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PERSONAL PROTECTIVE EQUIPMENT (HAZMAT) DISTRIBUTION SYSTEM DURING COVID-19 PANDEMIC IN DKI JAKARTA

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Abstract. This research aims to know the distribution system used in distribution of PPE in Jakarta during the pandemic. A good PPE distribution system can help prevent current virus spread. This research was conducted using a qualitative approach since the researchers wanted to clearly describe the flow of distribution conducted by the Jakarta Task Force. The object of this research was the Merpati Halim PPE warehouse, which is located in Halim Perdanakusuma. Data collection techniques used in this research were interviews and observations. This research used data reduction as data analysis technique developed by Miles and Huberman. The result in this research illustrates that the distribution system conducted by the warehouse of Halim Perdanakusuma is indirect since there are many parties involved in the PPE distribution process in Jakarta.

Keywords: Distribution, distribution system, inventory, warehousing

Introduction

Indonesia has been facing the COVID-19 pandemic spread since 2nd of March 2020. This Virus was firstly identified in Wuhan, China. This corona virus includes a new type of pre-existing SARS virus. The new type Corona Virus, SARS-CoV2, has infected more than 200,000 people in 152 countries within less than 3 months.

According to the Head of the Emerging disease Unit and Zoonosis WHO Dr. Maria Van Kerkhove, the spread of this corona virus can be through droplets, or a little fluid, mostly through sneezing or coughing. After the virus spread to various countries, on March 11th, 2020 the WHO officially announced that COVID-19 was categorized into a pandemic (Culp, 2020).

Personal Protective equipment (PPE) plays a crucial role for medical personnel who are leading the forefront of handling the COVID-19 case. According to *PERATURAN MENTERI TENAGA KERJA DAN TRANSMIGRASI REPUBLIK INDONESIA NOMOR PER.08/MEN/VII.2010* Personal Protective Equipment (PPE) is a tool that has the ability to protect a person which functions as isolator or protector throughout the body from potential hazards in the workplace.

The PPE is very important in the supplies owned by the hospital. (Ding & Zou, 2016) The core activity of the distribution is the process of consolidating goods, sorting and shipping of distribution vehicles. Distribution activities can also be attributed to humanitarian logistics activities, in previous research (Hidayat et al., 2017) distribution is an activity process outbound and logistics allocation and items from warehouse to be given to people who are eligible, through a process handover and can be accounted for. This is done on request according to the need for disaster mitigation.

In conclusion, distribution is the process of consolidating goods, sorting and delivering from warehouses to send to the right people, through the handover process that can be reckoned. In distribution activity there is a distribution system that is very responsible for the smooth distribution process, in its research (Ali et al., 2012) says that the distribution system is a complex network and configurations are designed to have a direct connection to the operation and performance. In his research (Kersting, 2016) said the distribution system was usually

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started with the distribution substance supplied by one or more sub-transmission lines. According to (Hübner et al., 2016), advanced distribution system is usually marked with the source (location of reception), destination (place of acceptance) and which connects it. The conclusion of the distribution system is a complex distribution network and can be marked by the source, destination, and that connect it.

(Sajidin & Wahyuningsih, 2019) argued that warehousing or warehouse is an area which serves to store goods for production or finished goods with a period of time, which will be distributed to the destination location according to the request. (Haslindah et al., 2017) said that warehouse is important because the warehouse is a storage place for any goods required by the company, so it can be analogous that the warehouse is the center where all goods are collected and start point for goods to be distributed to retailers or directly to consumers. (Nasim et al., 2016) said, basically warehousing concerns all activities regarding physical control of the inventory, usually in the form of finished goods. In our opinion, warehouse is very important because the warehouse is a place to store goods or goods needed by the company. Warehouse is the center where all the goods are collected and the starting point for the goods to be distributed.

