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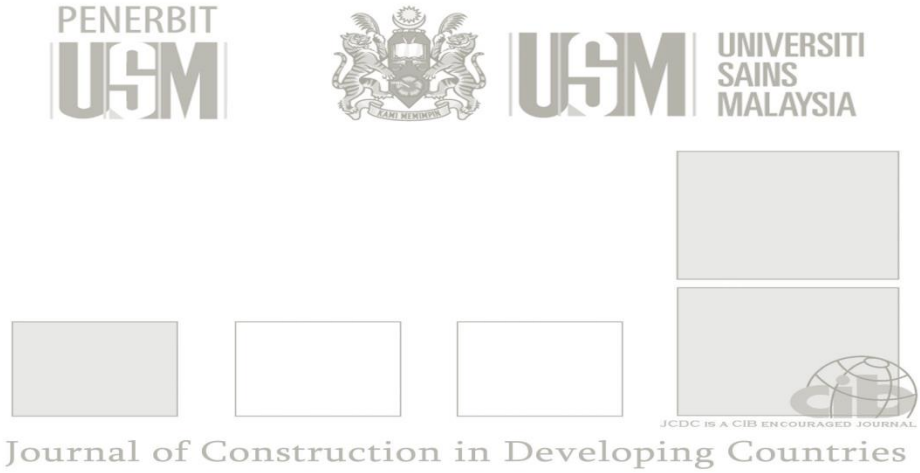

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EARLY VIEW

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Impact of the COVID-19 pandemic on construction workers in West Java

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ABSTRACT:

The COVID-19 virus that first appeared in Indonesia in March 2020 resulted in large scale lockdowns and consequential social and economic repercussions. The aim of this paper is to examine the impact of the pandemic on workers in the Indonesian construction sector. The first objective is to characterise the impact of the COVID preventative measures on their access to work, work hours, and income levels. This was followed by a study on the implementation of COVID-19 health and safety protocols at project sites. A survey conducted in November and December 2020 in the province of West Java indicated that contrary to job losses and wage cuts report in the literature for other regions, construction companies have resisted cutting the wages of the most vulnerable informal workers and only marginally cut wages and allowances of

their higher paid permanent workers. Compliance to COVID-19 health and safety protocols at project sites were reported to be high and in line with the compliance rates described in many other countries where the industry was allowed to operate. The only area of concern was the risk posed by cramped workers accommodation and the habit of workers socialising in common areas.

KEYWORDS: COVID-19, employment, wages, health, inequality

INTRODUCTION

The spread of the COVID-19 virus across the world has caused severe disruption to social and economic activities mainly due to the restrictions on movements and physical distancing imposed to curb its spread. While many economic sectors have experienced drastic declines in demand and output, the construction sector in many countries operated either at reduced levels or cautiously operating at its original capacity to keep workers employed and to prop up the economy. As governments consider the construction industry as a key economic sector, any unnecessary disruption or curtailment of its activities will reduce economic output and impede growth.

A global survey conducted in mid-2020 found that 18% of projects were disrupted and halted, 73% were disrupted, recommenced but reported delays while only 8% have had no impact (Ogunnusi et al. 2020). The construction sector in most countries has reported disruptions resulting from a total shutdown of construction activities, high number of COVID-19 infections and spread,

delays in raw material supply either from the manufacturers or due to problems with logistics, limits on the number of workers on project sites, shortage of personal protective equipment, having to care for children, and owners requesting for changes or reassessing their building needs. A survey carried out by Ikatan Quantity Surveyors Indonesia found that 80% of projects were affected by COIVD-19 ranging from delays and cost overruns to project suspensions or even terminations (Hansen et al. 2021). Another study that focused on construction companies reported that up to 25% of projects were suspended while those that have not appointed a contractor did not proceed (Larasati et al. 2021).

Lemieux et al. (2020) observed that the pandemic led to a 32% reduction in aggregate weekly work hours among workers and a 15% decline in employment in Canada. Crucially, nearly half of job losses were attributed to workers in the lowest earnings quartile with younger workers and those paid hourly most impacted. The presence of informal workers in the construction industry of developing countries has been linked to vulnerable employment and unstable income (Octavia 2020). The large-scale social distancing (PSBB) imposed by the government of Indonesia in 2020 has left many own account workers with little or no work prospects. Construction workers with no formal work arrangements such as those working in labour gangs may be out of work if the head contractor reduces the number of workers, cuts shift or delays the works. Those on informal work arrangements are not entitled to employment benefits such as social protection, advance notice of dismissal and severance pay. Initial reports of similar studies on the global economic effects of COVID-

19 indicated that the crisis has accentuated and deepened economic and social divides along skills levels, education, income, and gender bases in OECD countries (Jackson et al. 2021). Lower-middle income countries were impacted the most. Other studies indicated that a migrant workforce is more likely to lose their jobs during economic downturns due to the prevalence of employment under temporary contracts, lower wages, and savings, working in jobs that cannot be performed from home and limited access to the safety net (Fassani and Mazza 2020).

