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The Relationship of Working Hours, Work Stress, and Smoking Habits with the Incidence of Hypertension among *Bendi* (Horse-Drawn Carriage) Drivers in the Jam Gadang Tourism Area, Bukittinggi City, in 2026

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ABSTRACT

Abstract:

Introduction: Hypertension is known as a "silent killer" because it often presents no symptoms, leaving many sufferers unaware of their condition. Bendi (traditional horse-drawn carriage) drivers are at risk of hypertension due to long working hours, exposure to various stressors while on the job, and smoking habits. This study aimed to determine the relationship between working hours, work stress, and smoking habits and the incidence of hypertension among *bendi* drivers in the Jam Gadang Tourism Area, Bukittinggi City, in 2026. **Methods:** This study employed a quantitative approach with a cross-sectional design. The sample consisted of 60 *bendi* drivers selected via total sampling. The study was conducted from June 27 to July 10, 2026. Data were collected through questionnaires and blood pressure measurements. Univariate and bivariate analyses were performed with a significance level of α=0.05. **Results:** Univariate results showed that 48 respondents (80.0%) had working hours classified as high-risk; 30 respondents (50.0%) experienced mild work stress and 30 (50.0%) experienced moderate work stress; 35 respondents (58.3%) were heavy smokers; and 36 respondents (60.0%) had hypertension. Bivariate results indicated a relationship between working hours and hypertension (p=0.050), work stress and hypertension (p=0.004), and smoking habits and hypertension (p=0.003). **Conclusion:** It is concluded that there are relationships between working hours, work stress, and smoking habits and the incidence of hypertension. It is recommended that *bendi* (horse-drawn carriage) drivers regulate their working hours, make effective use of break times, manage stress, cut down on smoking, and undergo regular blood pressure checks. The Health Office is expected to enhance health education and blood pressure screening as a preventive measure against hypertension, while the Tourism Office is expected to increase training on occupational health and the prevention of hypertension risk factors.

Keywords: Hypertension, Working Hours, Work Stress, Smoking Habits

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A. Introduction:

Background

Hypertension is a non-communicable disease characterized by a sustained elevation in blood pressure above normal levels—specifically, ≥140/90 mmHg. It is a leading cause of death globally and a risk factor for various chronic conditions, such as heart disease, stroke, diabetes mellitus, and

kidney disorders (1). Hypertension no longer affects only the elderly; it also impacts adults aged 19–59, a group vulnerable to the condition due to lifestyle factors and the demands of work or other activities (2). Based on data from the World Health Organization (WHO) in the 2023 Global Report on Hypertension, it is estimated that approximately 1.4 billion adults aged 30–79 worldwide suffer from hypertension (3). In Indonesia, hypertension is a health issue associated with the epidemiological transition, which has driven a shift in disease patterns from infectious diseases to non-communicable diseases. According to the 2023 Indonesian Health Survey (*Survei Kesehatan Indonesia/*SKI), the prevalence of hypertension among the population aged 18 years and older stands at 30.8% (4). Profile data from the West Sumatra Provincial Health Office, based on the 2020 accountability report from the Non-Communicable Disease Prevention and Control and Mental Health (P2PTM *Keswa*) section, identified hypertension in 65.15% of the 48,815 residents aged 15 years and older (5). In the city of Bukittinggi, based on 2024 data from Statistics Indonesia (*Badan Pusat Statisik/*BPS), hypertension ranks fifth among the ten most common diseases (6). Data from the Bukittinggi City Health Office for 2025 records 8,329 cases of hypertension in Bukittinggi City (7). Several modifiable risk factors for hypertension associated with working conditions include working hours, work-related stress, and smoking habits (8). Long working hours may be associated with increased blood pressure (9). Work-related stress can also increase the risk of hypertension, while smoking can lead to an increase in blood pressure (10). Bukittinggi is a tourist city featuring *bendi* a form of traditional transport as a distinctive characteristic and symbol of its identity (11). Preliminary survey results indicate that *bendi* (horse-drawn carriage) drivers work irregular hours or follow a rotating shift system. Fluctuating daily passenger numbers can create economic pressure, leading to work-related stress due to income uncertainty. Furthermore, the vast majority of these drivers smoke. Observations also reveal that some drivers are unaware of their blood pressure status, as they do not undergo regular health check-ups.

