







# Health Profile of Formal Sector Workers

## A Cross-Sectional Study Based on Worker's Health Check-Up in Indonesia

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**Abstract. Background:** Indonesia has more than 125 million workers, and Indonesian regulations ordered medical check-ups for all employees. Despite abundant workers' health data in industries and health providers, national data is still limited. This study aimed to investigate the health profile of Indonesian workers.

**Method:** We analyzed the health data of 12031 workers examined in a national-wide health provider between 2015 and 2016. The data included smoking habits, body mass index, blood pressure, hemoglobin, blood lipid, blood sugar, blood creatinine, ECG, spirometry, and audiometry test. The analysis focused on the proportions of diseases among workers and the proportion of diseases according to gender and age.

**Results:** The proportion of male workers was 78.8%, and the average age was 36.9. The highest percentage of workers was from DKI Jakarta. The top five clinical findings were obesity (46.7%), dyslipidemias (44.5%), dental caries (21.7%), hearing loss (17.6%), and lung function problems (17.6%). Almost in all findings, the proportion of diseases in males was higher than in females except for anemia and bacteriuria. The proportion of kidney function problems, myocardial ischemic/infarct, hepatitis B carrier, diabetes mellitus, anemia, hyperuricemia, hypertension, lung function problem, hearing impairment, dyslipidemia, and obesity were higher in older workers.

**Conclusion:** In general, this study can provide an overview of the health profile of Indonesian workers and can be a reference for the development of worker health programs. Individual programs can be given based on gender and age to maintain workers' health and prevent further deterioration.

**Keywords:** Health Profile · Industries · Workers

## 1 Introduction

Indonesian Central Bureau of Statistics reported that the number of Indonesian workers in 2016 was 120.7 million, of which around 50 million (41.72%) worked in the formal sector and the remaining 70 million (58.28%) worked in the informal sector [1]. The majority of workers spend at least a third of their daily activities at work. Diverse activities and work environments posit workers in various occupational exposures that can affect their health [2].

Technological developments and globalization have impacted the variety of jobs and businesses in the world that have increased the opportunity for workers to come into contact with or be exposed to various potential health hazards in the workplace [3]. On the other hand, Indonesia is still facing the problem of double burden disease, where the prevalence of infectious diseases is still high, along with the increasing prevalence of non-communicable diseases in the community [4]. Work-related illnesses will be an additional burden to the country because they will significantly affect business continuity and productivity [5].

The Indonesian government has had significant concern for workers' health since 1980, expressed by issuing the Decree of Minister of Manpower No. 2, 1980. It regulated that it is mandatory for employers to facilitate regular health examinations for their employees. As a result, a routine medical check-up is a common practice, particularly for formal sector industries, and workers' health data, especially formal workers, are available in companies and health facilities. However, the national health profile of Indonesian workers is still limited.

This study aimed to determine the health profile of workers and the distribution of the clinical findings based on gender and the business sector in Indonesia. It is expected that Indonesia has national data on worker health that can be used as a basis for developing health programs and increasing worker productivity for the sustainability of the nation's productivity.

## 2 Methods

A cross-sectional study was conducted to achieve the research objectives. The samples were total sampling collected from secondary data of workers' annual health examinations carried out in 2015–2016 by a health provider with facilities in several areas of Indonesia. The health provider has been standardized by the National Accreditation Committee (KAN) for Medical Laboratories ISO 15189-2007 so that calibration of all medical equipment and standardization of examination procedures are guaranteed.

Clinical findings were defined following the widely accepted definition in Indonesia presented in Table 1. The diseases were distributed by gender and age. The research data were processed and analyzed with the SPSS version 20.0 program. Ethical clearance was obtained from the Ethical Committee of the Medical Faculty of Universitas Indonesia.

