International Journal of Innovative Research and Scientific Studies, 7(4) 2024, pages: 1651-1661

IJIRSS
International Journal of Innovative Research & Scientific Studies

ISSN: 2617-6548

URL: www.ijirss.com

Unveiling the health implications of working hours in the Indonesian workforce

Padang Wicaksono[1*], Poeti Nazura Gulfira Akbar[2], Della Anissa Wienartha[3]

[1,3] *Department of Economics, Universitas Indonesia, Indonesia.*
[2]*Department of Tourism Business Management, Universitas Indonesia, Indonesia.*

Corresponding author: Padang Wicaksono (*Email: padangwicaksono@gmail.com*)

Abstract

This research aims to evaluate and compare the impact of working hours on the physical and psychological well-being of workers before and during the COVID-19 pandemic, where people were forced to work from home. While existing studies primarily concentrate on the physical and mental health of office workers, there is a notable gap in understanding how changes in work hours affect individuals in various professional sectors. This study seeks to address this gap by conducting a comprehensive investigation across a diverse range of employment, encompassing white collar, gray collar, and blue collar occupations. Using datasets from Indonesia's National Labor Survey (Sakernas) in 2019 and 2020, the study focuses on the working-age population engaged in various occupations, including employees, casual agricultural workers, and casual non-agricultural workers. Further categorization involves classifying individuals into white collar, gray collar, and blue collar segments. The total number of individuals analyzed was 215,607 in 2019 and 201,077 in 2020. Employing an ordered logistic regression method due to the categorical nature of the dependent variable, the study reveals consistent findings regarding the impact of working hours on health across the years 2019 and 2020. Extended work hours correlate with improved health outcomes, indicating better health for those working longer, while individuals with fewer hours exhibit lower chances of achieving good health. In 2019, occupational status significantly influences worker health, with gray and blue collar workers having lower probabilities of better health compared to white collar workers. However, this occupational effect on health is absent in 2020.

Keywords: COVID-19 pandemic, Ordered logistic regression, Pandemic, Well-being, Work from home, Workers health, Working hours.

DOI: 10.53894/ijirss.v7i4.3478
Funding: This research is supported by the Vocational Education Program, Universitas Indonesia (Grant number: PKS-12/UN2.F14.DV/HKP.05.01/2024).
History: Received: 18 March 2024/**Revised:** 13 June 2024/**Accepted:** 4 July 2024/**Published:** 30 August 2024

Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: Conceptualization, methodology, P.W., P.N.G.A., and D.A.W; data curation, formal analysis, resources, writing—original draft, P.W. and D.A.W; funding acquisition, supervision, P.W. and P.N.G.A.; investigation, P.N.G.A. and D.A.W; writing—review & editing, P.N.G.A. All authors have read and agreed to the published version of the manuscript.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Institutional Review Board Statement: The Ethical Committee of the Vocational Education Program, Universitas Indonesia, Indonesia has granted approval for this study on 7 July 2023 (Ref. No. KET-05/UN2.F14.M2 /PPM.00.00/2023).
Publisher: Innovative Research Publishing

1. Introduction

The COVID-19 epidemic caused significant changes at the human, organisational, and institutional levels, affecting policies, productive operations, and organisational frameworks. Significantly, many firms had a notable transformation from the conventional work-from-office (WFO) paradigm to the work-from-home (WFH) model. As a result of this transformation, organisations, including those in Indonesia, have had to evaluate and adjust their work methods, using creative approaches to overcome the difficulties caused by the epidemic. Initially, the use of WFH was limited to certain work areas as a measure to reduce the danger of workers travelling and potentially contracting COVID-19. The implementation of Indonesia's Large-Scale Social Restrictions (LSSR), commonly known as "Pembatasan Sosial Skala Besar (PSBB)," primarily carried out this measure. A significant number of employees were instructed to work from home on a full-time basis, altering the conventional understanding of working from home, which was previously limited to certain types of work, infrequent arrangements, or unique employee circumstances.

WFH has significantly reduced daily commute time, allowing employees to have more flexibility in managing household duties and the freedom to select working hours that match with their peak productivity [1]. Providing the opportunity to work from home allows employees to escape the typical office environment, enabling them to create innovative approaches that enhance their overall well-being, including both physical and psychological health [2].

Although the advantages of working from home, such as the ability to balance work and family responsibilities, are widely recognised, it is important to consider the possible disadvantages. Studies indicate that prolonged periods of remote work might result in decreased social connections and physical exercise, which may contribute to mental health difficulties such as social isolation and depression, particularly for persons who reside alone [3]. Managing work schedules within a family setting can provide difficulties, resulting in unclear boundaries between work and personal life, as well as increased level of stress and anxiety [4]. In addition, previous research on the impact of remote work arrangements and flexible work hours on employee health suggests a decrease in both physical and emotional well-being [1]. The decline is linked to a decrease in physical activity, alterations in eating patterns, limited interaction with coworkers, handling childcare duties, work-related interruptions, changes in work schedule, workstation setup, and contentment with indoor environmental conditions.

While many studies have investigated the impact of working from home on well-being (e.g., [1, 2, 5, 6]), there is a lack of research underscoring this relationship while considering the importance of working hours in influencing the health of workers who work remotely. Studies investigating the impact of working hours on well-being typically take place in a pre-pandemic context, neglecting to discuss the relationship within the context of WFH, particularly during the Covid-19 pandemic. This provides room for exploration, as a review by Silver [7] demonstrated that there are distinctive characteristics among homeworkers before and after the pandemic. Thus, this study aims to fill the first research gap: the lack of research focusing on comparing the impact of working hours between the pre-pandemic period when employees did not work remotely and the pandemic period when employees worked remotely.