Literature Review

Previous research indicates that occupational and behavioral factors are associated with the incidence of hypertension. Ahmed et al. (2020) found a significant relationship between working hours and the incidence of hypertension among bus drivers in Tamil Nadu (12) . Research by Fitriani et al. (2025) on online motorcycle taxi drivers also indicates a significant relationship between work stress and the occurrence of hypertension (13). Meanwhile, Mutiara et al. (2021) found a significant association between smoking habits and the incidence of hypertension in men over the age of 40 (14). The study results indicate that working hours, work stress, and smoking habits are factors associated with the occurrence of hypertension.

Research Gap

While numerous previous studies have examined the relationship between occupational factors, behavioral factors, and the incidence of hypertension among informal sector workers such as bus drivers and online motorcycle taxi drivers as well as formal sector workers, none have specifically investigated *bendi* (traditional horse-drawn carriage) drivers in the Jam Gadang Tourism Area of Bukittinggi City. Consequently, there is a research gap regarding the specific subject and location of study: *bendi* drivers in the Jam Gadang Tourism Area of Bukittinggi City.

Novelty and Rationale of the Study

This is the first study conducted on *bendi* (horse-drawn carriage) drivers in the Jam Gadang tourism area of Bukittinggi City. It examines the relationship between working hours, work-related stress, and smoking habits and the occurrence of hypertension among workers in the informal tourism sector.

Research Objectives

This study aims to determine the relationship between working hours, work stress, and smoking habits and the incidence of hypertension among *bendi* (horse-drawn carriage) drivers in the Jam Gadang Tourism Area, Bukittinggi City, in 2026.

B. Methods:

Study Design

This study is a quantitative study employing an analytical design with a cross-sectional approach. Analytical research aims to determine the relationship between independent and dependent variables simultaneously.

Research Location and Timeline

This research was conducted in the Jam Gadang Tourism Area, Bukittinggi City, West Sumatra Province. The study was carried out during June and July 2026.

Population and Sampling Technique

The population of this study consists of all *bendi* (horse-drawn carriage) drivers in the Jam Gadang Tourism Area of Bukittinggi City in 2026, totaling 60 individuals. The sampling technique employed is total sampling, as the population size is relatively small.

Data Collection Procedures and Instruments

The data used in this study are primary data obtained through questionnaires and blood pressure measurements using a sphygmomanometer. The working hours variable was measured using a questionnaire adapted from the 2021 National Labor Force Survey (SAK21), code 16a. The work stress variable was measured using the Perceived Stress Scale (PSS-10), while smoking habits were measured using the GN-SBQ questionnaire. Blood pressure measurements for *bendi* (traditional horse-drawn carriage) drivers were conducted with the assistance of a nursing student using a sphygmomanometer.

Statistical Analysis

Data analysis in this study comprised both univariate and bivariate analyses. Univariate analysis was used to examine the frequency distribution of each variable, while bivariate analysis employed the Chi-square test to determine the relationship between the independent and dependent variables. The analysis was conducted at a 95% confidence level ($\alpha = 0.05$). If the p-value was ≤ 0.05, the null hypothesis (H0) was rejected and the alternative hypothesis (Ha) was accepted indicating a relationship between the independent and dependent variables and vice versa.