Warehouse activities are also very closely related to the supplies of the goods. (Shenoy & Rosas, 2017) defines supplies as stock or goods used to support production (raw materials and semi-finished goods), supporting activities (maintenance, repair and operation equipment), and customer service (finished goods and spare parts). (Sharma & Arya, 2016) supplies are defined as a list of goods and materials available in stock for business. In inventory accounting it is considered an asset. (Lianga, 2013) Inventory-related factors include inventory checking, input/output confirmation of goods and booking management. In conclusion, Inventory is a list of items or goods stored in the warehouse.

This study focuses on the distribution system of PPE in Jakarta which is very important for the continuity of the handling of COVID-19 to protect the medical personnel from the exposure of Corona virus directly.

Method

The basic methods used in this study were qualitative methods. (Umanailo et al., 2019) interpret qualitative method as a certain tradition in social sciences, fundamentally it is the observation of man in the relationship between the people. The data collection techniques used were interviews and observations. This research was conducted in the warehouse of Covid-19 task force located in GOR Merpati Halim and became the largest PPE storage center in Indonesia for the handling of Covid-19.

Interviews are face-to-face conversations between interviewers and interviewee. The purpose of the interview is that the interviewer wants to get information from the person interviewed. This research collected data with structured or unstructured interviews. In this case the informant must have the capability and competence in regards to the distribution system of the PPE.

Observation is a data collection activity through observations conducted on a field activity, which can obtain an information that can help the research being made. In this case the observable party should pay attention to an activity carefully in order to obtain accurate information.

Data Analysis techniques used in this research using data reduction (Lis Lesmini, Raden Didiet Rahmat Hidayat, Mohammad Iqbal Firdaus, 2017) developed by Miles, Huberman and Saldana (2014) which include (after data collection) data reduction, the separation of data from data that is not needed, to be more conical, indicating the pattern of the data.

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Discussion and Result

1. PPE Inventory

   At the beginning of the task force, PPE supplies were initially imported from several countries with procurement flows passing through several stages as well as several institutions. In addition to imports, supplies were also obtained from PT. ING and PT. Jewel on March 22, 2020. The import of the PPE becomes an initial inventory that complies with the standards set by the WHO.

   Furthermore, PPE supplies are obtained from several factories in Indonesia, but the raw materials of the PPE are imported from PT. Boho (China) and PT. Kaltex (South Korea) because of the characteristics of the material in accordance with the standards given by the WHO. These PPE factories are located in Bandung, Cimahi, Depok, Malang, and others.

   Since March 25th, 2020 the Halim Perdanakusuma Warehouse, SOETA BNPB Warehouse, and KEMENKES warehouse have been receiving the goods and have reached the target of the government program in the procurement of PPE as much as 5 millions hazmat. The Government is conducting the procurement of Phase 2 PPE which is still in progress until now.

Table 1. Medical Supplies

MEDICAL EQUIPMENT DISTRIBUTION MERPATI HALIM – As Per July 13th, 2020	
PPE (PERSONAL PROTECTIVE EQUIPMENT)	**4,090,450**
GOGGLES	**3,000**
SURGICAL MASK	**812,884**
N95 MASK	**26,390**
RAPID TEST	**285,000**
MEDICAL GLOVES	**318,300**

Source : BNPB

The table 1 shows the total of the medical devices distributed from Halim Perdanakusuma warehouse throughout Indonesia.

The Government also performs several actions to fulfill the PPE supplies, in which the government publishes some provisional regulations as follows:

1) *PERATURAN MENTERI PERDAGANGAN REPUBLIK INDONESIA NOMOR 23 TAHUN 2020*
   About temporary prohibition of antiseptic exports, mask raw materials, personal protective equipment, and masks

   PERATURAN MENTERI KEUANGAN REPUBLIK INDONESIA NOMOR 171/PMK.04/2019

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On the exemption of import duty on imports of goods by central Government or local government, which is shown for the public interest, this regulation is strengthened by the *PERATURAN MENTERI KEUANGAN REPUBLIK INDONESIA NOMOR 34/PMK.04/2020*, which discusses the provision of customs and excise facilities and taxation on imports of goods for the purposes of handling pandemic COVID

2. *PPE Warehousing*
The PPE Warehouse Center which has most of the most PPE supplies in Indonesia is located at the Halim Perdanakusuma warehouse. This warehouse can be categorized as an emergency warehouse, because there is a change in functions from sport venue into PPE warehouse. Inventory in this warehouse is distributed throughout the region in Indonesia.

