

## Metabolic profiles of internal medicine residents



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### ABSTRACT

**Background:** Obesity is a pressing global health concern that affects not only developed, but also developing countries. This condition is linked not only to the rising incidence of metabolic and cardiovascular diseases, but also exerts a considerable economic burden due to its high associated costs. Moreover, metabolic disorders, including obesity, can affect both the general population and medical practitioners alike. Therefore, we conducted an observational cross-sectional study to assess the metabolic profiles of internal medicine residents at Faculty of Medicine, Universitas Udayana, Denpasar Bali.

**Methods:** This is a descriptive cross-sectional observational study carried out in 2022 at the Diabetic Polyclinic in the Prof. dr. I Goesti Ngoerah Gde Ngoerah Hospital, Denpasar. The study approved by the Ethical Committee of the Faculty of Medicine, Universitas Udayana. All subjects were given information regarding this study and signed the informed consent. The metabolic profiles that were evaluated included body mass index, blood pressure, lipid profile, and fasting blood glucose.

**Results:** Out of the 116 participants in this study, one individual (0.9%) was found to have underweight, while 20 (17.2%) were classified as normal and another 20 (17.2%) as overweight. A majority of the participants, comprising 75 individuals (64.7%), were classified as obese. Further analysis revealed that metabolic disorders were prevalent in this study, with 9 individuals (7.8%) diagnosed with hypertension, 2 individuals (1.7%) with diabetes mellitus, 99 individuals (85.3%) with dyslipidemia, and 16 individuals (13.8%) with metabolic syndrome.

**Conclusion:** The findings of this study indicate that a significant proportion of internal medicine residents at Faculty of Medicine, Universitas Udayana were classified as obese, and a considerable number were diagnosed with various metabolic disorders, including hypertension, dyslipidemia, diabetes mellitus, and metabolic syndrome.

**Keywords:** internal medicine, metabolic profile, obesity, residents.

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### INTRODUCTION

Obesity is a widespread health issue that not only impacts developed nations but also developing ones. It not only contributes to a rise in metabolic and cardiovascular diseases, obesity is also one risk factor for the other non-communicable disease and has significant economic consequences due to its high costs.<sup>1-3</sup> Addressing this problem requires a comprehensive and strategic approach to reduce mortality and morbidity rates.

Obesity is a chronic illness marked by a physiological process that results in an excessive accumulation of adipose tissue. As a result, there is an elevated risk of morbidity and mortality. Multiple factors affect the complex interplay between environmental factors and genetic

regulation of weight gain. Consequently, numerous individuals with a body mass index greater than 25 kg/m<sup>2</sup> suffer from various metabolic disorders and associated complications.<sup>4</sup>

The prevalence of obesity has risen dramatically over the past three decades. It is estimated that approximately 500 million individuals worldwide are affected, with children and adolescents being the most affected group. Developed nations, like the United States, have particularly high rates of overweight individuals, with two-thirds of adults being classified as such and one-third falling into the category of obesity.<sup>5</sup> The Asia Pacific region is witnessing a growing prevalence of obesity. To illustrate, Japan has seen a rise in obesity rates from 16.7% in 1976-1980 to 24% in 2000, while China has also experienced an

increase in obesity rates from 3.7% in 1982 to 19% in 2002.<sup>6</sup>

Over time, the obesity rate in Indonesia has continued to increase. According to a 2013 study conducted by the Ministry of Health, the prevalence of obesity among the adult population was 15.4%. The prevalence of obesity among adult males in 2013 was 19.7%, which was higher than the rates recorded in 2007 (13.9%) and 2010 (7.8%). Among adult females aged 18 years and above, the prevalence of obesity was 32.9%, significantly higher than the rates recorded in 2007 (13.9%) and 2010 (15.5%).<sup>7</sup>

Central obesity is recognized as a significant risk factor associated with various chronic illnesses. Individuals, particularly men with a waist circumference exceeding 90 cm and women with a waist

circumference exceeding 80 cm, are categorized as having central obesity. In Indonesia, there is a 26.6% prevalence of central obesity, which appears to be rising across all provinces, with DKI Jakarta having the highest rate.<sup>7</sup>

Obesity is linked to other metabolic disorders, including high blood pressure, diabetes, and dyslipidemia. In addition, being overweight or obese heightens the likelihood of developing various diseases, such as cancer, cardiovascular disease, asthma, gallbladder issues, osteoarthritis, and low back pain.

Obesity-related metabolic disorders not only affect the general population but also have an impact on the healthcare professionals, including internal medicine residents at Faculty of Medicine, Universitas Udayana. The COVID-19 pandemic has led to a more sedentary lifestyle due to online activities, making these residents more susceptible to becoming overweight or obese. As a result, the risk of developing metabolic disorders increases among these internal medicine residents, who are expected to be exemplary in treating patients with metabolic disorders. Therefore, we have initiated a study in order to examine the metabolic profile of internal medicine residents at Faculty of Medicine, Universitas Udayana.