The aim of this research is to examine the policies and measures implemented by construction companies to manage the spread of COVID-19 at project sites and the impact of these mitigation measures on the incomes and well-being of their employees and construction labourers. Employment of construction workers in Indonesia is either permanent or contract workers employed by the head contractor who provide administration, management, engineering, finance, planning, supervision of projects, or informal workers who are responsible for the physical construction tasks under the leadership and management of a labour subcontractor. The first objective is to assess the impact of the decline in construction activities and wages on these two groups of workers especially the informal workers who are viewed as more vulnerable. The second objective is to evaluate the implementation of health protocols imposed on the industry and its impact on the workers' well-being. The construction industry was allowed to operate under strict COVID-19 protocols during this entire period. Every project site was required to establish a task force that comprised representatives of both the employer and the contractor to

socialise and implement COVIOD-19 health protocols, construct additional health facilities, implement safe work arrangements and to report workers who are infected to the health authorities following Ministerial Instruction No.2 of 2020.

COVID-19 IN INDONESIA AND ITS CONSTRUCTION INDUSTRY

It took about a month from the first report of COVID-19 cases in Indonesia to the imposition of lockdowns in Jakarta and surrounding areas in April 2020. Schools and offices were closed, and the movement of workers and residents was severely restricted to control the transmission of COVID-19 in what was known as large-scale social restriction (PSBB). This included the closure of schools and workplaces, reduced number of patrons in markets and shops that serve essential needs, a ban on large gatherings, reduced number of passengers in public transport, and transportation of only essential goods. Healthcare, security, and other essential sectors were allowed to operate under stringent health guidelines. These restrictions were increasingly tightened in response to the slow rise of infections over a nine-month period until January 2021.

As the number of COVID-19 cases began to increase in January 2021, the government reimposed restrictions on community activities ranging from levels 1 to 4 where level 4 was the most stringent with the closure of schools, all non-essential workers to work from home, and only essential activities allowed. These restrictions known as Enforcement of Restrictions on Community Activities (*Pemberlakuan pembatasan kegiatan masyarakat or PPKM*) were implemented based on the severity of COVID-19 infection in each region. The

decision on the level of PPKM restriction to impose was left to the regional governments. The Jakarta Post (2021 Jan 14) reported that these curbs were less stringent that the requirements under the previous PSBB policy. Construction of public infrastructure was listed as an essential and critical service, and therefore remained operational together with the manufacture and supply of cement and other building materials.

Despite the increase in COVID-19 cases in Jakarta and its neighbouring areas in the West Java province, stakeholders were concerned with protecting the safety, health, and wellbeing of construction workers so that they can continue to work in a secure, hazard-free working environment. Shutting down this sector will lead to significant job losses and put immense pressure on the government to assist a large cohort of informal workers labouring on project sites. Historically, the construction sector in Indonesia was characterised by poor occupational health and safety (OHS) practices with safety incidents and accidents occurring frequently.

The Minister for Public Works issued Covid-19 Prevention Protocol for the construction industry on 27 March 2020 requiring the formation of Prevention of COVID-19 Task Forces and the implementation of health protocols at every project site (Ministry of Public Works and Housing 2020). Essentially, these instructions were for the project owner and contractors to jointly establish a task force with the duty, responsibility, and authority to socialise, educate, promote, and implement COVID-19 preventative measures at the project site, coordinate with the COVID-19 Task Force at the ministry to identify potential COVID-19 hazards in the field and conduct health checks. The task force was

also responsible for monitoring workers' health and their movements, provide vitamins and health supplements to boost the workers' immunity, and liaise with the health department in the event of an infection. Project sites may be subject to a temporary cessation of activities if cases were detected or very stringent health and distancing protocols if the projects were deemed to be essential or urgently required to be completed such as health facilities or quarantine centres.

The facilities required on project sites were clearly spelled out: contractors were required to provide medical rooms in the field equipped with oxygen supply, non-contact temperature scanners and trained personnel; additional hand washing facilities with water, soap and hand sanitizer, tissues, face masks for all workers and visitors; and to implement contingency plans to bring patients to the nearest hospital or public health centre. The task force was to disseminate information on these prevention measures during morning briefings and conduct temperature scans for all workers before entry to the project site, while at work and again before departing at the end of the workday. If a worker was confirmed as a COVID-19 case, work may be suspended for 14 days while the project site was disinfected.

By July 2021, President Widodo came under increasing pressure to reopen the economy with many Indonesians impacted by these restrictions, declining incomes and potentially facing difficulties in feeding their families (Jakarta Post 23 July 2021). As of the date of writing in September 2021, daily case numbers have declined to less than 2,000 per day leading to several regional governments relaxing these PPKM restrictions.

LITERATURE REVIEW

The impact of the COVID-19 pandemic on the construction industry has manifest in many forms. The most obvious was when the government orders a shutdown of all non-essential sectors or if workers were infected with COVID-19 and the project site shut down to prevent further transmission of the virus. Other impacts reported in the literature included the disruptions to the supply of imported construction materials (Pathisrana 2020), shortage of PPE as these were diverted for use by healthcare workers, material price escalation, the shortage of truck drivers crossing state lines in the US (Alsharef et al. 2021), and poor adherence to health protocols (Bsisu 2020, Zheng et al. 2021).