Most studies conducted before and after the pandemic have predominantly focused on the physical and mental well-being of office-based workers only. Silver [7] argued that homeworkers, particularly those predominantly working from home, have a higher likelihood of being self-employed. In 2019, a quarter of those mainly working from home were self-employed, contrasting with 7% who were government employees. While not dominant in any major industry, homeworking is notable in specific sectors, such as 11% in agriculture, forestry, fishing, hunting, and mining, 14% in information, 13.6% in finance, insurance, and real estate, and 15.5% in professional services. Professional and financial services observe an overrepresentation of home-workers compared to the overall labor force. Remote work has notably increased in well-educated and higher-paid sectors like technology, communications, professional services, finance, and insurance. People are less likely to perform jobs related to goods, such as production, maintenance, or transportation, from home. This leaves a significant gap in understanding how changes in working hours before and during the pandemic, with a shift from work from the office to work from home, affect individuals across various workplace sectors. It leads us to the second research gap: the lack of studies conducting a comprehensive investigations that encompass a diverse spectrum of employment, including white-collar, gray-collar, and blue-collar occupations.

Leaving aside the background, this study aims to investigate how changes in working hours affect employees' overall health. We structure this research around three main questions: (1) How is the situation of working hours among employees in Indonesia? (2) how the working hours impact workers health? (3) How the type of job impact workers health? To achieve this, the study will utilize an ordered logistic regression model, aiming to uncover the potential influence of both working hours and occupational types on the health of workers. The employing a statistical method that allows for the examination of ordinal outcomes, the research aims to provide a nuanced understanding of the complex interplay between these variables.

The study will take place within within the context of Indonesia, which is crucial to note. The lack of extensive data regarding work settings motivates the particular emphasis on this geographic location. Hence, the study will focus on analysing the factors of working hours and occupational categories within the distinct socio-economic and cultural context of Indonesia. The research seeks to address a significant gap in the current literature by adopting a comprehensive strategy and focusing on a specific geographical area. It intends to provide insights into the intricacies of this interaction within a unique socio-cultural environment.

This study makes valuable practical contributions by providing insights that help guide the creation of targeted workplace policies and activities. The results provide a detailed understanding of how alterations in working hours affect the physical and emotional well-being of workers in various sectors, including white collar, gray collar, and blue collar jobs. Employers may utilise this information to customise occupational health programmes, employee well-being initiatives, and flexible work arrangements to meet the distinct requirements of various job categories. The findings of the study may be used by

government authorities to develop more efficient labour legislation that prioritises the health of employees. Additionally, collaboration between different sectors can promote comprehensive approaches to well-being. In summary, the study's practical implications extend beyond academic discourse, providing actionable insights that can positively influence workplace practices and policies within the unique socio-cultural landscape of Indonesia.

The subsequent sections of the paper are organised in the following manner. Within the literature review, we analyse the areas where research is lacking and provide a rationale for our study on the health consequences of extended work hours. Additionally, we investigate how the kind of profession and other demographic characteristics influence employee health. The methodology section provides an overview of our research design. The findings section follows, where we present the results of the regression analysis. The analysis examines the impact of working hours, the independent variable, on workers' health, the dependent variable. Finally, the discussion section interprets these findings in relation to existing literature. The conclusion provides a concise overview of important discoveries, emphasises the theoretical and practical impacts, and suggests potential directions for further investigations.

2. Literature Review

2.1. Health Implications of Long Working Hours

Numerous organizations and companies frequently experience extended working hours, where the duration of work, including primary job tasks, associated responsibilities, commuting, and travel, is excessively prolonged and adversely affects workers' health, either directly or indirectly [8]. This phenomenon not only denies individuals their designated breaks but also poses a significant threat to their well-being. Research has linked prolonged periods of work to adverse health outcomes like hypertension and diabetes, as well as negative impacts on mental health like burnout, occupational stress, and depression [1, 9]. Therefore, the prolonged length of labour has become a critical determinant affecting the physical and mental well-being of the working population. Nevertheless, it is important to acknowledge that the results of research on the impact of extended work hours on health are inconclusive, resulting in contentious conclusions [9]. We need further exploration to better understand the connection between extended working hours and workplace stress [8].

Recent research by Xiao, et al. [1] focused on the impact of working from home (WFH) during COVID-19 on the physical and mental well-being of office workers. Respondents reported an increased likelihood of experiencing new physical or mental health difficulties when adjusting work hours, scheduling work around others, and dealing with more distractions. Extended online meetings and altered work schedules were associated with multiple new health problems, highlighting the challenges and health implications of WFH arrangements.

The studies presented thus far consistently demonstrate a significant negative impact on workers' well-being with longer working hours compared to those working fewer hours. The following hypothesis provides and expresses several significant relationships:

H_1: Longer working hours cause an increase in health problems.

2.2. Occupation Type and Employee Health

While many studies have explored the connection between working hours and employee health, past research has often overlooked the working class as a crucial factor. Different job types and varied time commitments can have subtle effects on health. Putting extra resources and effort into advancing one's career may lead to clear occupational identities, while roles with complex job requirements can have more noticeable impacts on health [10].

Given that an individual spends approximately one-third of their time in the workplace, employment and working conditions profoundly impact health [11]. Beyond economic sustenance, a favorable working environment contributes to social prestige, personal growth, and protection against physical and psychological risks. This connection between worker health and productivity underscores the importance of emotionally and physically fit individuals in fostering motivation, optimism, and creativity for an effective and efficient working environment.

A study by Chu [12] assesses the self-rated health (SRH) of individuals engaged in extended working hours in China. This research identified a detrimental link between extended working hours and SRH. Among these workers, prolonged work hours negatively affect the health of those with college degrees or higher. One potential explanation is their lack of physical activity, unhealthy dietary habits, and chronic exposure to computer radiation in their working conditions.