## METHOD

Recruitment and collection data was performed on September 2022, and data analysis was performed on October 2022. This was a cross-sectional study was conducted at the Diabetes Polyclinic in Prof. dr. I Goesti Ngoerah Gde Ngoerah Hospital Denpasar, involving all of the internal medicine residents at Faculty of Medicine, Universitas Udayana. All participants signed informed consent forms after receiving information about the study. In addition to body mass index, blood pressure, lipid profile, and fasting blood glucose, the study also examined metabolic profiles. Body mass index (BMI) was classified into four category which was underweight (BMI <18.5 kg/m<sup>2</sup>), normal (BMI ≥18.5-24.9 kg/m<sup>2</sup>), overweight (BMI ≥25-29.9 kg/m<sup>2</sup>), and obesity (BMI ≥30 kg/m<sup>2</sup>). Blood pressure was classified into normotension (systolic <130 mmHg and/

or diastolic <85 mmHg) and hypertension (systolic ≥130 mmHg and/or diastolic ≥85 mmHg). Lipid profile was classified into normal and dyslipidemia. A person can be categorized as dyslipidemia if that person has one of the following criteria: (1) triglycerides level ≥150 mg/dL; (2) high-density lipoprotein cholesterol (HDL) level ≤40 mg/dL in men or ≤50 mg/dL in women; (3) low-density lipoprotein cholesterol (LDL) ≥100 mg/dL; or (4) blood total cholesterol ≥200mg/dL. In this study, we used fasting blood glucose level ≥126 mg/dl as a diagnostic criteria of type 2 diabetes mellitus. A participant will be classified to have a metabolic syndrome if that person has a combination of obesity, hypertension, and elevated fasting blood glucose. The inclusion criteria of this study are internal medicine residents who give consent to participate in this study, while the exclusion criteria is if the participant was lost in follow up in this study. Descriptive analysis was performed to depict the characteristics and the distribution of each variable among study participants.

## RESULT

A total of 116 individuals participated in the study. According to this study, one individual (0.9%) was identified to be in a state of underweight, while 20 individuals (17.2%) were deemed to have a normal weight, another 20 individuals (17.2%) were classified as being overweight, and the remaining 75 individuals (64.7%) were found to be obese (Figure 1).

This study revealed the presence of metabolic disorders, namely hypertension (affecting 9 individuals), diabetes mellitus (affecting 2 individuals), dyslipidemia (affecting 99 individuals), and metabolic syndrome (affecting 16 individuals), as indicated in the table provided below (Figure 2).

## DISCUSSION

Obesity is a condition marked by a pathological mechanism that leads to the accumulation of excess adipose tissue, thereby elevating the likelihood of morbidity and mortality.<sup>8,9</sup> Numerous factors can affect the interplay between environmental factors and genes

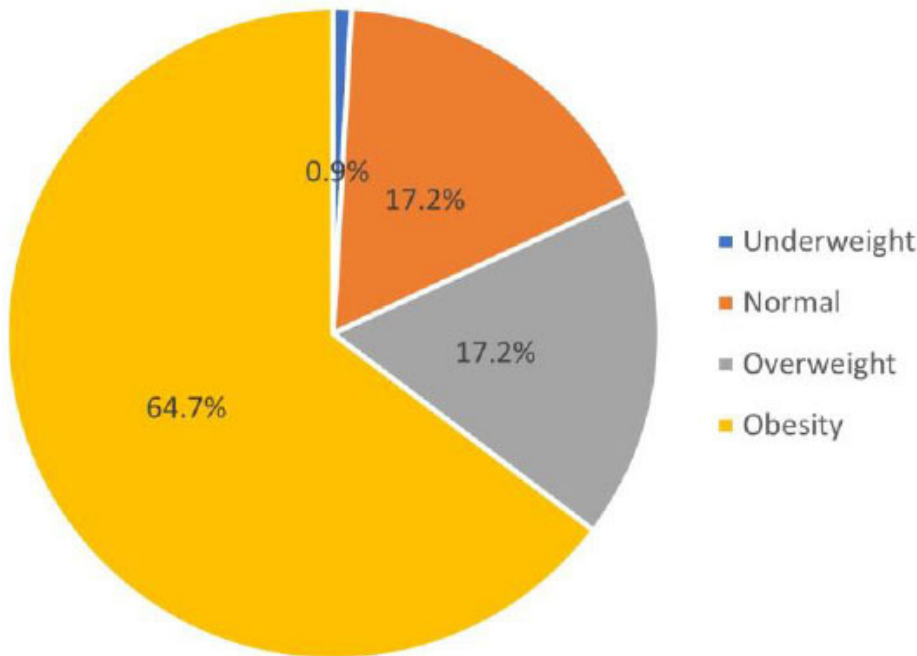
responsible for regulating weight gain, resulting in several metabolic complications associated with individuals having a body mass index of over 25 kg/m<sup>2</sup>.<sup>4,10-12</sup>

