

Differences in Risk Factors for Metabolic Syndrome and Stress Levels between School Teachers Living in Rural and Urban Areas in Karawang, Indonesia during the COVID-19 Pandemic

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ABSTRACT

This study investigated the differences in metabolic syndrome risk factors and psychological stress levels among school teachers in rural and urban areas during the COVID-19 pandemic in Indonesia. Waist circumference, High-Density Lipoprotein (HDL) and triglyceride levels, hypertension status, and fasting blood glucose were measured in 71 participants. The results showed higher rates of large waist circumference and hypertension in rural areas, and higher rates of low HDL, high triglyceride, and high fasting blood glucose in urban areas. In addition, a greater percentage of individuals in both rural and urban areas experienced high level of stress. These findings suggest different health risks associated with living in different areas during the pandemic.

Keywords: COVID-19 pandemic, metabolic syndrome, mental stress, risk factors

INTRODUCTION

The COVID-19 pandemic has had a significant impact on various health outcomes, with different communities experiencing a wide range of effects (Marroquín *et al.* 2020). This study investigated the differences in risk factors for metabolic syndrome and psychological stress levels among school teachers living in rural and urban areas of Karawang, Indonesia, during the COVID-19 pandemic. Metabolic syndrome, characterized by abdominal obesity, hypertension, dyslipidemia, and high blood glucose, increases the risk of cardiovascular disease and type 2 diabetes (Rochlani *et al.* 2017). In addition, psychological stress adversely affects overall health (Schneiderman *et al.* 2005). Data on waist circumference, blood HDL cholesterol and triglyceride levels, hypertension, and fasting blood glucose were collected from school teachers. The study aimed to contribute to existing research on health risks in rural and urban areas during the pandemic, and to provide information for planning of targeted interventions and policies to improve the well-being of school teachers and the overall health of the community.

METHODS

This research employed a cross-sectional design to investigate the risk factors associated with metabolic syndrome and psychological stress among school teachers living in different locations in rural and urban areas in Karawang, Indonesia, during the COVID-19 pandemic. Data collection was conducted at the end of the pandemic (in late 2022) to ensure that the participants had experienced the full impact of the crisis. Sampling activities included selection of participants from both rural (sparsely populated) and urban (densely populated) areas in Karawang. A purposive sampling technique was used, considering factors such as the availability of school teachers and their willingness to participate in the study. A total of 71 school teachers were included in the subjects, representing both rural and urban areas. Informed consent was obtained from all participants prior to their inclusion in the study. Data were collected using two primary methods. The first was to obtain measurements of waist circumference, HDL cholesterol, triglyceride levels, hypertension status, and fasting blood glucose. Blood serum samples were collected

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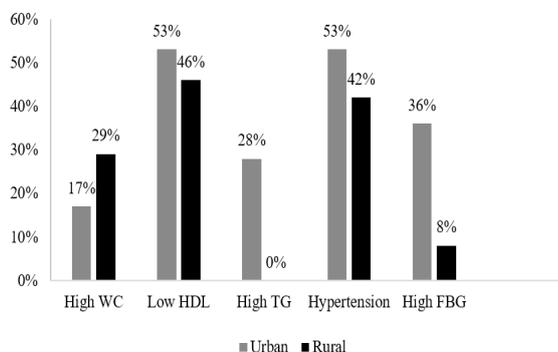
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by finger prick and analyzed in the laboratory to assess the metabolic risk factors. The second method was to administer the Perceived Stress Scale questionnaire to the participants to measure their stress levels according to established criteria. The questionnaire consisted of validated items that assessed the participants' perceptions of stress during the COVID-19 pandemic. Measurements were made of waist circumference in centimeters, HDL cholesterol and triglyceride levels in milligrams per deciliter, blood pressure for hypertension status, and blood glucose levels using the glucose oxidase-peroxidase method. This study was approved by the Ethics Committee of the Faculty of Medicine, University of Indonesia-Dr. Cipto Mangunkusumo National General Hospital (Reference No. KET-1088/UN2.F1/ETIK/PPM.00.02/2022).

RESULTS AND DISCUSSION

The results revealed notable differences in the prevalence of metabolic syndrome risk factors between rural and urban areas (Figure 1). In terms of waist circumference, a higher percentage (29%) of participants from rural areas had central obesity compared to those from urban areas (17%). This



Data of waist circumference* (<94 cm for men, <80 cm for women), HDL (>40 mg/dl for men and >50 mg/dL for women), triglyceride (<150 mg/dL), hypertension status (systolic blood pressure <120 mmHg and diastolic blood pressure <80 mmHg.), and fasting blood glucose (<100 mg/dL) of teachers in Karawang

*Optimal values according to the World Health Organization (WHO) guidelines

Figure 1. Prevalence of metabolic syndrome risk factors among schoolteachers in urban and rural areas of Karawang.

finding suggests that individuals in rural areas may be more prone to abdominal obesity, which is a key component of the metabolic syndrome. Furthermore, the prevalence of hypertension was higher among participants from urban areas (53%) compared to those from rural areas (42%). This finding suggests that individuals living in urban areas may be at a higher risk of developing hypertension, possibly due to lifestyle factors and limited access to healthcare facilities (Cyr *et al.* 2019). In contrast, participants from urban areas exhibited a higher prevalence of low High-Density Lipoprotein (HDL) level (53%) and high triglyceride level (28%) compared to those from rural areas (46% and 0%, respectively). These findings indicate that individuals in urban areas may be more susceptible to dyslipidemia, which is another crucial aspect of metabolic syndrome. Moreover, a higher percentage (36%) of participants from urban areas had high fasting blood glucose levels compared to those from rural areas (8%). This disparity suggests that urban residents may be at a higher risk of developing abnormal blood glucose levels and subsequently, type 2 diabetes (Gassasse *et al.* 2017).

The study encompassed a total of 71 participants, with 38 males (21 urban, 17 rural) and 33 females (18 urban, 15 rural). 38 participants were in the 25–40 age range, while 33 were above 40. This diverse sample enables a comprehensive exploration of research objectives across different demographics as shown as Table 1.

Regarding psychological stress levels, the study found that 23% of teachers in urban areas and 46% of teachers in rural areas obtained stress

Table 1. Subjects characteristics

Characteristics	Urban	Rural	Total
Gender			
Male	21	17	38
Female	18	15	33
Age			
25–40	21	17	38
>40	18	15	33

scores that exceeded the criterion of 14, indicating a significant prevalence of psychological stress among the participants. This observation implies that both urban and rural school teachers experienced elevated levels of stress during the COVID-19 pandemic.

CONCLUSION

This study revealed notable differences in risk factors for metabolic syndrome and psychological stress levels between school teachers in rural and urban areas in Karawang, Indonesia during the COVID-19 pandemic. These findings highlight the need for tailored interventions and targeted health care approaches for individuals residing in different geographical settings.

DECLARATION OF CONFLICT OF INTERESTS

The authors declare no conflicts of interest in the preparation of this manuscript.

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