Construction workers in Indonesia can be classified into two groups: a formal group of workers directly employed by the contractor that includes head office and project staff such as project managers, project engineers, planners, quantity surveyors, land surveyors, and field supervisors; and an informal group of skilled workers and labourers engaged by labour subcontractors known as *mandors* (Firman (1991). These *mandors* take on labour subcontracts for part of the works, directly engages the labourers, and are paid based on agreed price for work completed. This method of subcontracting allowed the contractor to manage its labour cost tightly as these labourers are not paid based on work hours but on measured outputs. In general, the *mandor* recruits workers from their home villages, extended families or from among persons known to them from previous projects. The availability of cheap rural labour and their willingness to move to the urban areas to work on project sites continue to supply many informal workers to the Indonesian construction

industry. Some of these workers upgrade their skills to become skilled masons, carpenters, or steel fixers after years of apprenticeship with these labour gangs. Educational attainment for these informal workers is low with nearly half at or below elementary school, 48% high school and only 4% with post-secondary education (Rahman 2020). Informal work was prevalent in many developing economies such as Sri Lanka where nearly 80% were reported to be informal (Pathisrana 2020).

An OECD (2012) comparison of the productivity of the formal and informal sectors indicated large differences in output and labour productivity. The average labour productivity of the informal workers was Rp 7 million compared to Rp 77 million in the formal sector in Yogyakarta whereas the figures for Banten were Rp 13 million and Rp 85 million, respectively. To reduce their vulnerability to declines in income from any single source, informal workers often take on a diverse range of jobs (Weibe 1996). Casual labour are farmers who leave their fields to look for jobs in the city after completing their harvests and when construction work is over, they return to their villages to farm again (Soemardi and Pribadi 2018). Workers in the construction industry were particularly vulnerable due to their lower level of education attainment and relying on low-skilled jobs (Rahman et al. 2020). In comparison, only 33% of the workers in manufacturing reported educational attainment of elementary school or lower. Octavia (2020) observed that the informal sector in developing countries was linked to vulnerable employment and unstable incomes. Many informal workers earned just enough before the pandemic not

to be able to benefit from programs that target households with little or no earning potential.

In terms of COVID-safe protocols, researchers found that many tasks in the construction industry were carried out by teams of workers making social distancing unrealistic, or the discomfort due to the wearing of masks for long periods (Alsharef et al. 2021). Other safety measures such as staggering work crews, limiting workers in the break rooms, temperature checks, disinfecting tools and surfaces, and requiring non-essential workers to work from home were adopted successfully. Bushman et al. (2021) reported that the use of a single elevator to transport workers and working in enclosed, non-ventilated spaces proved to be the primary cause of virus transmission in high-rise buildings. Compliance to health protocols in the construction industry was observed to be low due to having a wrong understanding about the transmission of the virus and the gung-ho attitude of the workers (Zheng et al. 2021). From a behavioural science perspective, Van Bavel et al. (2020) believed that people underestimated their likelihood of contracting a disease and ignore public health warning, that inequality leads to misinformation, and that messaging approaches must emphasise the benefits to the recipients, and that a strong sense of social identity can help coordinate efforts.

RESEARCH METHODOLOGY

Due to the emerging nature of the COVID-19 pandemic, very little information was available in the literature on which to design the methods for data collection and analysis. The literature indicated that non-permanent workers were most vulnerable during times of crisis either from an income and job

security perspective as these workers were the first to lose their jobs or have their hours cut, or from an occupational health and safety perspective as they were often desperately in need of work and would be willing to take on risky tasks. It was decided that the best approach was to conduct a survey on construction workers in the West Java province where the researchers were based. It was prudent to limit the scope of the research to this region as the researchers were also operating from home during the period of PSBB that was in force. The study was therefore limited to contractors operating in the province of West Java.

The survey covered three specific thematic areas of income vulnerability, travel and accommodation, and access to and impact of COVID-19 facilities. The workers were categorised into four: permanent employees engaged by the contractor, contract employees engaged by the contractor specifically for the project, casual or part-time staff engaged on a time basis, and informal workers engaged on a daily basis. Informal workers are defined as those who do not have an employment contract with the main contractor and mainly work for daily wages under the supervision of a *mandor*.

The survey on COVID-19 preventative measures was based on the requirements spelled out in the minister's instructions for the construction industry. The initial list of construction companies was those identified as working on public projects in West Java and extended to a wider sample of both public and private projects by a snowballing process. The survey was conducted online, and the survey link was distributed via email to the project management team with instructions to disseminate these to their entire project

team. The research was limited to respondents who could competently respond to this online survey. The survey was conducted in November and December 2020.