**Table 1.** The operational definition of clinical findings

Clinical finding	Definition
Obesity	Body Mass Index (BMI) $\geq 25$
Dyslipidemia	2 or more lipid profile are high than normal
Hypertension	Blood pressure 140/90 mmHg or more
Hyperuricemia	Male: uric acid $> 7$ , Female: uric acid $> 6$
Diabetes Mellitus	Fasting blood sugar $> 126$ mg/dl [6]
Myocardial Ischemic/infarct	Myocardial ischemic or infarct found in Electrocardiograph
Crystalluria	Positive Crystal in urine
Hearing problem	Hearing threshold 25 decibel or more
Lung function problem	Restriction or obstruction results of spirometry test
Kidney disorder	Blood creatinine $> 1.2$ mg/dl [7]
Liver function abnormality	The level of SGOT is twice or more of the normal upper limit (82 mg/dl)
Bacteriuria	Positive bacteria in urine
Anemia	Male: Hb $< 13.1$ mg%, female: Hb $< 11.7$ mg%
Dental Caries	Dental caries found during examination
Hepatitis B carrier	Hepatitis B virus positive gained from HBsAg test

### 3 Results

During 2015–2016, we found that 12138 workers performed health examinations at the health provider. In general, not all workers got examinations uniformly in terms of the examination type, so each examination point is different (Table 2). Males were the majority of workers who carried out health examinations, the highest proportion of workers was 17–35 years old (49,4%), and smokers among workers were 32.7%. Most workers who performed health examinations were from DKI Jakarta, followed by West Jawa and East Jawa (Table 3).

Figure 1 shows all clinical findings found in the study. The five highest proportions of clinical findings were obesity which was found in 5040 (46.7%) workers, followed by dyslipidemia was 2383 (21.7%) workers, dental caries was 934 (17.6%) workers, hearing impairment was 934 (17.6%) workers, and lung function abnormality was 507 (17.6%) workers. Other findings were presented respectively, hypertension was 1160 (10.7%) workers, hyperuricemia was 635 (7.7%) workers, diabetes mellitus was 452 (4.2%) workers, anemia was 558 (4.6%) workers, crystalluria was 403 (3.5%) workers, bacteriuria was 389 (3.3%) workers, liver function problem was 240 (2.3%) workers, Hepatitis B carriers were 138 (2.1%) workers, myocardial ischemic/infarct was 70 (1.1%) workers, and kidney function impairment was 93 (1.1%) workers.

**Table 2.** Variables and Number of Each Sample

No	Health Examinations	Number	Percent
1	History and smoking and habits	12031	100.0
2	Physical examination	10976	91.2
3	Hematology and urinalysis	11595	96.4
4	Blood chemistry and serology		
	a. SGPT	10291	85.5
	b. Lipid Profile	8992	74.7
	c. Uric Acis	8213	68.3
	d. Blood sugar	10739	89.3
	e. Creatinine	8727	72.5
	f. HBsAg	6709	55.8
5	Electrocardiography (ECG)	8085	67.2
6	Audiometric Examination	5332	44.3
7	Spirometry Examination	2892	24.0

