International Journal of Clinical Science and Medical Research

ISSN(print): 2770-5803, ISSN(online): 2770-582X

Volume 06 Issue 05 May 2026

DOI: https://doi.org/10.55677/IJCSMR/V6I5-04/2026, Impact Factor: 8.005

Page No : 150-153

Potential Changes in Blood Pressure during Fasting In Young Adults

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ABSTRACT

Background: Fasting is widely practiced as a non-pharmacological intervention that may influence cardiovascular health, including blood pressure regulation. Elevated blood pressure in young adults is increasingly recognized as a significant risk factor for future cardiovascular disease.

Objectives: This study aimed to evaluate changes in blood pressure during fasting and after breaking the fast among young adults.

Methods: An experimental study with a one-group pretest-posttest design was conducted involving 100 young adult participants aged 18–24 years. Subjects underwent fasting for eight hours prior to blood pressure measurement. Blood pressure was measured again 30 minutes after breakfast using a calibrated digital sphygmomanometer. Data analysis was performed using the Kolmogorov–Smirnov normality test followed by the Wilcoxon test due to non-normal data distribution.

Results: The mean systolic blood pressure during fasting was 102.66 mmHg, increasing to 108.06 mmHg after breaking the fast. Mean diastolic blood pressure during fasting was 70.01 mmHg and increased slightly to 70.70 mmHg after breaking the fast. Statistical analysis demonstrated a significant increase in systolic blood pressure after breaking the fast compared with fasting conditions (p=0.000), while no significant difference was observed in diastolic blood pressure (p=0.238).

Conclusions: These findings suggest that fasting may contribute to lowering systolic blood pressure in young adults. Fasting may therefore serve as a supportive non-pharmacological strategy for maintaining cardiovascular stability and supporting systemic health prior to dental treatment procedures.

Published Online: May 26, 2026

KEYWORDS:
fasting, blood pressure, systolic blood pressure, diastolic blood pressure, young adults

INTRODUCTION

Blood pressure assessment is an essential component of systemic evaluation before dental treatment procedures. Uncontrolled hypertension may increase the risk of complications during dental care and may influence treatment planning. Hypertension is currently recognized as one of the leading causes of morbidity and mortality worldwide, including among young adults. In Indonesia, the prevalence of hypertension remains high despite improvements in public health awareness and healthcare access.

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****Cite this Article: Ferhad, A., Dewi, K.K. (2026). Potential Changes in Blood Pressure during Fasting In Young Adults. International Journal of Clinical Science and Medical Research, 6(5), 150-153. https://doi.org/10.55677/IJCSMR/V6I5-03/2026***

Several studies have reported increasing rates of elevated blood pressure among adolescents and young adults. Hypertension during early adulthood is associated with increased risk of cardiovascular disease, stroke, renal failure, and long-term disability later in life. Lifestyle factors such as poor dietary habits, obesity, physical inactivity, smoking, and psychological stress contribute significantly to elevated blood pressure among young individuals.

Non-pharmacological interventions have become increasingly important in blood pressure management. Among these interventions, fasting has attracted attention because of its potential effects on metabolic regulation and cardiovascular function. Fasting may influence insulin levels, autonomic nervous system activity, and lipid metabolism, all of which are associated with blood pressure regulation.

Previous studies have suggested that fasting may reduce systolic and diastolic blood pressure through modulation of sympathetic activity and enhancement of parasympathetic responses. However, limited studies have specifically investigated the acute effects of fasting on blood pressure among healthy young adults in relation to systemic conditions relevant to dental treatment.

Therefore, this study aimed to evaluate changes in blood pressure during fasting and after breaking the fast among young adults.

MATERIALS AND METHODS

This experimental study used a one-group pretest-posttest research design. The study population consisted of preclinical dental students aged 18–24 years. Participants were selected using purposive sampling according to predetermined inclusion and exclusion criteria.

A total of 100 participants were included in the study. Inclusion criteria included healthy young adults willing to fast for eight hours and undergo blood pressure measurements. Individuals with systemic diseases, smoking habits, or current medication use were excluded.

Participants fasted for eight hours overnight prior to the examination. Blood pressure was measured at 08.00 a.m. using a calibrated Omron digital sphygmomanometer. After the initial measurement, participants consumed breakfast consisting of rice, vegetables, and side dishes. A second blood pressure measurement was performed 30 minutes after breakfast.

Blood pressure measurements included systolic and diastolic values. Data were analyzed using SPSS software. The Kolmogorov–Smirnov test was used to assess data normality. Since data were not normally distributed ($p<0.05$), the Wilcoxon signed-rank test was applied to compare blood pressure measurements during fasting and after breaking the fast. Statistical significance was established at $p<0.05$.

RESULTS

The collected data was then analyzed using a normality test to determine whether the data were normally distributed. The Kolmogorov-Smirnov test was used because the sample size was 100. Data were normally distributed if the significance value was ($p>0.05$) and not normally distributed if the significance value was ($p<0.05$). The results of the data normality test can be seen in Table 1 below:

Table I. Normality Test Results

Variable	p-value	Sample Size
Systolic fasting blood pressure	0.003	100
Diastolic fasting blood pressure	0.000	100
Systolic postprandial blood pressure	0.001	100
Diastolic postprandial blood pressure	0.003	100

All variables showed non-normal distribution ($p<0.05$). Therefore, non-parametric analysis using the Wilcoxon test was performed. The difference in average blood pressure at each measurement can be seen in Table 2 below:

Table 2. Mean Blood Pressure Values During Fasting and After Breaking the Fast

Variable	Mean (mmHg)	Sample Size
Systolic fasting blood pressure	102.66	100
Diastolic fasting blood pressure	70.01	100
Systolic postprandial blood pressure	108.06	100
Diastolic postprandial blood pressure	70.70	100

From the data above, mean systolic and diastolic blood pressure values were lower during fasting compared with after breaking the fast. The non-normally distributed data was then subjected to a Wilcoxon test to determine the difference in blood pressure during and after fasting.