This warehouse has no special layout, in addition to the absence of special layouts, this warehouse also uses tools in inbound and outbound processes such as hand pallet. The placement of the PPE supplies is done by stacking the boxes in a multi-storey, to facilitate the inbound and outbound processes carried out in the warehouse.

Packaging from PPE is considered to protect the PPE from damage and maintain the quality of the PPE. The packaging consists of 2 layers, boxes or cardboard that become the outer packaging and plastic as an inner packaging PPE. With the packaging of the PPE such as warehouse party does not provide special handling in the inventory of PPE.

To maintain the safety of the warehouse, the warehouse located in Halim Perdanakusuma is guarded by military Police (POM) 1 team guard for 24 hours after that was made the team turnover. It is the care of the military police in order to safeguard the goods of any kind of loss or unwanted things.

3. *PPE Distribution*
The initial distribution took place on 22 March 2020, PPE was obtained from PT. ING and PT. Permata as many as 5,000 boxes with a total of 100,000 PPE units. PPE obtained was directly distributed to DKI Jakarta, West Java, and Central Java because at that time, the three provinces had a lot of patients and lacked the preparation of the PPE for the medical personnel who had direct contact with the Covid-19 patients.

Some of the PPEs do not meet the standards of the WHO. PPEs that do not meet standards are not distributed to medical personnel who care for Covid-19 patients, but are distributed to needy communities. For example, those who spray disinfectant for public benefit.

In the distribution of PPEs, there are several parties involved. The parties involved in the distribution are the Halim Perdanakusuma warehouse, SOETA BNPB warehouse, and Ministry of Health warehouse. From the three PPE warehouses, the PPEs are sent/distributed to the health Office per district, then the health service distributes to the hospitals in need which have been listed by the Ministry of Health.

Distribution to several areas was hampered because the area had first shut down the region and the prohibition of the ship in (before PSBB). With this policy, there was a barrier to the distribution of PPE through sea lanes that became the main choice in distributing the PPE to several regions in eastern Indonesia. For example, the study of the PPE to Papua was hampered because the carrying vessel was suspended in the Makassar area. The sea-route selection was because the limitations of the AU aircraft (at that time Air transport was dismissed except for Air Force transport). Unlike the

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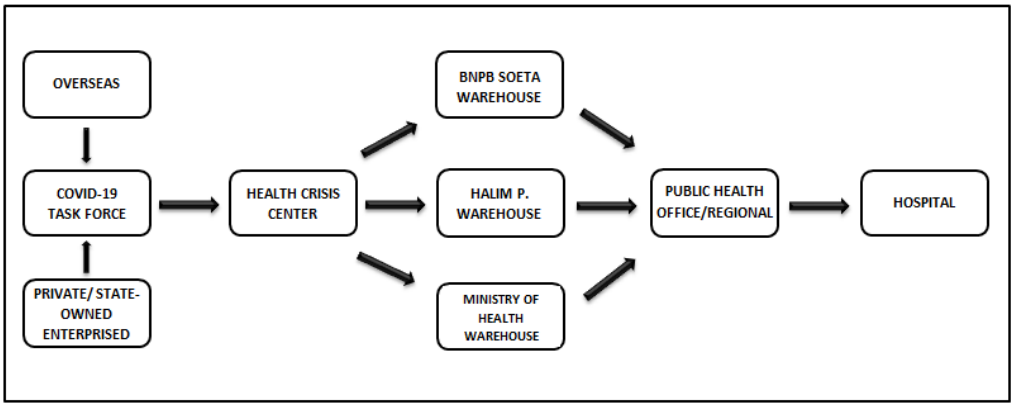
distribution of PPE in Jakarta which remains effective despite the inclusion of large-scale social restrictions (PSBB).