Previous studies also demonstrate that workers classification based on the type of job they perform and the nature of their work, which is then further classified as white collar, gray collar, and blue collar according to their occupational type (exclude soldier), has a distinct influence on employees health. White-collar workers are typically engaged in managerial, professional, or administrative roles, often requiring mental skills. Blue-collar workers, on the other hand, are involved in manual labor in industries such as manufacturing or construction. Gray-collar workers fall between these categories, combining elements of both white and blue-collar roles, often performing tasks that require a mix of physical and mental skills. Wong, et al. [8] conducted a study that highlighted the significance of occupation type in determining variations in working hours. Their findings revealed that blue-collar workers faced a higher risk of occupational health problems compared to white and pink-collar workers. One could attribute this discovery to the limited control over one's own work schedule. However, this aspect merits attention in future research endeavors.

H_2: Occupation type has a significant impact on employees' health.

2.3. Demographic Factors and Health

Demographic factors play an important role in influencing employees' health, so this study study included specific variables such as gender, age, marital status, and residential areas, as control measures.

The impact of prolonged work hours on health exhibits gender-based disparities, as highlighted by the International Labour Organizations [13]. Social roles and socioeconomic status variations contribute to excessive involuntary overtime that adversely affects males' mental health of males, while females may experience compromised physical health. Extended work hours notably influence the health of male workers, given their traditional role as breadwinners and heightened vulnerability to workplace stressors [12]. This stress and longer working hours are more prevalent among men compared to women, who often take on diverse roles in the workplace. Studies by Kivimäki, et al. [14] and Wong, et al. [8] indicated no significant effects for gender or the method of diagnosis in the association between long working hours and health.

Research also reveals that marital status significantly influences employee health. Married women may face higher levels of professional stress than unmarried women, influenced by cultural norms, societal expectations, and additional responsibilities placed on married individuals [15]. Balancing full-time work with family responsibilities can lead to ongoing tension and stress, adversely affecting mental health [16].

Additionally, as stress has a positive correlation with individuals, the relationship between working hours and health may vary with age. Archer, et al. [17] study indicated that age group significantly influenced the relationship between stress and well-being, as well as stress and health, with the association being weaker in older adults. Mental well-being emerged as a significant moderator in the relationship between perceived stress and perceived health in older adults, unlike its mediating role in the younger population. Elevated well-being appears to function as a protective factor in the association between stress and health for older adults.

Lastly, health disparities between urban and rural areas emphasize the need to address health challenges in remote regions. This is crucial not only to counter urban migration but also to alleviate concentrated poverty, poor health status, and a high disease burden in rural areas [18]. The association between poverty and poor health extends to various illnesses and injuries, with rural and isolated areas generally experiencing higher rates of preventable mortality compared to urban areas. These regions also witness more significant and severe work-related injuries, partly due to the stoic mentality prevalent among farmers and agricultural workers—a "too tough to care" attitude. A study by Gutiérrez, et al. [19] supports these findings, revealing that individuals engaged in manual jobs, such as agriculture and production/industrial roles, faced a heightened risk of mortality compared to those in administrative/professional positions, regardless of the rural or urban setting. Notably, in urban areas, participants with domestic/service jobs or no main job exhibited a greater risk of mortality than those in administrative/professional roles, particularly among men. Considering ongoing demographic shifts in rural and urban contexts, understanding the impact of occupation as a socioeconomic factor on health is crucial for identifying the most vulnerable groups.

H_3: Demographic factors have a significant impact on employees' health.

3. Research Methodology and Data Collection

3.1. Research Design

This study utilizes secondary data from the National Labor Force Survey (NLFS) published by the Statistics Indonesia (SI) for the years 2019 and 2020. The research design focuses on examining the impact of working hours on the health of employees before and during the COVID-19 pandemic, with specific attention to changes over time. The study employs a longitudinal approach, analyzing data from two consecutive years to assess trends and differences. The data is designed with three primary objectives and provides insights into employment correlations with factors like education, working hours, occupational type, and employment status. As seen in Table 1, it addresses issues of unemployment and underemployment, and collects valuable information on residents in the non-labor force group, contributing to a nuanced understanding of the national employment landscape.

3.2. Research Technique

The study employs both descriptive and inferential analysis techniques to assess the research hypothesis. Descriptive analysis is used to summarize the characteristics of the study sample and key variables, while inferential analysis is utilized to examine relationships and make predictions about the population. Specifically, the study utilizes the ordered logistic regression method to analyze the influence of working hours (an independent variable) on workers' health (a dependent variable). This method allows for an assessment of the ordinal nature of health outcomes. We incorporate control variables such as sex, age, and martial status to enhance the robustness of the analysis, account for potential confounding factors, and improve the accuracy of the results.

3.3. Research Participants

The study's participants consist of the working-age population (15-64 years) in Indonesia who are currently employed as employees, casual agricultural workers, and casual non-agricultural workers. Based on their occupational type, we further classify these individuals into white-collar, gray-collar, and blue-collar workers. The units of analysis in this study were 215,607 individuals in 2019 and 201,077 individuals in 2020.

3.4. Data Collection

Data collection involves accessing and extracting relevant information from the SAKERNAS dataset for the years 2019 and 2020. The dataset includes information on employment status, working hours, health status, and demographic characteristics of the participants. The researchers likely obtained permission to use the data from Statistics Indonesia (BPS) and followed ethical guidelines for secondary data analysis.

Table 1.
List of variables.