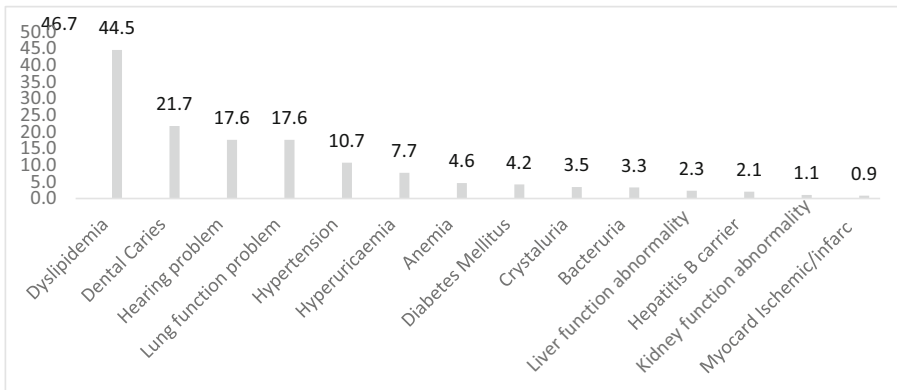
**Table 3.** Workers Characteristics

	Number	Percent
<b>Gender</b>		
Male	9483	78,8
Female	2548	21,2
<b>Age</b>		
17–35 years old	5942	49,4
36–55 years	5818	48,4
>55 years	271	2,2
<b>Smoking habit</b>		
Yes	3174	32,7
No	8857	67,3
<b>Location</b>		
Sumatera	257	2.1
Kalimantan	109	0.9
Sulawesi	119	1.0
Papua	21	0.2

*(continued)*

**Table 3.** (continued)

	Number	Percent
Offshore	88	0.7
DKI Jakarta	6879	57.4
West Jawa	3445	28.7
Central Jawa	195	1.6
East Jawa	775	6.5
Others	102	0.9



**Fig. 1.** Distribution of Clinical Findings Among Workers

Male workers were dominant in obesity, dyslipidemia, dental caries, hearing problem, lung function problem, hypertension, hyperuricemia, diabetes mellitus, crystalluria, liver function abnormality, Hepatitis B carrier, kidney function disorder, myocardial ischemic/infarct. The proportion of anemia and bacteriuria was much higher in female workers. The proportion of lung function abnormality was slightly higher in female workers (Fig. 2).

The proportion of kidney function problems, myocardial ischemic/infarct, hepatitis B carrier, diabetes mellitus, anemia, hyperuricemia, hypertension, lung function problem, hearing impairment, dyslipidemia, and obesity increased following the age categories. The higher the age, the higher the proportion of the diseases (Fig. 3).