Scope and/or Limitations of the Methodology Used

This study focused on the relationship between working hours, work-related stress, and smoking habits and the incidence of hypertension among *bendi* (horse-drawn carriage) drivers in the Jam Gadang tourism area of Bukittinggi City. A limitation of the study was that data collection took place while the respondents were working; consequently, the researcher had to align the timing of interviews and questionnaire completion with the respondents' activities. In some instances, the interview process had to be temporarily halted when a respondent picked up passengers. Additionally, some respondents wished to resume work immediately, thereby limiting the time

available for interviews. To mitigate these issues, the researcher ensured that respondents understood every question and that all questionnaires were fully completed before concluding the data collection process.

C. Results And Discussion

Implications

Univariate Analysis

Table 5.1 Overview of Respondent Characteristics.

Respondent Characteristics	Frequency (n)	Percentage (%)
History of Hypertension		
- Yes	0	0,0%
- No	60	100,0%
Education		
- Elementary School	17	28,30%
- Junior High School	29	48,30%
- Senior High School	14	23,30%
- Higher Education	0	0,0%
Duration of Work as a Carriage Driver		
- More than 3 years	60	100,0%
- Less than 3 years	0	0,0%

Based on Table 5.1, it is evident that among the 60 respondents, none (0.0%) had a history of hypertension, while all respondents (100.0%) had no such history. Regarding the highest level of education attained, nearly half of the respondents (29 individuals or 48.3%) had completed junior high school or its equivalent, followed by 17 individuals (28.3%) with primary school education or its equivalent, and 14 individuals (23.3%) with senior high school education or its equivalent; there were

no respondents (0.0%) with a higher education background. In terms of the duration of employment as *bendi* (traditional horse-drawn carriage) drivers, all respondents (100.0%) had been working for ≥3 years, while there were no respondents (0.0%) with less than 3 years of experience.

Table 5.2 Age Characteristics of Respondents.

Variable	N	Mean	Standard Deviation	Maximum	Minimum
Age	60	45,10	11,226	76	30

Based on Table 5.2, the average age of the respondents is 45.10 years. This indicates that, in general, the bendi drivers participating in this study are around 45 years old. The youngest respondent is 30 years old, while the oldest is 76 years old. The standard deviation is 11.226.

Table 5.3 Frequency Distribution of Working Hours for *Bendi* (Horse-Drawn Carriage) Drivers in the Jam Gadang Tourist Area, Bukittinggi City, 2026.

Working Hours	Frequency	%
No Risk	12	20,0%
At Risk	48	80,0%

Working Hours	Frequency	%
Total	60	100%

Table 5.3 shows that out of 60 respondents, 12 (20.0%) had non-risky working hours, while 48 (80.0%) had risky working hours. Field findings indicate that the majority of workers with risky working hours (exceeding 8 hours per day) were under the age of 65. Conversely, those with non-risky working hours (8 hours or less per day) were generally over the age of 65 or individuals who worked as *bendi* (horse-drawn carriage) drivers as a side job.

Table 5.4 Frequency Distribution of Work Stress Among *Bendi* (Horse-Drawn Carriage) Drivers in the Jam Gadang Tourist Area, Bukittinggi City, 2026.

Work Stress	Frequency	%
Mild Sress	30	50,0%
Moderate Stres	30	50,0%
Total	60	100.0%

Table 5.4 shows that out of 60 respondents, 30 (50.0%) experienced mild work-related stress, while another 30 (50.0%) experienced moderate work-related stress. Field findings indicate that economic factors are a cause of work-related stress among *bendi* (horse-drawn carriage) drivers. Respondents stated that tourists often consider the fares expensive, which affects the number of passengers using their services. This situation impacts their earnings and serves as a source of the work-related stress experienced by the respondents.

Table 5.5 Frequency Distribution of Smoking Habits Among *Bendi* (Horse-Drawn Carriage) Drivers in the Jam Gadang Tourist Area, Bukittinggi City, 2026.