FINDINGS

A total of 261 responses were recorded where 36 were permanent workers, 136 contract workers, 11 casual or part-time workers and 78 daily workers. Contract workers were those engaged for the duration of the project. Casual or part-time workers were hired whenever required while the daily workers were labourers engaged by the *mandor* to carry out physical construction activities in a labour gang.

There are obvious differences in the roles of permanent, contract, casual and daily workers. Permanent workers were employed as engineers, site managers, supervisors, administration staff, occupational health and safety (OHS) officers, and QA/QC officers. Contract staff who were engaged specifically on the project work were also employed in similar roles but in greater numbers reflecting the wider use of project staff than permanent employees. Additionally, drivers, operators and survey assistants were all engaged on contract. Casual staff on the other hand were engaged as site administration and OHS roles. Daily workers were either skilled (*tukang*) in the areas of carpentry, masonry, concreting, plumbing, or unskilled (*laden*) who assist the skilled workers by carrying materials, clearing waste or general housekeeping. Details of the respondents age, educational attainment and experience are summarised in **Table 1** below.

<Table 1 about here>

The respondents were 92% male and 8% female reflecting the gender imbalance of the workforce in the construction industry. The highest proportion of female employees was seen in the permanent workforce at 14% while there were no women among the daily workers. The mode and median age of permanent, contract and casual workers were all in the 25-29 age group whereas the daily workers exhibited a more uniform spread with a large cohort in the 20-24 age group. The number of graduates was highest among the permanent workers at 83% followed by contract workers at 33% and finally casual workers at 18%. Evidently, a degree is a requirement for gaining permanent employment with contractors. Contract and casual workers were a combination of senior high school, diploma, and degree holders. The survey indicated that the educational attainment of the daily workers was the lowest at only elementary, junior high or senior high school levels. Permanently employed workers were the most experienced while a large proportion of contract and casual staff presented less than 4 years of experience. In general, the permanent workers were the most experienced, more highly educated, marginally older whereas the daily workers were the least experienced, least educated, and youngest.

Motorcycles were the most common mode of transport for these workers' commute to work (see **Table 2**). Permanent workers also reported driving their own cars but the proportion of workers driving to work reduced to 13% for

contract staff and to 9% for casual staff. Only 3% of the workers utilised public transport. Daily construction workers in Indonesia were normally provided with accommodation by the employer at close proximity to the project site. These workers' quarters were constructed by the contractor but billed as part of the construction overheads to the project client. Due to the proximity of the accommodation to the project site, more than half of these workers spent less than 15 minutes or travel less than 4kms to get to work either by foot or on their own motorcycles. The survey showed that approximately half of all workers lived within 4km and took less than 15 minutes to travel to their location of work, usually on motorcycles.

<Table 2 about here>

The 261 respondents were reportedly engaged by 21 different contractors with 182 workers or nearly 70% engaged by PT Wijaya Karya and another 35 by PT PP, both large state-owned construction companies. Despite the over-representation of these two companies, the workers were engaged on numerous projects and represented different site and project management characteristics. The remainder were private contractors. These projects were divided into infrastructure and building with an 80%-20% split in favour of infrastructure such as rail, road, dam, ports, and airports. The data on project type and value shown in **Table 3** below indicate that most of the projects were large-scale infrastructure valued above Rp 500 billion (US$35 million) or high-

rise building projects between Rp 10 billion to 500 billion (US$0.7 to 35 million). Not all the respondents were aware of the total value of the projects.

<Table 3 about here>

Wages and allowances: The median basic salary for permanent workers was Rp 5-10 million (US$350-$700) per month whereas most of the contract, casual and daily workers reported basic wages less than Rp 5 million (<$350) as shown in **Table 4** below. This was in line with the reported average salary for permanent workers of Rp 5.1 million and Rp 3.2 million for DKI Jakarta and West Java, respectively (BPS 2020). As many as 96% of daily workers earned less than Rp 5 million per month which corresponded to an estimated Rp 150,000 per day (BPS 2021). The minimum wage for all employed workers was Rp 4.4 million in DKI Jakarta for 2021 but ranged from a low of Rp 1.8 million in the province of Central Java to Rp 3.5 million in Papua. The greatest impact of wage cuts was seen in the group of workers with the most secure employment, the permanent workers, where 61% reported cuts of up to 20%. The daily workers who were earning wages close to the minimum wage were least affected by wage cuts with 71% reporting no changes and only 11% reporting cuts of up to 10%. Almost all permanent workers received allowances in addition to their monthly salaries with 58% receiving up to Rp 5 million while the remaining received between Rp 5-10 million. This benefit was also extended to contract and casual workers where 66% and 27% received allowances, respectively.

