expensive and high technology. Therefore, it is important to control MetS risk factors to prevent PTM cases from occurring.

## CONCLUSION

The majority of ASN employees in Jambi City experienced incidents of MetS and the risk indicators for MetS that were mostly experienced were central obesity, increased blood pressure and decreased levels of HDL-C.

It is recommended to ASN employees and the Jambi City Government, especially

the Health office, that anticipatory efforts are in the form of prevention and treatment of risk factors that affect the incidence of MetS through supporting policy strategies and health services, as follows: 1) Raising awareness of Jambi city ASN employees in prevention and control of MetS risk factors by increasing communication, information, and education (KIE) about PTM; 2) encourage the movement to implement the "CERDIK" culture of behavior for the prevention of PTM, namely regular health checks, get rid of cigarette smoke, be diligent in physical activity, have a healthy diet with balanced calories, get enough rest, and manage stress; 3) initiate the implementation of an integrated development post (Posbindu) in the workplace in the context of early detection of MetS risk factors for the prevention of PTM; 4) encourage early follow-up for ASN who have MetS risk factors to health care facilities.

## REFERENCE

1. WHO. *Noncommunicable diseases: Key facts*. Jakarta; 2021.
2. Kementerian Kesehatan Republik Indonesia. *Riset Kesehatan Dasar (Riskesdas)*. 2018.
3. Kementerian Kesehatan Republik Indonesia. *Buku Pedoman Manajemen Penyakit Tidak Menular*. Jakarta: Direktorat Jenderal Pencegahan dan Pengendalian Penyakit Tidak Menular; 2019.
4. Alberti KGMM, Eckel RH, Grundy SM, Zimmet PZ, Cleeman JI, Donato KA, et al. *Harmonizing the metabolic syndrome: A joint interim statement of the international diabetes federation task force on epidemiology and prevention; National heart, lung, and blood institute; American heart association; World heart federation; International . Circulation*. 2009;120(16):1640–5.
5. Singh N, Scmhrd. *Metabolic Syndrome: Practice Essentials, Background, Pathophysiology*. *J Hear Stroke*. 2018;3(1):1044.
6. Rini S. *Sindrom Metabolik*. *Sindrom Metab [Internet]*. 2015;4(4):88–93. Available from: <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Sindrom+Metabolik#1>
7. Balkau B, Charles M-A, Drivsholm T, Borch-Johnsen K, Wareham N, Yudkin JS, et al. *Frequency of the WHO metabolic syndrome in European cohorts, and an alternative definition of an insulin resistance syndrome*.

- Diabetes Metab [Internet] [Internet]. 2002;28:3634–76. Available from: <https://research-information.bris.ac.uk/en/publications/frequency-of-the-who-metabolic->
8. Anand SS, Yi Q, Gerstein H, Lonn E, Jacobs R, Vuksan V, et al. Relationship of metabolic syndrome and fibrinolytic dysfunction to cardiovascular disease. *Circulation*. 2003;108(4):420–5.
  9. Cameron AJ, Magliano DJ, Zimmet PZ, Welborn T, Shaw JE. The Metabolic Syndrome in Australia: Prevalence using four definitions. *Diabetes Res Clin Pract*. 2007;77(3):471–8.
  10. Iqbal SP, Ramadas A, Fatt QK, Shin HL, Onn WY, Kadir KA. Relationship of sociodemographic and lifestyle factors and diet habits with metabolic syndrome (MetS) among three ethnic groups of the Malaysian population. *PLoS One* [Internet]. 2020;15(3):1–16. Available from: <http://dx.doi.org/10.1371/journal.pone.0224054>
  11. Bantas K, Yosef HK, Moelyono B. Perbedaan Gender pada Kejadian Sindrom Metabolik pada Penduduk Perkotaan di Indonesia Urban Population. *J Kesehat Masy Nas*. 2007;7(5):219–26.
  12. Soewondo P, Purnamasari D, Oemardi M, Waspadji S, Soegondo S. Prevalence of metabolic syndrome using NCEP/ATP III criteria in Jakarta, Indonesia: the Jakarta primary non-communicable disease risk factors surveillance 2006. *Acta Med Indones*. 2010;42(4):199–203.
  13. Suastika K, Dwipayana P, Saraswati IMR, Gotera W, Gde Budhiarta AA, Dwi Sutanegara IN, et al. Prevalence of Obesity, Metabolic Syndrome, Impaired Fasting Glycemia, and Diabetes in Selected Villages of Bali, Indonesia. *J ASEAN Fed Endocr Soc*. 2011;26(2):159–62.
  14. Nurzakiah Hasan MKM, Hadju V, Jafar N, Thaha RM. Prevalence of metabolic syndrome (MetS) and determinants among obese teachers in Makassar, Indonesia. *IJUM Med J Malaysia*. 2019;18(2):29–38.
  15. Kementerian Kesehatan Republik Indonesia. Laporan Rikerdas Provinsi Jambi 2018 [Internet] [Internet]. Jakarta; 2019. Available from: <https://anyflip.com/cjsr/qctv/basic>.
  16. Grundy, Scott M. Chair Cleeman, James I. Daniels SR, Donato KA, Eckel RH, Franklin BA, Gordon DJ, Krauss RM, et al. Diagnosis and Management of the Metabolic Syndrome. *Circulation* [Internet]. 2005;112. Available from: <http://circ.ahajournals.org/content/112/17/2735>
  17. Tanrewali MS. Hubungan Aktivitas Fisik dengan Kejadian Sindrom Metabolik pada Usia Dewasa di Wilayah Kerja UPT Puskesmas Lambu Kecamatan Lambu Kabupaten Bima Physical Activity Relationship With Metabolic Syndrome In Adults Age At Work Area of Upt Lambu Health Center Su. *J Kesehat Masy*. 2019;4(1):28–32.
  18. Wulandari MY, Isfandiar MA. Kaitan sindroma metabolik dan gaya hidup dengan gejala komplikasi mikrovaskuler. *J Berk Epidemiol*. 2013;1(No. 2 September):224–33.
  19. Puryaningtyas R D SD. Hubungan Asupan Karbohidrat dan Protein dengan Kejadian Metabolic Syndrome pada Pekerja Wanita di PT. Iskandar Indah Printing Textile Surakarta. Skripsi Univ Muhammadiyah Surakarta [Internet]. 2020;168–78. Available from: [http://eprints.ums.ac.id/86235/1/NASKAH\\_PUBLIKASI.pdf](http://eprints.ums.ac.id/86235/1/NASKAH_PUBLIKASI.pdf)
  20. Samodro P, Prastowo A, Zulfannisa NH, Wahyuni N. Konsumsi Fast Food dan Aktivitas Fisik dengan Kejadian Sindrom Metabolik Di RSUD Prof. Dr. Margono Soekarjo Purwokerto. *J Nutr*. 2020;21(2):83–90.
  21. Sihombing M, Tjandrarini DH. Faktor Risiko Sindrom Metabolik Pada Orang Dewasa Di Kota Bogor. *Penelit Gizi dan Makanan (The J Nutr Food Res)*. 2015;38(1):21–30.
  22. Ibrahim IA, Syahrir S, Adha AS, Sulastri NL, Universitas BG, Negeri I, et al. Faktor Risiko Kejadian Sindrom Metabolik pada Polisi di Kepolisian Resort Kota Besar (POLRESTABES) Makassar. *Public Heal Sci J* [Internet]. 2019;11(2):194–202. Available from: <https://doi.org/10.24252/as.v11i2.11929>