The number of PPEs distributed to the area is adjusted to the number of patients in an area. In Java Island, distribution of PPE is adjusted to the minimum standard of PPE for 1 patient. However, when distributing outside Java will usually be units that will be distributed in order to distribute the distribution to be effective and efficient (pressing cost).

Figure 1. Total PPE distributed in Jakarta



Source: BNPB

Figure 1 shows the map of PPE distribution in Indonesia. We can see the total personal protective equipment distributed to referral hospital in Jakarta is 700.533 units. The referral hospitals which get the PPE are Sulianti Saroso Hospital, Persahabatan Hospital, Fatmawati Hospital, Gatot Subroto Hospital, Mintoharjo Hospital, bhayangkara Hospital, Tarakan Hospital, Cengkareng hospital, Pasar Minggu Hospital, Koja Hospital, Pertamina Jaya Hospital, Duren Sawit Hospital, and Pelni Hospital.

Conclusion

The largest PPE warehouse center in Indonesia is located in Halim Perdanakusuma Warehouse, the PPE supplies are obtained through grants from various parties, both grants from abroad and in the country. In addition, supplies are also obtained by making purchases to factories in Indonesia using imported materials from Korea.

Figure 2. Distribution Flow

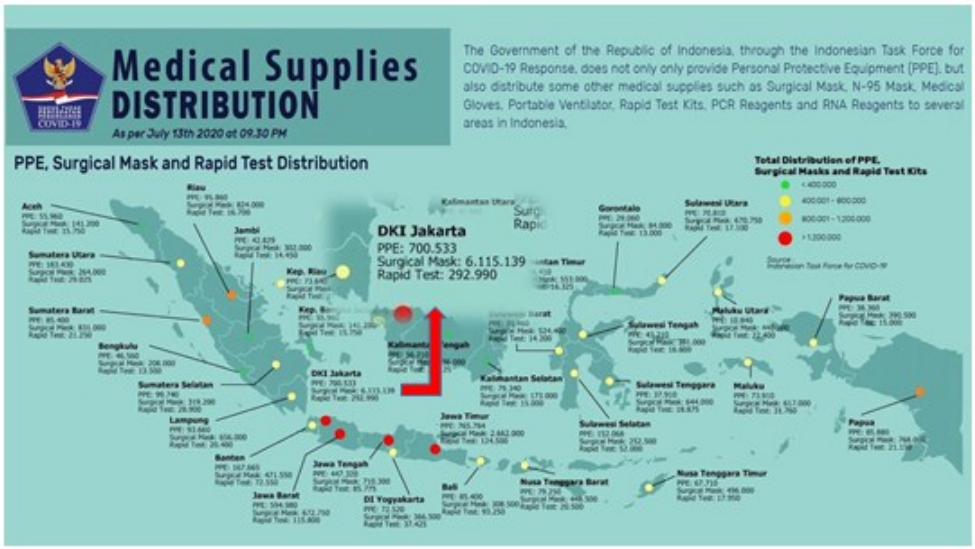


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Figure 2 describes the distribution system used in the distribution of PPE (Hazmat). The distribution system shows an indirect distribution system because it involves several parties. Where the distribution is started from COVID-19 Task Force get PPE (Hazmat) from abroad or private company/BUMN then send it to the Health crisis center and sent directly to the warehouse. Special inventory of Hazmat precedence to the warehouse of Halim Perdanakusuma, which is the central warehouse for Hazmat. In the warehouse PPE Halim Perdanakusuma (Hazmat) is stored and started to be distributed to the district Health Department, then the Regional health department sends a PPE (hazmat) to the hospital that requires PPE (HAZMAT) for the treatment of Covid-19 patients.