No.	Variables	Definition	Category
Independent variable			
1	Working hours	Total hours used by an employee to do his/her job during a calendar week.	Hours
2	Occupational type	Occupational type according to standard classification of types of jobs in Indonesia is classified into white collar, gray collar, and blue collar	0 = White collar 1 = Gray collar 2 = Blue collar
Dependent variable			
3	Workers health	Physical health: Difficulty in seeing, hearing, walking/climbing stairs, and moving fingers/hand. Psychological health**:** Difficulty in speaking and/or understanding or communicating with other people, and other difficulties/disorders (e.g., difficulty remembering or concentrating, taking care of himself/herself, or behavioral/emotional disorders, etc.)	1 = Both physically and psychologically unhealthy 2 = Either physically or mentally unhealthy 3 = Both physically and psychologically healthy
Control variable			
4	Sex	Gender based on respondents' answers	0 = Female 1 = Male
5	Age	Age at last birthday	Year
6	Marital status	Marital status	0 = Others 1 = Married
7	Living area	Region where a person lives	0 = Rural 1 = Urban

4. Results and Data Analysis

4.1. Descriptive Analysis

Total observations in the August 2019 are 215,607 individuals and 201,077 individuals in the August 2020. Based on the data, the average weekly working hours during COVID-19 decreased compared to before the pandemic, from 40.61 hours in 2019 to 37.78 hours in 2020 (as seen in Table 2). Most of the respondents are blue-collar workers, with a majority being female. Urban and rural areas almost equally split the respondents.

Table 2.
General description of workers.

Characteristics	Category	2019	2020
(1)	(2)	(3)	(4)
Working hours (Mean)		40.60584	37.78201
Worker's health (%)	Seeing	16.21	16.32
	Hearing	16.71	16.71
	Walking	16.72	16.69
	Moving fingers/hand	16.79	16.76
	Communicating	16.80	16.77
	Other	16.77	16.75
	Total	100	100
Occupational type (%)	White collar	32.85	32.23
	Gray collar	13.34	13.63
	Blue collar	53.81	54.14
	Total	100	100
Age (Mean)		37.58974	37.8755
Sex (%)	Female	34.42	34.36
	Male	65.58	65.64
	Total	100	100
Marital status	Others	76.07	76.71
	Married	23.93	23.29
	Total	100	100
Living area (%)	Rural	47.12	48.43
	Urban	52.88	51.57
	Total	100	100

In Indonesia, despite a decrease in the average weekly working hours amid COVID-19, workers are experiencing noticeable fluctuations in their working schedules. Before the pandemic, the maximum recorded working hours per week was 98. However, during the pandemic, some workers, comprising 4 white-collar workers and 5 blue-collar workers, are now working up to 168 hours per week. This substantial increase in work schedule variations is particularly pronounced among blue-collar workers.

Table 3.
General description of working hours in 2019 and 2020.

Working hours	2019 (%)	2020 (%)
≤ 40 hours/Week	48.62	54.82
> 40 hours/Week	51.38	45.18

However, the reduction in average working hours in Indonesia can still be elucidated by examining data that reveals an increase in the percentage of workers putting in ≤40 hours per week in August 2020, as depicted in Table 3. Despite the overall decline in workers' health during the pandemic, some aspects, such as vision, showed improvement. Eye health (with or without glasses) increased by 0.11%, from 16.21% in August 2019 to 16.32% in August 2020. Similarly, the hearing health of workers (with or without hearing aids) remained unchanged. Conversely, workers' abilities in walking or climbing stairs and moving fingers or hands witnessed a decline of 0.03% during the pandemic. Early on the implementation of societal restrictions to curb the spread of COVID-19 resulted in reduced physical activity and exercise among employees, contributing to an increase in the number of workers staying at home. Additionally, workers' ability to speak and/or understand/communicate with others decreased from 16.80% in August 2019 to 16.77% in August 2020 (a decrease of 0.03%). The pandemic-mandated stay-at-home conditions deprived workers of opportunities for social interactions, potentially leading to mental health issues such as social isolation and depression. The pandemic also led to 0.02% decrease in other aspects of workers' psychological health, such as memory/concentration, self-care, and behavioral/emotional disorders. Common stressors identified include the anxiety over job loss and the subsequent loss of income. Moreover, social isolation, conflicting messages from authorities, and a continuous state of uncertainty contribute to emotional distress and factors detrimental to mental health.

The study, based on unit analysis, focused on workers aged 15-64 years. The mean age was 37.59 years in 2019 and 37.88 years in 2020. Male and female workers make up the majority of the workforce, both before and during the pandemic. ,Throughout the pandemic, the percentage of female workers decreased from 34.42% in August 2019 to 34.36% in August 2020 (a decrease of 0.06% or 5,130 female workers). Another variable to consider is marital status, which is divided into married and not married, where not married includes single, divorced, or widowed individuals. Data indicates that unmarried workers dominate the labor force, accounting for 76.07% in 2019 and slightly increasing to 76.71% in 2020, while married workers decreased by 0.64% in 2020.

In 2020, during the pandemic, there was a 1.13% increase in the proportion of workers residing in rural areas, rising from 47.12% in 2019 to 48.43% in 2020. This shift occurred as many individuals in urban areas lost their jobs during the COVID-19 period, resulting in a decrease in the number of urban workers and an increase in rural workers. This aligns with the broader trend that Indonesia will experience an augmentation in the number of gray-collar workers (an increase of 0.29%) and blue-collar workers (an increase of 0.33%) in August 2020. According to Statistics Indonesia (BPS), agricultural employees rose from 36.71 million (27.53 percent) in August 2019 to 41.13 million (29.76 percent) in August 2020.