However, only one-third of the daily workers received allowances. Typically, the employers will hand out allowances for *hari raya*, transport, food, and family plus an annual bonus. Therefore, the impact of COVID was more pronounced in formal employment where 50% of the permanent workers and 32% of contract staff reported cuts to allowances. The impact of cuts to allowances was limited to only 26% of the daily workers. In general, the results indicate that cuts to salary and wages were more pronounced in the higher income level permanent workers compared to daily workers who were earning wages marginally above minimum wage. Employers also chose to direct their cuts to allowances on their permanent and contract workers rather than the lower income casual and daily workers. Other non-monetary benefits provided to these workers included transportation, accommodation, and social security through the BPJS insurance scheme that continued throughout the period of survey. It was interesting to note that 19% of the workers were reimbursed for the purchase of vitamins and health supplements while only 4% received reimbursements for setting up a home office.

<Table 4 about here>

Nearly one in four workers in the construction industry supplemented their incomes during the pandemic as shown in **Table 5** which shows that almost 40% of the permanent and 25% of contract workers had another source of income compared to only 16% for the daily workers. The impact of the

pandemic was evident by the time the survey was carried out as one in every two workers reported a job loss in their household. The survey indicated that job losses were more likely in the lower income and vulnerable households of the daily workers than for permanent workers. The combined impact of the decline in incomes and job losses has resulted in more than 80% of these workers reporting a change in spending pattern.

<Table 5 about here>

Work hours: The workers in the construction industry continue to report excessively long hours of work with 50% working 40-56 hours per week and another 36% exceeding 56 hours during the period of the survey as shown in **Table 6**. On top of the regular 40-hour week, 60% reportedly working overtime and 34% between 28-49 extra hours which may seem excessive. These long hours of work were observed in all four worker categories.

<Table 6 about here>

As directed by the minister of public works in April 2020, all the contractors must immediately implement COVID-19 health protocols at project sites, provide briefings and training to socialise these measures, and build additional facilities to control and limit the spread of the virus. The survey reported that the reach

of these briefings was very high with close to 100% of the respondents saying that they have attended these briefings as shown in **Table 7**. The most common PPE provided by the contractors were face masks and hand sanitizers, but casual workers reported slightly lower rates of compliance compared to the other groups. Protective clothing and face shields are not common, only about 25% of the workers reported their availability whereas more than 50% said that gloves were supplied. All respondents reported that facilities such as hand wash basins, clinics, and regular sanitising were available while shields in meal and work areas were only reported by about one-third of those surveyed. Temperature checks and enforcement of the wearing of masks were the actions most often carried out at project sites. Other screening requirements such as quarantining infected workers, filling in health forms, rapid testing, swab tests were carried out more for permanent and contract workers compared to daily workers. Social distancing was most prevalent with the permanent staff but reduced slightly for daily workers due to the nature of their work. Efforts were also made to minimise contact during delivery of materials by organising non-contact deliveries, sterilising equipment, and isolating delivered materials.

<Table 7 about here>

The workers were also canvassed on their preferred COVID-19 preventative measures with rankings presented in **Table 7** indicating that while their priorities were for strong health protocols, different groups of workers had different

priorities. All the workers prioritised the implementation of health protocols at the project sites such as social distancing and personal protective equipment. Evidently permanent workers who may be able to continue their tasks from home indicated a preference to work from home whereas the daily workers indicated a preference for a temporary stop to site activities (with continued payment of wages). All the workers ranked free vaccines, free COVID-19 screening tests and health supplements highly.

The final section of the survey gathered data on impact of COVID-19 on their commute to work, inter-district travel and conditions in the workers' accommodation with the results shown in **Table 8**. The responses in an earlier section showed that most workers utilised their own private transport to commute to work or walked to the project site so social distancing was not an issue. The most important obligations were the wearing of masks, distancing, and avoiding physical contact during inter-district travel. Workers that were required to travel during this period were reimbursed for rapid covid tests. Many respondents reported a lack of social distancing in the workers accommodation blaming it on a culture of socialising in the mess halls and having multiple persons occupying a room. The responses in this section did not exhibit much variation between the four groups of workers indicating that these challenges or issues affected all the workers.

<Table 8 about here>

THEORETICAL AND PRACTICAL IMPLICATIONS

The theoretical contributions of the study challenged previous findings that wage cuts and reduced work hours were among the responses by Indonesian contractors as projects were delayed or exposed to cost overruns due to the COVID-19 outbreak (Hansen et al. 2021). The notion that the daily workers were more vulnerable during the pandemic was tested in this study. The results clearly indicated that the salary cuts were very minimal and focused only on the group of higher paid permanent workers. Wage cuts, if any, were limited to less than 10% for daily workers compared to up to 20% for permanent workers. Similarly, cuts were directed at the allowances for permanent workers rather than for the daily workers indicating that employers were sympathetic to the position of the daily workers who were earning marginally above minimum wage.

These findings run contrary to several recent publications from Indonesia that suggested that workers at the low end of the income distribution were more likely to be affected by the lockdown measures putting an additional 1.3 to 19.7 million people into poverty (Suryahadi et al., 2020, ILO 2020). A UNICEF et al. (2021) survey in Indonesia revealed that 74% of households reported a reduction in income, and 91% reported that the primary earner working fewer hours and earning less. More than two-thirds of those at the bottom 40% (B40) received cash assistance from the government but there were concerns that the segment of households who were initially just above the poverty line (estimated at 20% of the population by Olivia et al. 2020) would be pulled down into poverty and not avail themselves to government assistance. These

findings indicate that construction employers in Indonesia have resisted cutting jobs and reducing wages compared to significant job losses in Malaysia (Gamil, 2022) and the departure of foreign workers due to the limit placed on the number of site operatives allowed to be on site (Olanrewaju et al. 2021).

