



Original Article

Body Mass Index and Blood Pressure Profiles Among Women of Reproductive Age Attending Community Health Services in Pantoloan, Palu: A Descriptive Study

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ABSTRACT

Background: Cardiovascular disease remains a major global health problem, with approximately 19.8 million deaths reported in 2022. Abnormal body mass index (BMI) and elevated blood pressure are modifiable cardiovascular risk factors that may develop during adolescence and the reproductive years. However, data on these risk factors among women of reproductive age attending community-based health services in Pantoloan are limited. This study aimed to describe the distribution of BMI and blood pressure categories among women of reproductive age attending community health activities in the catchment area of Pantoloan Community Health Center, Palu, Indonesia.

Method: A descriptive study was conducted in 2026 among 74 women aged 15–49 years, recruited using non-probability convenience sampling during Posyandu activities. Body weight, height, and blood pressure were measured according to a standardized study protocol. BMI and blood pressure categories were summarized using frequencies, percentages, and Wilson 95% confidence intervals (CIs).

Result: Among the 74 participants, 39 (52.7%) were aged 15–24 years. Based on the study-defined BMI categories, 51 participants (68.9%; 95% CI: 57.7–78.3) had a normal BMI, while 23 (31.1%; 95% CI: 21.7–42.3) had a BMI outside the normal range. Normal blood pressure was recorded in 43 participants (58.1%; 95% CI: 46.7–68.7), whereas 31 (41.9%; 95% CI: 31.3–53.3) had blood pressure above the study-defined normal category, including 26 (35.1%) with prehypertension and 5 (6.8%) with hypertension.

Conclusion: Although most participants had normal BMI, elevated blood pressure was relatively common. These findings highlight the importance of standardized blood pressure reassessment, appropriate BMI interpretation, lifestyle counseling, and referral when indicated in community-based health services. Findings should be interpreted within the study population because convenience sampling limits generalizability.



INTRODUCTION

Cardiovascular disease (CVD) remains the leading cause of death globally. The World Health Organization estimated that CVD caused approximately 19.8 million deaths in 2022, accounting for about 32% of all deaths worldwide, with a substantial burden occurring in low- and middle-income countries ([World Health Organization, 2025a](#)). Cardiovascular health in women is influenced by conventional and sex-specific factors throughout the life course, beginning from adolescence and the reproductive years ([Chandrasekhar et al., 2026](#)). Several major cardiovascular risk factors, including excess body weight, elevated blood pressure, tobacco use, unhealthy diet, and physical inactivity, are modifiable and may be identified before clinical cardiovascular disease develops ([Boakye et al., 2024](#); [Sukma et al., 2025](#)). Recent evidence among reproductive-aged women also indicates that overweight and obesity contribute substantially to suboptimal cardiovascular risk profiles.

Women of reproductive age (WRA), commonly defined in population-based health studies as women aged 15–49 years, represent an important population for early cardiovascular prevention ([Andriani et al., 2026](#); [Zakiyah et al., 2025](#)). Cardiovascular health during the reproductive years is relevant not only to women's long-term health but also to preconception, pregnancy, and subsequent maternal health outcomes ([Khan et al., 2023](#)). Among modifiable cardiovascular risk factors, body mass index (BMI) and blood pressure are feasible indicators for assessment in community and primary care settings. BMI is a simple anthropometric measure calculated from weight and height and is commonly used to identify underweight, overweight, and obesity at the population level ([Susantini, 2021](#)). However, interpretation should consider age: adult BMI cutoffs are appropriate for adults, whereas the World Health Organization recommends sex- and age-specific BMI-for-age references for individuals aged 5–19 years.

Elevated blood pressure is another important modifiable cardiovascular risk factor because persistent increases in blood pressure contribute to vascular damage and increase the risk of cardiovascular, cerebrovascular, and kidney disease ([Pradono et al., 2020](#); [World Health Organization, 2025b](#)). Recent population-based evidence shows that hypertension is already an important health concern among WRA and is associated with factors including age, BMI, smoking, and other behavioral and reproductive characteristics ([Andriani et al., 2026](#); [Chhabra et al., 2022](#)). A nationwide study among women aged 15–49 years also demonstrated a positive relationship between BMI and blood pressure, supporting the importance of assessing these two indicators together ([Acharya et al., 2025](#)). Blood pressure classification nevertheless requires age-appropriate interpretation. The classification used in the original study protocol—normal blood pressure, prehypertension, and hypertension—was based on adult thresholds; therefore, findings among younger participants should be interpreted cautiously and primarily as screening indicators requiring appropriate follow-up rather than as definitive clinical diagnoses.