4.2. Ordered Logistic Regression

In this study, inferential analysis is employed to assess the research hypothesis, utilizing the ordered logistic regression method to examine the influence of working hours (an independent variable) on workers health (a dependent variable). We incorporate control variables, such as individual characteristics like sex, age, and marital status, to enhance the robustness of the analysis.

The parameters of the ordered logistic model undergo testing to ascertain the impact of independent factors on the dependent variable. With the p-value falling below both the 5% and 10% alpha thresholds, the model test's outcomes indicates its significance. Consequently, it can be inferred that the combined impact of independent factors on the emotional and physical well-being of employees holds statistical significance.

We employ one independent variable and five control variables in the ordered logistic regression analysis. The initial phase involves conducting partial parameter testing to identify the predictor variables that exert a significant impact on the severity of workers' health.

For partial parameter testing, we employ the following hypothesis:

$H_0: \beta_k = 0$ (The tested predictor variable had no impact on the response variable).

$H_1: \beta_k \neq 0$ (The predictor variable has an impact on the outcome variable).

Table 4 reveals that, in 2019, all independent variables significantly influence the health of workers with a confidence level of 95%, as indicated by p-values below 0.05. However, the control variable, sex, lacks significance with a p-value of 0.194, suggesting that gender does not exert a noteworthy impact on worker health in 2019. The outcomes of the ordered logistic regression model, detailed in the table, involve two logit models that incorporate all predictor variables due to the response variable having three categories. As a result, the derived equation for the ordered logistic regression model is as follows:

Table 4.
Partial parameter testing for data in 2019.

Variable	Coefficient	Standard error	Z	P-value
Independent variable				
Hour	0.011	0.00067	16.48	0.000
Type				
● Gray collar	-0.133	0.039	-3.41	0.001
● Blue collar	-0.221	0.023	-9.65	0.000
● White collar (*Ref*)	-0.157	0.037	-4.66	0.001
Control variable				
Sex				
● Male	0.028	0.022	1.3	0.194
● Female (*Ref*)	0.07	0.026	2.73	0.006
Age	-0.088	0.001	-81.56	0.000
Marital				
● Married	-0.277	0.039	-7.02	0.000
● Others (*Ref*)	-0.335	0.047	-7.21	0.000
Area				
● Urban	-0.287	0.021	-13.95	0.000
● Rural (*Ref*)	-0.275	0.024	-11.33	0.000
Constanta 1	-9.336	0.073		
Constanta 2	-6.556	0.063		

$$Logit\ (\gamma_1) = \log\left(\frac{\gamma_1}{1-\gamma_1}\right)$$
$$= -9.336 + 0.011Hour - 0.133Type_{grey} - 0.221Type_{blue} - 0.088Age - 0.277Marital_{married} - 0.287Area_{urban}$$

$$Logit\ (\gamma_2) = \log\left(\frac{\gamma_2}{1-\gamma_2}\right)$$
$$= -6.556 + 0.011Hour - 0.133Type_{grey} - 0.221Type_{blue} - 0.088Age - 0.277Marital_{married} - 0.287Area_{urban}$$

Table 5.
Partial parameter testing for data in 2020.

Variable	Coefficient	Standard error	Z	P-value
Independent variable				
Hour	0.0099	0.00075	13.09	0.000
Type				
● Gray collar	0.049	0.046	1.07	0.284
● Blue collar	-0.04	0.027	-1.48	0.139
● White collar (*Ref*)	-0.133	0.039	-3.41	0.001
Control variable				
Sex				
● Male	0.07	0.026	2.73	0.006
● Female (*Ref*)	0.09	0.012	3.44	0.000
Age	-0.09	0.001	-69.55	0.000
Marital				
● Married	-0.335	0.047	-7.21	0.000
● Others (*Ref*)	-0.246	0.029	-7.02	0.000
Area				
● Urban	-0.275	0.024	-11.33	0.000
● Rural (*Ref*)	-0.278	0.012	-15.99	0.000
Constanta 1	-9.63	0.085		
Constanta 2	-6.887	0.073		

Table 5 indicates that in 2020, working hours will have a significant impact on workers' health (P-value < 0.05), and the other control variables will also have a significant impact on workers' health. However, the occupational type does not have

a significant impact on worker health, as indicated by the P-value > 0.05 in 2020. Given the categories of the response variable and the results of the ordered logistic regression model presented in the table, we apply two logit model that encompass all predictors variables.

$$Logit\ (\gamma_1) = \log\left(\frac{\gamma_1}{1-\gamma_1}\right)$$
$$= -9.63 + 0.0099Hour + 0.07Sex_{male} - 0.088Age - 0.335Marital_{married} - 0.275Area_{urban}$$

$$Logit\ (\gamma_2) = \log\left(\frac{\gamma_2}{1-\gamma_2}\right)$$
$$= -6.887 + 0.0099Hour + 0.07Sex_{male} - 0.088Age - 0.335Marital_{married} - 0.275Area_{urban}$$

The logistic regression model employs the odds ratio to interpret the coefficients. The odds ratio assesses the probability that a specific exposure will lead to a particular outcome. It indicates the likelihood of a specific exposure resulting in a particular outcome compared to the likelihood of that exposure not leading to the event. The odds ratio values for each coefficient in the model, which represent the impact of working hours, occupational type, sex, age, marital status, and year on the severity of worker health, are as follows:

Table 6.
The odds ratio value of each variables.