On the issue of supplementary incomes, the finding that nearly 40% of permanent employees had incomes from other sources corroborate the findings from UNICEF et al. (2021) where employees had to rely on running a small side business.

Despite a decline in total employment in the construction industry of 7% in August 2020 (compared to the same period twelve months previously) and further decline of 2.3% during February 2021 (BPS, 2021), this study found no evidence of the severance of employment of workers during the period of study. Total hours worked remained high because of the essential nature of the work in the industry. This study adds empirical evidence that essential construction workers have increased job security during the pandemic, but the greater infection risk suggested by Gaudecker et al. (2020) was not investigated.

Siregar (2021) reported that the construction industry was the worst hit by the pandemic with a 36.3% decline in Q4-2020 revenue compared to the previous year. Planned investments in infrastructure were cut back in 2020 as these funds were diverted to social assistance programs to alleviate the impact of the pandemic. The *Kartu Prakerja*, an unemployment insurance and upskilling program launched in 2020 was converted into a cash transfer program to assist unemployed workers gain the skills they need to secure jobs in other sectors

(Suryahadi et al. 2020). By mid-June 2020, the government had committed stimulus and social assistance programs totalling close to 6% of GDP (Olivia et al. 2020).

The establishment and implementation of COVID-19 protocols in the construction industry following ministerial instruction No.2 of 2020 was broadly viewed as a success. Basic measures such the socialisation of health protocols to all the workers, the use of PPE and the provision of health facilities were successfully implemented according to almost all the workers surveyed. There was no discernible difference in the reported compliance rates for permanent, contract, casual or daily workers. Compliance in more detailed measures such as screening, testing, movement controls, and minimising contact during the delivery of materials were slightly lower in the daily worker group compared to permanent workers. The compliance rates in the construction industry were significantly higher than those reported by ILO (2020) indicating that the combined employer and contractor representation and leadership in the COVID taskforce for every project site was implemented effectively and that the privilege to continue construction activities during the period of PSBB and PPKM was justified. This is broadly in line with the 84% compliance rate reported by Olanrewaju et al. (2021) for the construction industry in neighbouring Malaysia. The high compliance in Indonesia compared favourably to the great variation in compliance of staff in following safety protocols in Indonesian hospitals (Prajogo et al. 2021).

The main area of concern was the lack of social distancing in workers accommodations where daily workers could socialise in the mess halls and

have more than one person living in a room. There was little research into the living conditions of these workers. The only other location where accommodation was identified as an issue was in Singapore where foreign construction workers were housed in cramped, unhygienic, and unsanitary dormitories provided by employers. Migrant workers living in dormitories were the most severely impacted demographic there (Kaur-Gill, 2020). Recommendations to alleviate these problems include limiting workers' movement, preventing mixing between blocks, staggering times for kitchens and showers and to limit the number of workers in recreation rooms or common areas. Woo (2020) argued that greater awareness of these issues by civil society organisations and policymakers will lead to improved worker welfare and provide the necessary resources for managing the pandemic and other health-care crises.

There were no significant deviations in the findings on COVID preventative measures implemented in Indonesia against those implemented elsewhere where construction companies were allowed to operate under strict compliance to health and safety protocols. Permanent workers were in favour of working from home as a social distancing measure whereas daily workers either proposed more stringent enforcement of mask wearing to allow work to continue at project sites or a temporary shut down while getting paid. These differences are clearly aligned to the daily workers informal work arrangements.

One point that has not been observed previously in the literature but revealed in this survey was the practice of supply or reimbursements for the purchase of

vitamins and health supplements to construction workers. The purchase of vitamins and supplements appeared as responses to questions about reimbursements and again on suggested COVID health protocols reflecting either the importance of these supplements to build resistance to a potential COVID-19 infection or indicative of a lack of nutrition. There wasn't sufficient information in the survey to shed further light on this practice.

CONCLUSIONS

The findings reinforced several general characteristics of the Indonesian construction industry. The workers in the industry were evidently divided into two groups where higher educated, more experienced, professional workers are permanently employed as supervisory and management staff whereas lower educated, less experienced, skilled and unskilled labourers were engaged on an informal basis to work on physical construction tasks.