Evidence from Indonesia further supports the importance of cardiovascular risk-factor assessment among women of reproductive age. A population-based Indonesian study involving women aged 15–49 years demonstrated that several reproductive and lifestyle characteristics were associated with prehypertension and hypertension ([Zakiyah et al., 2025](#)). Community-based studies have similarly reported associations between obesity or nutritional status and hypertension among WRA attending primary care or Posyandu services ([E. R. Astuti, 2023](#); [Shofia et al., 2024](#)). In addition, hypertension prevention among Indonesian WRA has been recognized as an important component of preventive health behavior and primary care intervention ([Septiana & Kusumawati, 2024](#)).

Local data indicate a need for further community-based assessment. Pantoloan Community Health Center recorded 320 women of reproductive age in its catchment area, including 49 women documented as having hypertension. Previous studies have examined cardiovascular risk factors in broader adult or reproductive-aged populations, while other research has focused on cardiovascular risk-prediction models. However, commonly used cardiovascular risk-prediction tools have specific age ranges and input requirements that may not be appropriate for all women aged 15–49 years

(Sofogianni et al., 2022). Moreover, information describing the distribution of directly measured BMI and blood pressure among women attending community health activities specifically in Pantoloan remains limited. Describing these readily measurable factors may provide locally relevant information for counseling, repeat screening, and preventive services.

Therefore, this study aimed to describe the distribution of BMI and blood pressure categories among women of reproductive age participating in community health activities in the catchment area of Pantoloan Community Health Center, Palu, Indonesia. The study focused on measured BMI and blood pressure categories rather than estimating 10-year cardiovascular risk because available risk-prediction tools do not adequately cover the age range and available variables of all participants in this study.

METHODS

Study Design

This descriptive study was conducted from May to July 2026 in the catchment area of the Pantoloan Community Health Center, Palu, Central Sulawesi, Indonesia. Data were collected once from each participant during the study period. The reporting of this study was guided by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations for cross-sectional studies.

The source population comprised 320 women of reproductive age registered within the Pantoloan Community Health Center catchment area. The sample size was estimated using the single-population proportion method, assuming a 95% confidence level, an expected proportion of 50%, and an absolute precision of 10%. An expected proportion of 50% was used because no reliable prior estimate was available for the primary proportions of interest. After applying a finite population correction based on the known source population of 320 women, the target sample size was set at 74 participants.

No allowance for potential nonresponse was included in the original sample-size calculation. The numbers of individuals approached, those who declined to participate, and those who were otherwise not enrolled were not documented separately; therefore, the response rate could not be calculated. Ultimately, 74 eligible participants were enrolled and included in the final analysis.

Measurement and Operational Definitions

Body weight was measured once using a digital scale with participants wearing light clothing, and height was measured once using a microtoise stadiometer with participants barefoot. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m^2). According to the original study protocol, BMI was classified using adult cutoffs as underweight ($<18.5 \text{ kg}/\text{m}^2$), normal ($18.5\text{--}24.9 \text{ kg}/\text{m}^2$), overweight ($25.0\text{--}29.9 \text{ kg}/\text{m}^2$), or obese ($\geq 30.0 \text{ kg}/\text{m}^2$). These categories were applied to all participants, including 27 participants aged 15–19 years. Current guidance recommends age-specific BMI-for-age assessment for individuals aged 5–19 years rather than the direct application of adult BMI cutoffs. However, date-of-birth data and age in months were not recorded in the original dataset; therefore, retrospective BMI-for-age reclassification of participants aged 15–19 years could not be performed reliably. The present analysis consequently retained the BMI categories specified in the original protocol, and findings for participants aged 15–19 years were interpreted with caution.

Body Mass Index (BMI) was calculated as body weight (kg) divided by the square of height (m^2). Height was measured using a microtoise stadiometer with participants barefoot, while body weight was measured using a digital scale with participants wearing light clothing; each measurement was performed once. The respondents were aged 15–49 years, including 27 respondents aged 15–19 years. Because date-of-birth data or age in months was unavailable, the WHO *BMI-for-age z-score*

classification was not applied to the 15–19-year-old age group. BMI classification used the categories predetermined in the research protocol.

Blood pressure was measured using a digital sphygmomanometer. Participants were instructed to sit and rest for approximately 5 minutes before measurement. Blood pressure was measured on the left arm with the arm positioned at heart level. One blood pressure measurement was obtained for each participant; therefore, no average of repeated measurements was calculated. The original study records did not document cuff-size selection, device-validation status, or calibration procedures. Accordingly, these procedures could not be retrospectively verified and are acknowledged as methodological limitations.

According to the predetermined study protocol, Blood pressure was categorized according to the adult thresholds predetermined in the original study protocol, which were based on the Joint National Committee 7 (JNC 7) classification: normal blood pressure (<120 mmHg systolic and <80 mmHg diastolic), prehypertension (120–139 mmHg systolic and/or 80–89 mmHg diastolic), and hypertension ($\geq$ 140 mmHg systolic and/or $\geq$ 90 mmHg diastolic). These thresholds were originally developed for adults and were applied to the entire study sample, including participants younger than 18 years. Therefore, blood pressure categories among participants aged 15–17 years should be interpreted cautiously and as study-defined screening categories rather than age-specific clinical classifications. Because only one blood pressure measurement was obtained, the hypertension category was considered “hypertension at screening” and not a confirmed diagnosis of hypertension..