Being overweight or obese can elevate the likelihood of developing a range of medical conditions, such as type 2 diabetes, all types of cancer except for oesophageal and prostate cancer, cardiovascular disease, asthma, gallbladder issues, osteoarthritis, and low back pain.<sup>10,13,14</sup>

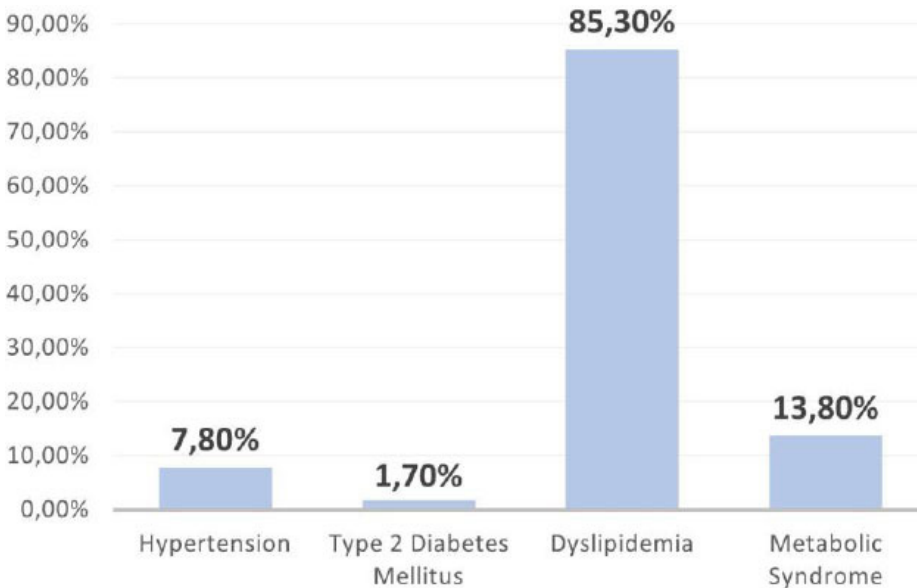
According to research conducted in Turkey, a significant percentage of healthcare professionals are obese, with 61.2% of physicians, 37.5% of nurses, 30.5% of midwives, and 66.7% of medical assistants falling into this category.<sup>15</sup> According to research conducted in Malaysia, 43% of healthcare workers had a BMI within the normal range, while 33.1% were classified as overweight and 20.1% were classified as obese.<sup>16</sup> According to research conducted in Palestine, 65% of healthcare workers were either overweight or obese, with 39.3% falling into the overweight category and 25.7% classified as obese.<sup>17</sup>

Our findings indicated that a significant proportion of internal medicine residents were not only overweight but also presented metabolic complications. In comparison to the general adult population in Indonesia, our study unveiled a higher prevalence of obesity among internal medicine residents. The Ministry of Health of the Indonesian Republic, in conjunction with the National Basic Health Research in 2018, reported an obesity prevalence of 21.8% in adults over 18 years old.<sup>18</sup>

The high occurrence of overweight and obesity among internal medicine residents is likely due to irregular and prolonged work hours, as well as work-related that leaves little time for physical activity and improper dietary intake. These study findings can assist us in planning early intervention strategies that include education and control of diet, physical activity, and, if necessary, pharmacotherapy to prevent complications and set a positive example for patients. Our hope is that all internal medicine residents will adopt and adhere to healthy lifestyle habits to prevent future metabolic issues.



**Figure 1.** Prevalence of nutritional status by body mass index category.



**Figure 2.** Prevalence of metabolic disorders among subjects.

#### Limitation of this study

This study has various drawbacks, including the restricted number of study participants, and failure to assess factors such as physical activity, intake, and years of training of residents that may have influenced the metabolic profile.

#### CONCLUSION

The research revealed that a significant number of internal medicine residents at Faculty of Medicine, Universitas Udayana were suffering from obesity, as well as

metabolic issues such as dyslipidemia, hypertension, diabetes mellitus, and metabolic syndrome. Given the diversity of potential factors, a follow-up study is recommended to further investigate this topic.

#### ETHICAL CLEARANCE

The study has been approved by the Ethical Committee of the Faculty of Medicine, Universitas Udayana (No.1986/UN.14.2.2.VII.14/LT/2022).

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#### AUTHOR CONTRIBUTION

The authors of this study were granted unrestricted access to all data and bore sole responsibility for ensuring its integrity and the precision of the data analysis.

#### CONFLICT OF INTERESTS

The authors have stated that they have no competing interests.

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