As the pandemic restricted activities on project sites and put constraints on the movement of workers, many of the large contractors cut salaries and allowances for their permanent workers while the wages for the daily workers were only marginally affected. This is in line with the World Bank and Bappenas (2020) business survey carried out in October 2020 where 16% of large firms experienced difficulties in paying wages as projects were delayed and disrupted by the impact of the lockdowns and social restrictions. More than 60% of the permanent workers reported up to 20% reduction in salaries compared to only 11% of daily workers reporting cuts of up to 10%. As many as 40% of the permanent workers had supplementary income of less than Rp 5 million from other sources whereas only 16% of the informal workers had any

supplementary incomes. Permanent workers received substantially more benefits such as reimbursements for health supplements and vitamins compared to informal workers. Taken collectively, the evidence clearly indicated that the contractors focused their salary and wage cuts on the higher income permanent workers than the lower paid informal workers contrary to the accepted view on the vulnerability of informal work. This could be attributed to the already low wages commanded by these informal workers and any further cuts will no longer meet the minimum living wage. However, these informal workers reported nearly double the number of job losses in their household at 58% compared to only 31% for permanent workers confirming that the pandemic has disproportionately affect lower income households. This survey had indicated that despite other studies that reported a larger decline in incomes for the lower income segment, the construction industry held back on cuts to the wages of their most vulnerable workers. Despite numerous researchers reporting that inequalities in income and employment were more visible or amplified during the pandemic, the workers with less secure or informal employment in the construction industry were not disproportionately impacted.

All the recommended COVID-19 protocols by the government were successfully communicated and implemented to a high level by the contractors. The most prevalent actions were the wearing of face masks, and the use of hand sanitizers while facilities such as hand wash basins were added, and regular sanitizing carried out. While controls on workers movements were extensively enforced, accommodation provided by the employer was

identified as a potential source of COVID-19 transmission given the cramped living conditions, lack of social distancing, and the culture of socializing in the mess halls. Limiting the movement of workers and the number of workers in recreation rooms and common areas as suggested by research on workers dormitories in Singapore may be a useful solution.

REFERENCES

Alsharef, A., Banerjee, S., Uddin, S. M., Albert, A., and Jaselskis, E. (2021) "Early impacts of the COVID-19 pandemic on the United States construction industry." International journal of environmental research and public health 18,4: 1559. https://doi.org/10.3390/ijerph18041559

Badan Pusat Statistik (2020a) Konstruksi Dalam Angka 2020, December 2020, BPS-Statistics Indonesia.

Badan Pusat Statistik (2020b) Hasil survey social demografi dampak COVID-19, BPS-Statistics Indonesia.

Bsisu, K. A. (2020). "The impact of COVID-19 pandemic on Jordanian civil engineers and construction industry." International Journal of Engineering Research and Technology 13(5): 828-830.

Bushman, D., Sekaran, J., Jeffery, N., Rath, C., Ackelsberg, J., Weiss, D., Wu, W., Van Oss, K., Johnson, K., Huang, J., Khatun, U., Sheikh, T., Sutcliff, J. and Tsoi, B. (2021). "Coronavirus Disease 2019 (COVID-19) Outbreaks at 2 Construction Sites—New York City, October–November 2020." Clinical Infectious Diseases 73, Supplement_1:S81-S83.

https://doi.org/10.1093/cid/ciab312

Fassani, F., and Mazza, J. (2020) A vulnerable workforce: Migrant workers in the COVID-19 pandemic. Luxembourg: Publications Office of the European Union.

Firman, T. (1991) "Rural households, labor flows and the housing construction industry in Bandung, Indonesia." Tijdschrift voor economische en sociale geografie 82, no. 2 (1991): 94-105. https://doi.org/10.1111/j.1467-9663.1991.tb01800.x

Gamil, Y., (2020). The impact of pandemic crisis on the survival of the construction industry: A case study of COVID-19, Mediterranean Journal of Social Sciences, 11, No.4:122-128. DOI: https://doi.org/10.36941/mjss-2020-0047

Gaudecker, H.M.V., Holler, R., Janys, L., Siflinger, B.M. and Zimpelmann, C., (2020). Labour supply in the early stages of the COVID-19 pandemic: empirical evidence on hours, home office, and expectations (No. 13158). Institute of Labor Economics (IZA).

Hansen, S., Rostiyanti, S.F., Rizaldi, R. and Andjarwati, C. (2021) "Quantity Surveyors' Response to the COVID-19 Outbreak: A Mixed Method Approach." In Journal of the Civil Engineering Forum, vol. 1000, no. 1000. https://doi.org/10.22146/jcef.60715

International Labour Organization (2020) The impact of the COVID-19 pandemic on jobs and incomes in G20 economies. ILO-OECD paper prepared at the request of G20 Leaders Saudi Arabia's G20 Presidency 2020.

Jackson, J. K., Weiss, M. A., Schwarzenberg, A.B. Nelson, R.M., Sutter, K.M. and Sutherland, M.D. (2020) "Global economic effects of COVID-19." Congressional Research Service.

Jakarta Post (2021a) What you need to know about Indonesia's newest COVID-19 restrictions, Available at https://www.thejakartapost.com/news/2021/01/14/what-you-need-to-know-about-indonesias-newest-covid-19-restrictions.html [Accessed on 08 September 2021].

Jakarta Post (2021b) 70 million informal workers most vulnerable during pandemic, Available at https://www.thejakartapost.com/news/2020/04/03/70-million-informal-workers-most-vulnerable-during-pandemic.html [Accessed on 08 September 2021].