Statistical Analysis

The data were analyzed descriptively. Categorical variables were presented as frequencies and percentages. Wilson 95% confidence intervals (CIs) were calculated for the main BMI and blood pressure proportions. No hypothesis testing was performed because the objective of the analysis was descriptive. The analysis included all 74 participants with recorded categorical data.

The research data were processed and analyzed using IBM SPSS Statistics version 27. All data from the 74 respondents were checked before analysis, and no missing values were found for the variables analyzed. Therefore, all analyses used a denominator of 74 respondents.

Ethical Considerations

Participation was voluntary, and confidentiality was maintained throughout data collection and reporting. Written informed consent was obtained before participation.

This study received ethical approval from the Research Ethics Committee of Poltekkes Kemenkes Palu under approval number 005150/KEPK POLTEKKES KEMENKES PALU/2026 on July 1, 2026. All respondents participated voluntarily and signed informed consent after receiving an explanation of the study objectives, benefits, procedures, risks, and their right to withdraw from the study. The confidentiality of respondents' identities and data was maintained through the use of identification codes and the presentation of research findings in aggregate form.

RESULTS

All 74 participants included in the analysis had recorded data on age group, BMI category, and blood pressure category. More than half were aged 15–24 years (52.7%), while only two participants (2.7%) were aged 45–49 years (Table 1).

Table 1. Distribution of participants by age (n = 74)

Age group (years)	n	%	95% CI
15–24	39	52.7	41.5–63.7
25–34	17	23.0	14.9–33.7
35–44	16	21.6	13.8–32.3
45–49	2	2.7	0.7–9.3
Total	74	100.0	—

Based on the study-defined adult BMI categories, 51 participants (68.9%; 95% CI 57.7–78.3) were classified as having normal BMI. Overall, 23 participants (31.1%; 95% CI 21.7–42.3) were classified outside the normal category, including 10 underweight, 9 overweight, and 4 obese participants (Table 2). These categories should be interpreted cautiously because the study-defined adult cutoffs were also applied to participants aged 15–19 years.

Table 2. Body mass index categories based on the study-defined adult cutoffs (n = 74)

BMI Category	n	%	95% CI
Underweight	10	13.5	7.5–23.1
Normal	51	68.9	57.7–78.3
Overweight	9	12.2	6.5–21.5
obesity	4	5.4	2.1–13.1
Non-normal BMI (combined)	23	31.1	21.7–42.3

Normal blood pressure was recorded in 43 participants (58.1%; 95% CI 46.7–68.7). Thirty-one participants (41.9%; 95% CI 31.3–53.3) had blood pressure above the study-defined normal category; 26 were classified as having prehypertension and 5 as having hypertension at screening (Table 3).

Table 3. Blood pressure categories at screening based on study-defined adult thresholds (n = 74)

Blood Pressure Category	n	%	95% CI
Normal	43	58.1	46.7–68.7
Prehypertension	26	35.1	25.2–46.5
Hypertension at screening	5	6.8	2.9–14.9
Above normal (combined)	31	41.9	31.3–53.3

Based on the study-defined adult blood pressure thresholds, 43 participants (58.1%; 95% CI 46.7–68.7) were classified within the normal category. Thirty-one participants (41.9%; 95% CI 31.3–

53.3) had blood pressure above the study-defined normal category, including 26 participants (35.1%) in the prehypertension category and 5 participants (6.8%) in the hypertension-at-screening category

DISCUSSION

Based on the study-defined adult BMI categories, most participants were classified within the normal BMI category (68.9%), while 31.1% were classified outside the normal category, including underweight, overweight, and obesity. This distribution indicates heterogeneity in BMI status among women attending community health activities in Pantoloan and suggests that nutritional assessment in this population should address both insufficient and excessive body weight. Similar concerns have been reported in community-based research among women of reproductive age in Indonesia. [Astuti et al. \(2025\)](#), in a study of women attending Posyandu in Bandung, reported that nutritional status, particularly obesity, was significantly associated with prehypertension and hypertension. A descriptive study conducted in the catchment area of Tlogosari Wetan Community Health Center, Semarang, also documented a substantial burden of general and central obesity alongside elevated blood pressure among women of reproductive age ([Haryuti et al., 2017](#)). However, direct comparison should be made cautiously because their participants had different eligibility characteristics and the study specifically examined associations between nutritional status and hypertension, whereas the present study was designed only to describe BMI and blood pressure distributions.