Variables	Odds ratio 2019	Odds ratio 2020
Independent variable		
Hour	1.011**	1.01**
	-0.0007	*-0.0008*
Type		
● Gray collar	0.876**	1.051**
● Blue collar	*-0.034*	*-0.048*
● White collar (*Ref*)	0.802**	0.961**
Control variable		
Sex		
● Male	1.029	1.072**
● Female (*ref*)	*-0.022*	*-0.027*
Age	0.915**	0.914**
	-0.001	*-0.001*
Marital		
● Married	0.759**	0.715**
● Others (*ref*)	*-0.03*	*-0.033*
Area		
● Urban	0.752**	0.76**
● Rural (*ref*)	-0.015	-0.018

Note: ** is significant for α = 5%, the ones in bracket is the *standard error* value.

Table 6 presents the findings obtained from the study of the logistic regression model, highlighting several variables that show statistical significance. Significant factors that have a clear connection with worker health outcomes include working hours, distinctions between employment types such as gray and white collar, age, marital status, and residential location.

The odds ratio estimate of 1.011** (p = 0.0007) for the "hour" variable indicates that for each additional hour of labour, the likelihood of experiencing a certain severity level in worker health increases by a factor of 1.011, while taking into account other relevant factors. At the 5% level, the observed odds ratio reaches statistical significance, providing strong evidence of a significant connection between increased working hours and worker health.

Essentially, for each extra hour of work, there is a direct correlation with a 1.1% increase in the probability of suffering a certain degree of worker health severity.

On the other hand, the odds ratio estimate of 0.915 indicates that when age increases by one unit, the likelihood of encountering a certain severity level in worker health decreases by a factor of 0.915, while accounted for other relevant variables. To put it concisely, as a person gets older, their chances of experiencing a certain degree of worker health severity decrease by around 8.5%.

5. Discussion

In 2019, the odds ratio for working hours was 1.011, signifying that for employees working longer hours, the likelihood of transitioning from poor health levels (physically and mentally unhealthy) to moderate levels (either physically or mentally unhealthy) or from moderate to good health levels (physically and mentally healthy) increased by 1.011 times compared to those working fewer hours. This finding contradicts the research hypothesis, which posited that, prior to the COVID-19 pandemic, longer working hours heightened the risk of physical and mental health problems. Some researchers argue that as long as workers control their working hours, overtime labor does not adversely affect employee health. However, the most important factor is not just control but also the motivations driving a worker to extend their working hours.

Meanwhile, in 2020, the influence of working hours on worker health exhibited a consistent pattern with 2019, indicating that an increase in working hours correlates with a 1.01 times higher likelihood of workers having better health. These results are noteworthy and support the hypothesis that, despite an overall decrease in working hours in Indonesia, additional stressors during the pandemic impacted worker health. The COVID-19 pandemic brought about significant changes in the work environment, allowing greater flexibility for employees to work from anywhere and at any time. Many workers transitioned to remote work to curb the spread of COVID-19, providing them with the flexibility to choose optimal working hours and minimizing distractions from colleagues, particularly in open-plan workplaces [20]. However, the shift to remote work, coupled with reduced face-to-face interactions and working exclusively from home, posed challenges to employees, leading to an increased risk of mental health issues such as social isolation and depression [3]. Moreover, prolonged screen exposure from full-time computer work could contribute to fatigue, exhaustion, headaches, and eye-related problems [21]. Unfortunately, the lack of relevant data in the dataset limits further analysis of these factors.

The ESCP Business School [22] found that individuals working long hours due to external factors, like seeking rewards, are more likely to experience stress, depression, and other health issues. Conversely, actions driven by intrinsic motivations are satisfying and linked to positive emotions, attitudes, health, and well-being. In other words, internally motivated overtime work has a positive impact on worker health and well-being. For instance, people deliberately opt for extended work hours to enhance their personal growth, gain new abilities, or feel a sense of achievement. Loyalty to coworkers or the company, especially among knowledge workers for whom work is integral to their identity, can also be a driving force.

Despite distinct effects, extrinsic and intrinsic motivation can complement each other. For instance, there is an intertwining relationship between seeking progress and working extra hours to demonstrate a desire for a promotion. The study also revealed that the relationship between intrinsically motivated work effort and health was stronger at higher levels of overtime, while extrinsically motivated work effort decreased health and well-being irrespective of the amount of overtime.

Socioeconomic factors significantly influence the health of employees, with the exception of gender. In 2019, gender did not significantly affect worker health, but in 2020, it became a significant factor. This shift may be attributed to the challenges faced by female workers during the COVID-19 pandemic, making it more difficult for them to balance work schedules with family responsibilities. The odds ratio in 2020, at 1.063, indicates that male workers are more likely to experience positive health changes compared to female workers, with a 1.063 times lower chance for females to have good physical and mental health. Previous studies align with these findings, indicating that women, particularly those in industries directly impacted by COVID-19, face greater occupational risks and health problems [23]. Women who are frequently employed in sectors such as hospitality, cleaning, and domestic labor, may struggle to work from home due to added household duties [24]. Working mothers may also experience heightened stress, given the lack of support for homeschooling and childcare [24].

Working health tends to decline as age increases, with an odds ratio of 0.915 before the COVID-19 pandemic and 0.914 during COVID-19. This implies that for every year increase in age, there is a lower likelihood of maintaining good physical and mental health. Older and disabled employees, economically and physically vulnerable, face heightened risks during the pandemic, experiencing the combined impact of COVID-19 transmission and labor market disruptions [25].

Marital status is a factor, with married workers having odds ratios of 0.758 in 2019 and 0.715 in 2020. This indicates that married workers are more likely to experience negative health effects compared to unmarried counterparts (single, divorced, or widowed). Studies in Taiwan highlight the significant work-related burnout experienced by married workers due to changes in family roles, living conditions, and work conditions [26]. Difficulty in establishing clear work-life boundaries can lead to increased anxiety and stress, particularly for parents juggling household tasks and work commitments.