Kaur-Gill S (2020) The COVID-19 Pandemic and Outbreak Inequality: Mainstream Reporting of Singapore's Migrant Workers in the Margins. Frontiers in Communication, 5:65. https://doi.org/10.3389/fcomm.2020.00065

Larasati, D., Ekawati, N., Triyadi, S., Muchlis, A.F. and Wardhani, A (2021). "Impact of the Pandemic COVID-19 on the Implementation of Construction Contracts." In IOP Conference Series: Earth and Environmental Science, 738(1):012075. IOP Publishing.

Lemieux, T., Milligan, K., Schirle, T. and Skuterud, M. (2020) "Initial impacts of the COVID-19 pandemic on the Canadian labour market." Canadian Public Policy 46(S1): S55-S65.

Ministry of Public Works and Housing (2020) Instruksi menteri pekerjaan umum dan perumahan rakyat Republik Indonesia No.02/1N/M/2020 tentang protocol pencegahan penyebaran corona virus disease (COVID-19) dalam penyelengaraan jasa konstruksi.

Octavia, J. (2020) "Towards a National Database of Workers in the Informal Sector: COVID-19 Pandemic Response and Future Recommendations." CSIS Commentaries.

Ogunnusi, M., Hamma-Adama, M., Salman, H. and Kouider, T. (2020) "COVID-19 pandemic: the effects and prospects in the construction industry." International journal of real estate studies 14, no. Special Issue 2. https://rgu-repository.worktribe.com/output/1000407

Olanrewaju, A., AbdulAziz, A., Preece, C. N., & Shobowale, K. (2021). Evaluation of measures to prevent the spread of COVID-19 on the construction sites. Cleaner engineering and technology, 5, 100277. https://doi.org/10.1016/j.clet.2021.100277

Olivia, S., Gibson, J. and Nasrudin, R. (2020) "Indonesia in the Time of Covid-19." Bulletin of Indonesian Economic Studies 56(2):143-174. https://doi.org/10.1080/00074918.2020.1798581

Pathirana, L. P. D. S. (2020) "Effect of COVID-19 and Strategic Response: A Review on Sri Lankan Construction Industry." SSRG International Journal of Economics and Management Studies, 7:73-77.

Prajogo, D., Sohal, A., Dewi, R.S., Dewi, D.S., Sudiarno A., Widyaningrum R., Rahman A., Maryani A., Sebastian E., and Brown H., (2021), 'Occupational

Health and Safety (OHS): Protecting the Indonesian Healthcare Workforce during the COVID-19 Pandemic', The Australia-Indonesia Centre.

Rahman, M.A., Kusuma, A.Z.D. and Arfyanto, H. (2020). Employment Situations of Economic Sectors Impacted by The Covid-19 Pandemic. Public administration, 8:3-80.

Siregar, Reza Y., Gunawan, A.H. and Saputro, A.N. (2021) "Impact Of The Covid-19 Shock On Banking And Corporate Sector Vulnerabilities In Indonesia." Bulletin of Indonesian Economic Studies 57, no. 2: 147-173. https://doi.org/10.1080/00074918.2021.1956397

Soemardi, Biemo W., and Pribadi, K.S. (2018) "Developing construction industry human resources in Indonesia: Empowering the informal construction sector foreman for the industry". Asia Construction Conference, Kuching, Malaysia.

Suryahadi, Asep, Al Izzati, R. and Suryadarma, D. (2020). "Estimating the impact of covid-19 on poverty in Indonesia." Bulletin of Indonesian Economic Studies 56, no. 2: 175-192. https://doi.org/10.1080/00074918.2020.1779390

UNICEF, UNDP, Prospera, and SMERU (2021). Analysis of the Social and Economic Impacts of COVID-19 on Households and Strategic Policy Recommendations for Indonesia, Jakarta.

Van Bavel, Jay J., Baicker, K., Boggio, P.S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M.J. etal. (2020). "Using social and behavioural science to support COVID-19 pandemic response." Nature human behaviour 4, no. 5: 460-471.

Wiebe, Franck. (1996) Income insecurity and underemployment in Indonesia's informal sector. Vol. 1639. World Bank Publications.

Woo, J. J. (2020) Policy capacity and Singapore's response to the COVID-19 pandemic, Policy and Society, 39:3, 345-362. https://doi.org/10.1080/14494035.2020.1783789

World Bank and Bappenas (2020) COVID-19 impact on firms in Indonesia, Results from the Covid-19 Business Pulse Survey, Round 2: October 2020.

World Health Organization, 2020. WHO COVID-19 Dashboard. Geneva. Available online: https://covid19.who.int/ Accessed on 07 September 2021.

Zheng, Linzi, Chen, K. and Ma, L. (2020) "Knowledge, attitudes, and practices towards COVID-19 among construction industry practitioners in China." Frontiers in public health 8: 981. https://doi.org/10.3389/fpubh.2020.599769