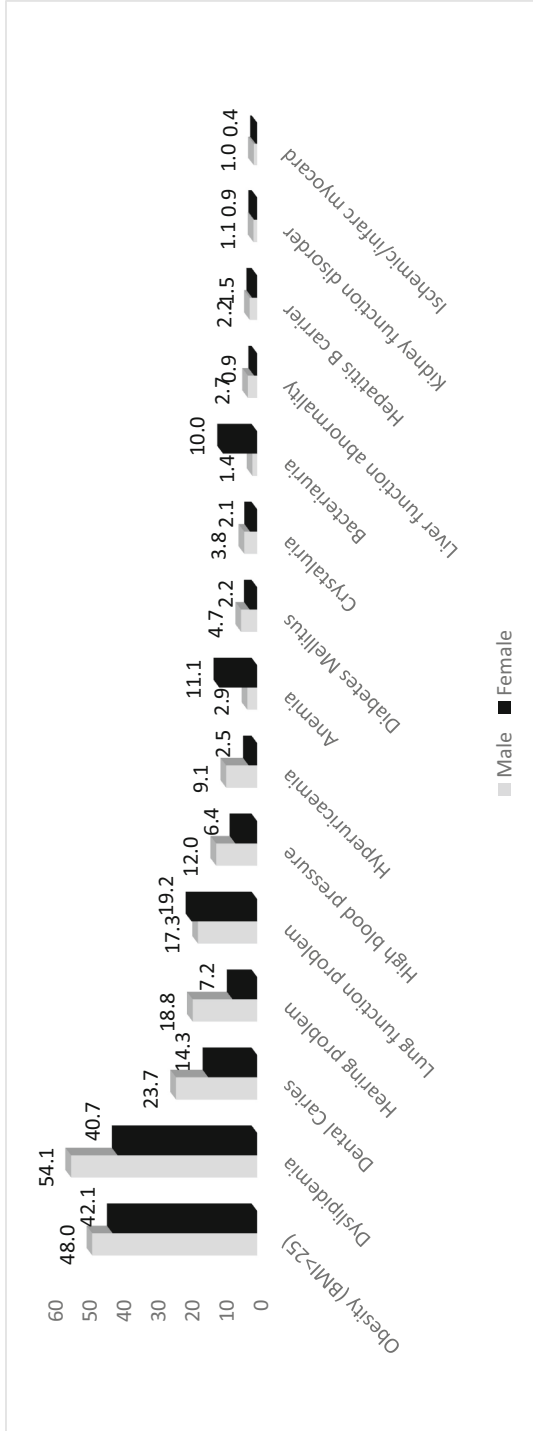
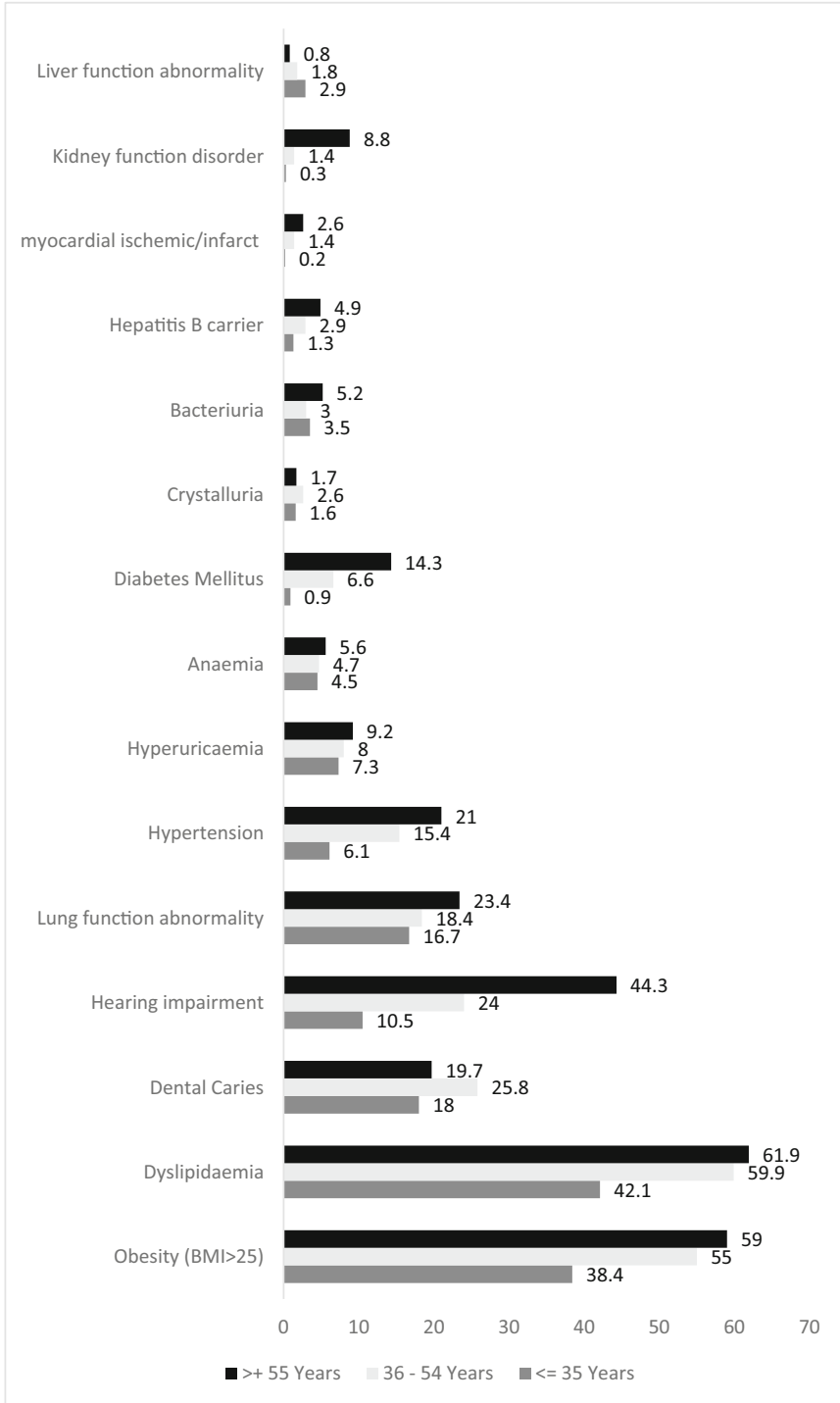