The data that had undergone the Kolmogorov-Smirnov normality test showed that it was not normally distributed, and then a further test, the Wilcoxon test, was performed. The results of the Wilcoxon test on systolic blood pressure can be seen in Table 3 below.

Table 3. Wilcoxon Test for Systolic Blood Pressure

Variable	Median	p-value
Systolic fasting blood pressure	102	0.000
Systolic postprandial blood pressure	110	

From the data above, a statistically significant increase in systolic blood pressure was observed after breaking the fast compared with fasting conditions ($p<0.05$). In the systolic group, 19 subjects experienced a decrease in systolic blood pressure after breaking the fast, 8 subjects remained the same, 73 subjects experienced an increase in systolic blood pressure after breaking the fast. The results of the Wilcoxon test on diastolic blood pressure can be seen in table 4 below:

Table 4. Wilcoxon Test for Diastolic Blood Pressure

Variable	Median	p-value
Diastolic fasting blood pressure	70	0.238
Diastolic postprandial blood pressure	70	

From the data above, no statistically significant difference was observed in diastolic blood pressure between fasting and postprandial conditions ($p>0.05$). In the diastolic group, 31 subjects experienced a decrease in diastolic blood pressure after breaking the fast, 19 subjects remained the same, and 50 subjects experienced an increase in diastolic blood pressure after breaking the fast.

DISCUSSION

The present study demonstrated that systolic blood pressure during fasting was significantly lower than systolic blood pressure measured after breaking the fast. These findings support previous studies indicating that fasting may positively influence cardiovascular regulation through metabolic and autonomic mechanisms.

Fasting induces metabolic switching from glucose utilization to ketone metabolism after prolonged caloric restriction. Reduced insulin levels during fasting may decrease sympathetic nervous system activity and reduce sodium retention, ultimately lowering blood pressure. Increased parasympathetic activity associated with fasting has also been linked to enhanced release of brain-derived neurotrophic factor (BDNF), which contributes to vasodilation and cardiovascular stabilization.

The findings of this study are consistent with previous research demonstrating significant reductions in systolic blood pressure during intermittent fasting and Ramadan fasting. Reduced caloric intake and improved lipid metabolism during fasting may contribute to improved vascular function and lower blood pressure levels.

In contrast, diastolic blood pressure did not show a statistically significant difference between fasting and postprandial measurements. Although mean diastolic values were slightly lower during fasting, the magnitude of change may have been insufficient to reach statistical significance. Variations in autonomic responses, vascular resistance, and individual physiological adaptation may explain these findings.

Fasting changes a person's eating and drinking patterns. Fadiyah's research, as cited in Dinata IW. et al. (2023), found a decrease in blood pressure in hypertensive patients after fasting. This is because in the body's metabolism, blood pressure can be influenced by food and drink intake. Increased fat cell mass leads to increased angiotensinogen production in adipose tissue, and increased HDL cholesterol levels play a key role in lowering blood pressure. Our research aligns with that presented in Fadiyah's study, which showed that fasting has an effect on blood pressure compared to the control group.

A study by Toledo et al. also demonstrated a decrease in systolic and diastolic blood pressure in a group of individuals who fasted for a long period. The mechanism of this decrease is related to increased parasympathetic activity due to brain-derived neurotrophic factor (BDNF), increased renal excretion of norepinephrine, and increased sensitivity to natriuretic peptides and insulin.

Hypertension during young adulthood is increasingly recognized as an important predictor of cardiovascular disease later in life. Early lifestyle interventions, including dietary modification and fasting practices, may therefore contribute to long-term cardiovascular health maintenance.

There is a causal relationship between high blood pressure and cardiovascular events not only in older adults but also in younger adults. In a longitudinal cohort study of young adults aged 18–30 years for an average of 18.8 years, the adjusted hazard ratio for cardiovascular disease events for high blood pressure (systolic blood pressure 120–129 mmHg and diastolic blood pressure 80 mmHg) in young adults compared with normal blood pressure (systolic blood pressure <120 mmHg and diastolic blood pressure <80 mmHg) was quite significant. Therefore, early identification of high blood pressure may be a promising strategy for intervention in high-risk populations.

Several limitations should be acknowledged. The study population consisted predominantly of female participants, which may limit generalizability. In addition, the fasting duration was relatively short and blood pressure measurements were conducted within a limited observation period. Future studies should include longer fasting periods, balanced gender distribution, and additional metabolic variables such as body mass index and lipid profiles.

In conclusion, fasting demonstrated a significant effect on systolic blood pressure reduction among young adults and may represent a beneficial non-pharmacological strategy for cardiovascular health management.

ACKNOWLEDGMENTS

The authors would like to thank all participants who voluntarily participated in this study and all individuals who contributed to data collection and research support.

FUNDING SOURCES

The research was funded by the Faculty of Dentistry, Prof. Dr. Moestopo University (Beragama).

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