Smoking Habit	Frequency	%
Non-smoker	5	8,3%
Light Smoking Habit	20	33.3%
Heavy Smoking Habit	35	58,3%
Total	60	100,0%

Table 5.5 shows that out of 60 respondents, the majority 35 individuals (58.3%) have a heavy smoking habit. Meanwhile, 20 respondents (33.3%) are light smokers, and 5 respondents (8.3%) do not smoke. Field findings indicate that most respondents began smoking at a young age and have maintained the habit to this day. Furthermore, some respondents stated that smoking has become a daily habit that is difficult to break, as it is perceived to provide a sense of calm and help alleviate boredom while waiting for passengers.

Table 5.6 Frequency Distribution of Hypertension Incidence Among *Bendi* (Horse-Drawn Carriage) Drivers in the Jam Gadang Tourism Area, Bukittinggi City, 2026.

Hypertension Status	Frequency	%
No Hypertension	24	40,0%
Hypertension	36	60,0%
Total	60	100,0%

Table 5.6 shows that out of 60 respondents, 24 (40.0%) did not have hypertension, while 36 (60.0%) did. Field findings indicate that some respondents with hypertension were unaware of their high blood pressure prior to the examination conducted for this study. Furthermore, some respondents stated that they did not undergo routine health check-ups and were therefore unaware of their blood pressure status.

Bivariate Analysis

Table 5.7 Relationship between working hours and the incidence of hypertension among *bendi* (horse-drawn carriage) drivers in the Jam Gadang tourism area, Bukittinggi City, 2026.

Working Hours	No Hypertension		Hypertension		Total		P-Value
	n	%	N	%	N	%	
No Risk	8	66,7%	4	33,3%	12	100,0%	0,050
At Risk	16	33,3%	32	66,7%	48	100,0%	
Total	24	40,0%	36	60,0%	60	100,0%	

Based on Table 5.7, among the 12 respondents with non-risk working hours, 8 (66.7%) did not have hypertension, while 4 (33.3%) had hypertension. Meanwhile, among the 48 respondents with risk-associated working hours, 16 (33.3%) did not have hypertension, while 32 (66.7%) had hypertension. A p-value of 0.050 ($p \leq 0.05$) was obtained; since this p-value meets the α criterion, H_0 is rejected and Ha is accepted, indicating a relationship between working hours and the incidence of hypertension. The results of this study are also consistent with research conducted by Friska et al. in 2018. That study employed a cross-sectional design involving 129 taxi drivers. The findings demonstrated a statistically significant association between long working hours and increases in systolic and diastolic blood pressure (15).

Table 5.8 Association between Work Stress and the Incidence of Hypertension among *Bendi* (Horse-Drawn Carriage) Drivers in the Jam Gadang Tourist Area, Bukittinggi City, 2026.

Work Stress	No Hypertension		Hypertension		Total		P-Value
	n	%	N	%	N	%	
Mild	18	60,0%	12	40,0%	30	100,0%	0,004
Moderate	6	20,0%	24	80,0%	30	100,0%	
Total	24	40,0%	36	60,0%	60	100,0%	

Based on Table 5.8, among the 30 respondents experiencing mild work stress, 18 (60.0%) did not have hypertension, while 12 (40.0%) had hypertension. Meanwhile, among the 30 respondents experiencing moderate work stress, 6 (20.0%) did not have hypertension, while 24 (80.0%) had hypertension; a p-value of 0.004 (≤ 0.05) was obtained. Since the p-value is less than α, H_0 is rejected and Ha is accepted, indicating a relationship between work stress and the occurrence of hypertension. The results of this study are consistent with research conducted by Ervina (2022). That study employed a cross-sectional design with a sample of 108 informal sector workers. The analysis results indicate that work stress is significantly associated with the occurrence of hypertension, with a p-value of 0.003 and an OR of 3.539 (16).

Table 5.9 Association between smoking habits and the incidence of hypertension among *bendi* (horse-drawn carriage) drivers in the Jam Gadang tourism area, Bukittinggi City, 2026.