Fig. 2. Distribution of Clinical Findings among Male and female



**Fig. 3.** Distribution of Clinical Findings Based on Age Categories

## 4 Discussion

This study succeeded in determining the proportion of diseases among Indonesian workers based on annual health examinations and filled the gap in the health profile data of Indonesian workers. The health profile also provided the distribution of diseases based on gender and age as the critical risk factor for several diseases. Unfortunately, Indonesia does not have national figures for workers' health that can be referred to for comparison. However, by taking more than 12,000 workers' health data, this study can be a good start to providing national data on workers' health profiles.

We observed that more than 78% of the formal workers who conducted health check-ups were male, which was reflected in women's lack of work participation. This finding supported the world employment social outlook reported by the ILO in 2018, stating that there was still a lack of women's participation in the world of work [8, 9]. In the country, National Central Bureau reported that men aged 25 years and over have the highest employment-population ratio, which is estimated at 89.5 percent when the young women have the lowest employment-population ratio, which is estimated at 32.6 percent in the same period [10].

When compared with the results of National Basic Health Research 2018, the health profile of the working community appeared to be better than the general population, except for obesity and hearing loss [11]. The prevalence of high blood pressure, diabetes mellitus, and anemia are far below the general population. This condition reflects a worker's health effect where the working community has a higher income level and opportunity to obtain health information than other community groups. Moreover, what is also very influential is that the working group is a young and productive age group, so the degenerative effect is not yet dominant.

The workers' health effect phenomena is prominent for nutrition-related diseases like anemia. The prevalence of anemia among the Indonesian community is around 21.7%, while it in workers was only 4.6%. However, the prevalence of obesity is much higher in the worker population than in the community as one of the side effects of higher income that is not parallel with a good lifestyle [12].

Specifically, the effect of gender on health problems is the high proportion of anemia and leukocyturia in female workers compared to male workers [13]. The gap in the proportion of anemia and leukocyturia in women is nearly five times that of men. The opposite happened with hypertension. The proportion of hypertension in female workers was almost half that of men and very far below the proportion of women in the general population. The effect of age can be seen clearly in clinical disorders associated with degenerative processes, such as diabetes mellitus, hypertension, kidney diseases, and coronary heart disease. The increase in degenerative diseases prevalence as workers get old was similar to the findings of Indonesian basic health research [14]. Those results showed a necessity to have a health program based on the group of age and gender according to the risk of health problems. Especially for female workers, the program to prevent anemia and urinary tract infection must be a concern because it is related to nutritional and personal hygiene needs during the reproductive period.

Subject selection carried out by total sampling based on data from one health facility was one of the limitations of this study. Even though the workers' health examination facilities have coverage in all major islands in Indonesia and their work procedures are



standardized, the representation of the subjects of this study can still be improved by involving several health facilities in further studies. However, the number of subjects was one of the strengths of this study. It is necessary to formulate coordination steps to collect health facilities and collaborate in forming a health database for workers in Indonesia to have more comprehensive data and representativeness.

## 5 Conclusion

This study achieved success to describe the health profile of Indonesian workers. The top five clinical findings were obesity, dyslipidemias, dental caries, hearing loss, and lung function problems. It is expected to bring benefits to the government or policymakers as a basis for preparing health programs and increasing the productivity of Indonesian workers.

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**Author Contribution.** Conceptualization and methodology, A.S. and A.W.S.; software, A.K.; formal analysis, A.S., A.B., D.F. and D.Y.; investigation, A.S., A.K., D.F. and D.Y.; writing—original draft preparation, A.S.; writing—review and editing, A.K., D.F. and D.Y.

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