Analyzing worker's living areas, the likelihood of employees in urban regions having good physical and psychological health is 0.75 times lower than rural workers before the pandemic and 0.76 times lower during the pandemic. This aligns with global trends where rural areas often exhibit lower health statuses than urban areas. The disparity is not solely attributed to poverty but also reflects diverse patterns of disease and injury.

6. Conclusion

Amidst the COVID-19 pandemic, employees experienced substantial shifts in working hours and environments, allowing for greater flexibility in work arrangements. This transformation directly influenced the physical and psychological well-being of workers. In Indonesia, the average working hours decreased during the pandemic in August 2020 compared to the pre-pandemic period in August 2019.

This study unveiled intriguing findings. Before COVID-19, employees working extra hours had a higher likelihood of maintaining good physical and psychological health compared to those working fewer hours. However, the pandemic crisis prompted significant adjustments in the working environment. Social restrictions impeded face-to-face interactions among coworkers, and the fear of job loss during the pandemic contributed to psychological challenges like social isolation and depression.

Balancing work and personal life became particularly challenging, especially for married women. The difficulty stemmed from managing work schedules around family responsibilities, such as household tasks and errands during work meetings. Some parents resorted to sacrificing sleep hours, opting to work at night or early in the morning to focus without interruptions. Age emerged as another factor influencing health, with older workers being more susceptible to COVID-19 infection and other health issues. Moreover, older workers faced a higher risk of job loss, leading to various physical and psychological health problems.

We observed a migration from urban to rural areas as some workers lost their jobs. The sectors most affected by COVID-19 in Indonesia included hospitality, food and beverage, transportation, warehousing, construction, processing, and trade. Consequently, a significant portion of the population transitioned into agriculture or other blue-collar jobs. Notably, blue-collar employees bore the brunt of the pandemic's impact on health, facing a higher risk due to fieldwork and extensive face-to-face interactions. On the contrary, white and gray-collar employees exhibited a lower risk of contracting COVID-19.

In summary, this study found no difference in the impact of working hours on workers' health before and during the pandemic. This result could be attributed to the lack of data on the working conditions that significantly influence health. Additionally, occupational type demonstrated an impact on workers' health in 2019 but did not exhibit a significant effect during the COVID-19 pandemic.

6.1. Policy Suggestions

The findings of the study offer crucial insights for policymakers, employers, and stakeholders concerned with enhancing worker health and well-being. The study underscores the vital role of flexible work arrangements, especially during times of crisis. Employers should maintain options for remote work and flexible scheduling to accommodate the diverse needs of employees. This not only helps mitigate the negative effects of prolonged screen time and social isolation associated with remote work but also fosters a healthier work environment.

Moreover, it is imperative for policymakers and employers to implement gender-sensitive policies and interventions. The pandemic has disproportionately impacted women's health and well-being. Supporting women to balance work and family responsibilities is crucial. This may involve providing access to affordable childcare, flexible work hours, and tailored mental health support. Additionally, older workers, who are more vulnerable to health risks, require targeted support and accommodations. Employers should consider age-sensitive policies such as flexible retirement options, health screenings, and access to telemedicine services to ensure the well-being of older employees. Furthermore, married workers often face challenges in maintaining work-life balance. Employers can alleviate these challenges by offering family-friendly policies such as parental leave, flexible scheduling, and telecommuting options. Addressing disparities in health outcomes between urban and rural workers is also paramount. Policymakers should invest in rural infrastructure and healthcare services to improve access to healthcare and tackle underlying social determinants of health.

In conclusion, acknowledging the complex interplay among working conditions, socioeconomic elements, and health consequences enables the implementation of focused policies and interventions to bolster worker health and well-being. These actions not only assist in overcoming the hurdles presented by the pandemic but also foster the development of healthier and more robust work environments for everyone involved.

7. Limitations and Future Research

The study encounters limitations, primarily stemming from the reduced questionnaire content in the August 2020, restricting the available information. Another constraint arises from the absence of post-pandemic data, which hinders a comprehensive assessment of how working hours influence employees' health before, during, and after the COVID-19 pandemic. Considering these limitations, future research is recommended to delve into the effects of working hours on employees' health in 2022. This would enable an analysis of the state of employees' health in the post-pandemic era, providing valuable insights into the long-term impacts. Additionally, a more in-depth investigation into workers' working conditions during COVID-19 is suggested, involving surveys to explore other influencing factors on individual workers' health, thus mitigating potential biases.

References

[1] Y. Xiao, B. Becerik-Gerber, G. Lucas, and S. C. Roll, "Impacts of working from home during COVID-19 pandemic on physical and mental well-being of office workstation users," *Journal of Occupational and Environmental Medicine*, vol. 63, no. 3, pp. 181-190, 2021. https://doi.org/10.1097/JOM.0000000000002097

[2] M. Kroesen, "Working from home during the corona-crisis is associated with higher subjective well-being for women with long (pre-corona) commutes," *Transportation Research Part A: Policy and Practice*, vol. 156, pp. 14–23, 2022. https://doi.org/10.1016/j.tra.2021.10.025

[3] A. I. Tavares, "Telework and health effects review," *International Journal of Healthcare*, vol. 3, no. 2, pp. 30-36, 2017. https://doi.org/10.5430/ijh.v3n2p30

[4] B. A. Evanoff *et al.*, "Work-related and personal factors associated with mental well-being during the COVID-19 response: Survey of health care and other workers," *Journal of Medical Internet Research*, vol. 22, no. 8, p. e21366, 2020. https://doi.org/10.2196/21366