Smoking Habits	No Hypertension		Hypertension		Total		P-Value
	N	%	N	%	N	%	
Non smoker	4	80,0%	1	20,0%	5	100,0%	
Light smoker	12	60,0%	8	40,0%	20	100,0%	0,003
Heavy smoker	8	22,9%	27	77,1%	35	100,0%	
Total	24	40,0%	36	60,0%	60	100,0%	

Based on Table 5.9, among the 5 non-smoking respondents, 4 (80.0%) did not have hypertension, while 1 (20.0%) had hypertension. Among the 20 respondents with light smoking habits, 12 (60.0%) did not have hypertension, while 8 (40.0%) had hypertension. Meanwhile, among the 35 respondents with heavy smoking habits, 8 (22.9%) did not have hypertension, while 27 (77.1%) had hypertension; a p-value of 0.003 (≤ 0.05) was obtained. Since the p-value is less than α, H_0 is rejected and Ha is accepted, indicating a relationship between smoking habits and the incidence of hypertension. The results of this study are also consistent with research conducted by Amelia & Sutanto (2022), which demonstrated a significant relationship between the intensity of smoking habits and the incidence of hypertension among construction workers (p-value = 0.003). That study concluded that the greater the intensity of smoking habits, the higher the likelihood of workers developing hypertension (17).

Research Contribution

This study contributes to the body of knowledge regarding the relationship between working hours, work-related stress, and smoking habits and the incidence of hypertension among informal sector workers specifically *bendi* (horse-drawn carriage) drivers in the Jam Gadang tourist area of Bukittinggi City. The findings may also serve as a reference for students and educational institutions in developing further research on hypertension risk factors among informal sector workers in tourist city environments.

Limitations

This study has several limitations. Data collection took place while respondents were working, requiring the researcher to coordinate the timing of interviews and questionnaire completion with the respondents' activities. In some instances, interviews had to be temporarily paused when respondents picked up passengers. Additionally, some respondents wished to resume their work immediately, thereby limiting the time available for interviews. To mitigate these issues, the researcher ensured that respondents understood every question and that the questionnaires were fully completed before concluding the data collection process.

Suggestions

Based on the findings, it is recommended that *bendi* (horse-drawn carriage) drivers manage their working hours, make effective use of break times, manage work-related stress, reduce smoking, and undergo regular blood pressure checks. The Health Office is encouraged to enhance health education and blood pressure screening as a preventive measure against hypertension among these drivers. The Tourism Office is expected to improve occupational health guidance and efforts to prevent hypertension risk factors among the drivers. For educational institutions, these research

findings are expected to serve as a reference for future studies regarding hypertension risk factors among informal sector workers.

D. Conclusion

Based on the research findings, it can be concluded that there is a relationship between working hours, work stress, and smoking habits and the incidence of hypertension among *bendi* (horse-drawn carriage) drivers in the Jam Gadang Tourism Area of Bukittinggi City in 2026. The analysis yielded p-values of 0.050 for the relationship between working hours and hypertension, 0.004 for the relationship between work stress and hypertension, and 0.003 for the relationship between smoking habits and hypertension. Thus, all three variables are associated with the incidence of hypertension among bendi drivers in the Jam Gadang Tourism Area of Bukittinggi City in 2026.