Limitation

In this research with limited time, energy, and data obtained, the discussion is limited in the scope of the PPE distribution system in the Halim Perdanakusuma Warehouse distributed to the referral hospitals located in Jakarta to face a COVID-19 pandemic in 2020.

References

Ali, I., Thomas, M. S., & Kumar, P. (2012). Effect of loading pattern on the performance of reconfigured medium size distribution system. *2012 IEEE 5th Power India Conference, PICONF 2012*. https://doi.org/10.1109/PowerI.2012.6479503

Culp, W. C. (2020). Coronavirus Disease 2019. *A & A Practice*, *14*(6), e01218. https://doi.org/10.1213/xaa.0000000000001218

Ding, D., & Zou, X. (2016). *The Optimization of Logistics Distribution Route Based on Dijkstra's Algorithm and C-W Savings Algorithm*. *Mmebc*. https://doi.org/10.2991/mmebc-16.2016.200

Haslindah, A., Fadhli, M., Andrianto, & Mansyur, R. (2017). Pengaruh Implementasi Warehouse Management System Terhadap Inventory Control Finish Good Berbasis Barcode Pt . Dharana Inti Boga. *Jural ILTEK*, *12*(24), 1760–1763.

Hidayat, R. D. R., Firdaus, M. I., & Lesmini (STMT Trisakti), L. (2017). PENGELOLAAN GUDANG LOGISTIK KEMANUSIAAN BNPB. *JURNAL MANAJEMEN INDUSTRI DAN LOGISTIK*. https://doi.org/10.30988/jmil.v1i2.21

Hübner, A., Holzapfel, A., & Kuhn, H. (2016). Distribution systems in omni-channel retailing. In *Business Research* (Vol. 9, Issue 2). https://doi.org/10.1007/s40685-016-0034-7

Kersting, W. (2016). Distribution System Modeling and Analysis, Third Edition. In *Distribution System Modeling and Analysis, Third Edition*. https://doi.org/10.1201/b11697

Lianga, C. C. (2013). Smart inventory management system of food-processing-and-distribution industry. *Procedia Computer Science*, *17*, 373–378. https://doi.org/10.1016/j.procs.2013.05.048

Lis Lesmini, Raden Didiet Rahmat Hidayat, Mohammad Iqbal Firdaus, J. K. L. (2017). the Role of Railway Integrated Distribution Centers. *Proceedings of the Conference on Global Research on Sustainable Transport (GROST 2017)*, *147*(Grost), 36–46.

Nasim, S., Maaz, S. M., Ali, F., & Khan, M. A. (2016). *Inventory Management through Lean Logistics and Warehousing Techniques Author ' s Details : Research Methodology Strategic Development of Lean logistics*. *10*, 159–171.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Sajidin, R., & Wahyuningsih, D. (2019). *PENGARUH PENERAPAN WAREHOUSE MANAGEMENT SYSTEM TERHADAP PELAYANAN PELANGGAN PADA PT PESAKA LOKA KIRANA*. *05*(02).

Sharma, A., & Arya, V. (2016). Study of Inventory Management in Manufacturing Industry. *International Journal of Advanced Engineering and Global Technology*, *04*(03), 2012–2021.

Shenoy, D., & Rosas, R. (2017). Problems and solutions in inventory management. *Problems and Solutions in Inventory Management*, *2015*, 1–283. https://doi.org/10.1007/978-3-319-65696-0

Umanailo, M. C. B., Hamid, I., Nawawi, M., Pulhehe, S., Yusuf, S., & Bon, A. T. (2019). Utilization of Qualitative Methods in Research Universities. *Proceedings of the International Conference on Industrial Engineering and Operations Management*, *August*, 2076–2081. http://ieomsociety.org/pilsen2019/papers/571.pdf