Previous studies also support the broader relevance of BMI to cardiovascular health among women of reproductive age. [Acharya et al. \(2025\)](#), using nationally representative data from 4,133 women aged 15–49 years in Nepal, found that higher BMI was positively associated with both systolic and diastolic blood pressure; overweight and obesity were also associated with higher odds of hypertension. Likewise, a large analysis across 21 low- and middle-income countries reported higher BMI as an important factor associated with hypertension among women of reproductive age ([Andriani et al., 2026](#)). These studies provide epidemiological context for assessing BMI and blood pressure together in community settings. Nevertheless, the present study did not perform an association analysis between BMI and blood pressure; therefore, no inference regarding a relationship between these two variables can be made from the Pantoloan data.

Regarding blood pressure, 41.9% of participants were classified as having values above the study-defined normal category, comprising 35.1% in the prehypertension category and 6.8% in the hypertension-at-screening category. The 41.9% figure should not be compared directly with hypertension prevalence reported in other studies because it combines prehypertension and hypertension-at-screening categories. For example, [Andriani et al. \(2026\)](#) reported hypertension prevalence of 10.52% among non-pregnant women of reproductive age across 21 low- and middle-income countries, while [Acharya et al. \(2025\)](#) reported hypertension among approximately 7.7% of reproductive-aged women in the Nepalese national dataset. Differences between these estimates and the present findings may reflect variation in population characteristics, age distribution, sampling methods, blood pressure measurement protocols, and classification criteria. More than half of the participants in the present study were aged 15–24 years, which may also contribute to a different blood pressure distribution compared with studies containing a larger proportion of older reproductive-aged women.

Indonesian evidence further suggests that blood pressure among women of reproductive age may vary according to reproductive, behavioral, and sociodemographic characteristics. [Zakiyah et al. \(2025\)](#), using population-based Indonesian data, found that oral contraceptive use was associated with higher odds of both prehypertension and hypertension. Other studies have identified age, smoking, BMI, education, and healthcare access as relevant factors among reproductive-aged women ([Octaria et al., 2020](#); [Datta & Husain, 2021](#)). However, these factors cannot be used to explain the Pantoloan findings directly because most were not evaluated analytically in the present study. Their

relevance instead emphasizes the need for future studies with larger probability-based samples and multivariable analyses to identify factors associated with elevated blood pressure in this population.

The blood pressure findings should also be interpreted primarily as screening results. Only one measurement was obtained for each participant, and the adult thresholds specified in the original protocol were applied across the study age range. Therefore, the 6.8% classified as hypertension at screening should not be interpreted as the prevalence of clinically confirmed hypertension. Instead, the relatively large proportion of participants with blood pressure above the study-defined normal category highlights the potential value of standardized repeat measurements and appropriate follow-up within community-based health services.

From a preventive-health perspective, the findings support the integration of BMI and blood pressure assessment into community health activities for women of reproductive age. Community services may provide opportunities for nutritional counseling, promotion of healthy dietary and physical-activity behaviors, repeat blood pressure assessment, and referral when abnormal screening findings persist. Recording continuous anthropometric and blood pressure values, rather than only categorical classifications, would also improve clinical follow-up and enable more informative age-stratified and association analyses in future research.

This study has several limitations. Its descriptive cross-sectional design does not permit causal inference, and the use of non-probability convenience sampling in a single health-center catchment area may have introduced selection bias and limited generalizability. The response rate could not be calculated because the numbers of women approached or declining participation were not documented, and the relatively small sample size limited precision for less frequent categories. Blood pressure was measured only once and classified using adult thresholds, including for participants younger than 18 years; therefore, hypertension should be interpreted as a screening classification rather than a confirmed diagnosis, and age-related misclassification may have occurred. In addition, cuff-size selection, device validation, and calibration were not documented. Adult BMI cutoffs were also applied to participants aged 15–19 years because age-in-months or date-of-birth data were unavailable, which may have resulted in BMI misclassification. Finally, the absence of raw continuous data and age-stratified cross-tabulations limited more detailed age-specific and association analyses.

CONCLUSION

Among women of reproductive age attending community health activities in the Pantoloan Community Health Center catchment area, most participants were classified within the study-defined normal BMI category, while nearly one-third had BMI outside the normal category. A substantial proportion also had blood pressure above the study-defined normal category, including participants classified as having prehypertension and hypertension at screening. These findings highlight the importance of continued BMI assessment, standardized repeat blood pressure measurement, age-appropriate interpretation, and appropriate follow-up within community-based health services. However, the findings should be interpreted cautiously because participants were recruited using non-probability convenience sampling, adult BMI and blood pressure thresholds were applied to younger participants, and blood pressure was measured only once. Therefore, the results describe the characteristics of the study participants and should not be interpreted as population-level prevalence estimates for all women of reproductive age in Pantoloan.

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