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F. References

1. Rahmadani W, Yovalwan T. Upaya Pencegahan Penyakit Paliatif dengan Hipertensi pada Remaja Melalui Edukasi Cerdik di Panti Asuhan Bumi Nusantara Kota Bengkulu. 2026;3(12):7001–8.
2. Public T, Science H, Berhubungan F faktor, Wulandari DY, Nisa H, Shofwati I. Jurnal Ilmu Kesehatan Masyarakat. 2025;14:29–36.
3. World Health Organization. Global report on hypertension 2023. Geneva: World Health Organization; 2023.
4. Tri Maiyusfa A. Hubungan Asupan Zat Gizi Mikro,Serat,dan Status Gizi dengan Kejadian Hipertensi Pada Lansia Usia 50-64 Tahun di Wilayah Kerja Puskesmas Andalas Kota Padang Tahun 2024. Padang: Universitas Andalas; 2024.
5. Meilisa M. Peningkatan Pengetahuan dan Keterampilan Analisis Data Surveilans Hipertensi di Tingkat Puskesmas Kota Bukittinggi Peningkatan Pengetahuan dan Keterampilan Analisis Data Surveilans Hipertensi di Tingkat Puskesmas Kota Bukittinggi Tahun 2022. 2023;7(2).
6. Badan Pusat Statistik. Jumlah Kasus penyakit terbanyak di kota bukittinggi 2024 [Internet]. Badan Pusat Statistik; 2024. Available from: https://bukittinggikota.bps.go.id/id/statistics-table/2/NTc0IzI=/jumlah-kasus-penyakit-terbanyak-di-kota-bukittinggi-2024.html
7. Dinas Kesehatan Kota Bukittinggi. Data Jumlah Kasus Hipertensi di Kota Bukittinggi Tahun 2025. Bukittinggi: Dinas Kesehatan Kota Bukittinggi; 2025.
8. Sergio Yudi Midu MA. Faktor-Faktor yang Mempengaruhi Kejadian Hipertensi pada Pekerja : Literature Review. 2024;7(3):637–47.
9. Batubara S, Rannie LT, Kedokteran F, Islam U, Utara S, Kedokteran F, et al. Hubungan Kelebihan Jam Kerja Dengan Kejadian Hipertensi Pada Pekerja PT.Astoria Bangun Pekasa Batam. 2019;2(1).
10. Toat A, Daeli W. Hubungan Perilaku Merokok , Stres Kerja , Shifting Dengan Kejadian Hipertensi Di PT .

X Program Studi Keperawatan , Universitas Indonesia Maju. 2024;2(1).
11. Rahmida G. Strategi Dinas Pariwisata Dalam Mempertahankan Bendi Yang Sudah Mengalami Perubahan Fungsi Sebagai Identitas Budaya di Jam Gadang Kota Bukittinggi. Bukittinggi: Institut Seni Indonesia Padangpanjang.; 2023.
12. Imtiaz Ahmed S, Felix PG. Original Research Paper A Study On Association Between Work- Related Factors And Hypertension Among Bus Drivers In Tamilnadu-A Cross Sectional Study. 2020;(2250):10–2.
13. Nabila Nurul Fitriyani , Rifatul Masrikihiyah DR. Hubungan Stres Kerja, Status Gizi, dan Asupan Natrium pada Pengemudi Ojek Online. 2025;8:635–40.
14. Mutiara S, Taureng H, Sari IP. Hubungan Kebiasaan Merokok Dengan Kejadian Hipertensi Pada Laki-Laki Usia Lebih Dari 40 Tahun Di Wilayah Kerja Puskesmas Kampar Kiri. Initium Medica J. 2021;1(1):1–7.
15. Friska D, Aw R, Mb M. Hubungan Antara Jumlah Jam Kerja Pengemudi Taxi dengan Peningkatan Tekanan Darah serta Faktor-faktor Lain yang Berhubungan. 2018;223–30.
16. Ervina. Faktor-Faktor Yang Berhubungan Dengan Informal Di Wilayah Kerja Puskesmas Kecamatan Faktor-Faktor Yang Berhubungan Dengan Informal Di Wilayah Kerja Puskesmas Kecamatan Jagakarsa Tahun 2022. Jakarta: Universitas Islam Negeri Syarif Hidayatullah Jakarta; 2022.
17. Amelia N, Sutanto H. Hubungan derajat perokok dengan kejadian hipertensi pada pekerja konstruksi PT . Takenaka Indonesia tahun 2020. 2022;4(1):163–70.