[5] M. J. Beck, D. A. Hensher, and E. Wei, "Slowly coming out of COVID-19 restrictions in Australia: Implications for working from home and commuting trips by car and public transport," *Journal of Transport Geography*, vol. 88, p. 102846, 2020. https://doi.org/10.1016/j.jtrangeo.2020.102846

[6] O. Rubin, S. Nello-Deakin, and M. Te Brömmelstroet, "What can we learn from the COVID-19 pandemic about how people experience working from home and commuting? Centre for Urban Studies, University of Amsterdam," Retrieved: https://urbanstudies.uva.nl/content/blog-series/covid-19-pandemic-working-from-home-and-commuting.html. 2020.
[7] H. Silver, "Working from home: Before and after the pandemic," *Contexts*, vol. 22, no. 1, pp. 66–70, 2023. https://doi.org/10.1177/15365042221142839
[8] K. Wong, A. H. Chan, and S. Ngan, "The effect of long working hours and overtime on occupational health: A meta-analysis of evidence from 1998 to 2018," *International Journal of Environmental Research and Public Health*, vol. 16, no. 12, p. 2102, 2019. https://doi.org/10.3390/ijerph16122102
[9] Y. Hong *et al.*, "The influence of long working hours, occupational stress, and well-being on depression among couriers in Zhejiang, China," *Frontiers in Psychology*, vol. 13, pp. 1-8, 2022. https://doi.org/10.3389/fpsyg.2022.928928
[10] E. Fein and N. Skinner, "Clarifying the effect of work hours on health through work-life conflict," *Asia Pacific Journal of Human Resources*, vol. 53, no. 4, pp. 448-470, 2015. https://doi.org/10.1111/1744-7941.12065
[11] World Health Organization, "Protecting workers' health world health organization," Retrieved: https://www.who.int/news-room/fact-sheets/detail/protecting-workers'-health. 2017.
[12] L. Chu, "Impact of long working hours on health based on observations in China," *BMC Public Health*, vol. 21, pp. 1-8, 2021. https://doi.org/10.1186/s12889-021-11190-0
[13] International Labour Organizations, "Working time around the world: Flexible working hours can benefit work-life balance, businesses and productivity," Retrieved: https://www.ilo.org/publications/working-time-and-work-life-balance-around-world. 2023.
[14] M. Kivimäki *et al.*, "Long working hours and risk of coronary heart disease and stroke: A systematic review and meta-analysis of published and unpublished data for 603 838 individuals," *The Lancet*, vol. 386, no. 10005, pp. 1739-1746, 2015. https://doi.org/10.3410/f.725736394.793512092
[15] N. Parveen, "Investigating occupational stress among married and unmarried working women in Hyderabad city," *Bahria Journal of Professional Psychology*, vol. 8, no. 1, pp. 21-37, 2009.
[16] A. Panigrahi, A. P. Padhy, and M. Panigrahi, "Mental health status among married working women residing in Bhubaneswar City, India: A psychosocial survey," *BioMed Research International*, vol. 2014, pp. 979827-979827, 2014. https://doi.org/10.1155/2014/979827
[17] J. Archer, Z. M. T. Lim, H. C. Teh, S. H. A. Chen, D. Koh, and S. Quah, "The effect of age on the relationship between stress, well-being, and health in a Singaporean sample," *Ageing International*, vol. 40, no. 4, pp. 416-429, 2015. https://doi.org/10.1007/s12126-015-9225-3
[18] L. Lindert, L. Kühn, and K.-E. Choi, "Rural-urban differences in workplace health promotion among employees of small and medium-sized enterprises in Germany," *BMC Health Services Research*, vol. 22, no. 1, p. 681, 2022. https://doi.org/10.1186/s12913-022-08052-9
[19] M. Gutiérrez, R. Wong, and Y. F. Kuo, "Rural and urban differences in lifetime occupation and its influence on mortality among Mexican adults," *Salud Publica De Mexico*, vol. 65, no. 5, pp. 513–522, 2023. https://doi.org/10.21149/14757
[20] J. Kim and R. De Dear, "Workspace satisfaction: The privacy-communication trade-off in open-plan offices," *Journal of Environmental Psychology*, vol. 36, pp. 18-26, 2013. https://doi.org/10.1016/j.jenvp.2013.06.007
[21] P. Majumdar, A. Biswas, and S. Sahu, "COVID-19 pandemic and lockdown: Cause of sleep disruption, depression, somatic pain, and increased screen exposure of office workers and students of India," *Chronobiology International*, vol. 37, no. 8, pp. 1191-1200, 2020. https://doi.org/10.1080/07420528.2020.1786107
[22] ESCP Business School, "Why working long hours does not necessarily hurt your health," Retrieved: https://escp.eu/news/why-working-long-hours-does-not-necessarily-hurt-your-health. 2022.
[23] T. Alon, M. Doepke, J. Olmstead-Rumsey, and M. Tertilt, "The impact of COVID-19 on gender equality," National Bureau of Economic Research. No. w26947, 2020.
[24] T. Kaur and P. Sharma, "A study on working women and work from home amid coronavirus pandemic," *Journal of Xi'an University of Architecture & Technology*, pp. 1400-1408, 2020. https://doi.org/10.5220/0010316704540461
[25] N. Rosenthal, Z. Cao, J. Gundrum, J. Sianis, and S. Safo, "Risk factors associated with in-hospital mortality in a US national sample of patients with COVID-19," *JAMA Network Open*, vol. 3, no. 12, p. e2029058, 2020. https://doi.org/10.1001/jamanetworkopen.2020.29058
[26] K.-T. Cheng and K. Chang, "The efficacy of stress coping strategies in Taiwan's public utilities during the COVID-19 pandemic," *Utilities Policy*, vol. 79, p. 101431, 2022. https://doi.org/10.1016/j.jup.2022.101431