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Analysis of courier needs for platelet concentrate transportation from the blood transfusion unit of the Indonesian Red Cross: perspective of Universitas Indonesia Hospital's blood bank

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ABSTRACT

Background: An unexpected surge in platelet concentrate requests at Universitas Indonesia Hospital during March 2025 created substantial operational challenges for the hospital's blood bank. At the time, the blood bank faced limited courier availability and the absence of a platelet agitator, resulting in increased courier dispatches to retrieve blood components from the Indonesian Red Cross Blood Transfusion Units (UTD PMI). This study aims to analyze the courier needs and to find the optimal timing for the transport of blood products to Universitas Indonesia Hospital

Methods: A descriptive observational study was conducted by extracting information from the courier communication group (messenger application) and the official blood product logbook of Universitas Indonesia Hospital Blood Bank for the period of March 2025. Data collected included frequency and timing of courier departures, destinations, and types of blood products transported. To strengthen operational analysis, an additional two-week onsite observations were conducted in April 2025 to identify logistical bottlenecks, evaluate workflow, and perform a structured risk analysis based on problem frequency and potential operational impact.

Results: A total of 38 courier trips were recorded in March 2025, averaging 1.6 trips per day. Most dispatches occurred during 20:00–23:59 and 12:00–15:59, which did not align with the designated courier support schedule for the blood bank. Increased platelet concentrate demand was the primary factor driving transport frequency. Risk analysis highlighted three major concerns: lack of systematic documentation of courier trips, insufficient courier human resources, and unavailability of a platelet agitator, which prevented appropriate storage of platelet components and increased transport dependency.

Conclusion: Corrective actions implemented included reinstating courier trip documentation, recommending time adjustments for courier assignments to better match peak operational needs, and proposing recruitment of additional couriers. Procurement of platelet agitators was also advised to improve storage capacity and reduce transport frequency.

Keywords: Blood Products, Hospital Blood Bank, Platelet Concentrates, Courier Logistics, Transportation Management.
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INTRODUCTION

Universitas Indonesia Hospital is an academic medical center situated within the University of Indonesia campus in Depok, Indonesia. The hospital functions as a facility for teaching, research, and healthcare services for the University of Indonesia, which includes medical laboratory operations and blood banking services.[1] The laboratory system at Universitas Indonesia Hospital utilizes an "integrated laboratory" model, where Clinical Pathology, Anatomical Pathology, Clinical Microbiology, Clinical Parasitology, the Biomolecular Laboratory, and the Hospital Blood Bank are organized under a single department and located in proximity. This integrated approach is designed to support the delivery of comprehensive and high-quality laboratory services.[2,3]

The Hospital Blood Bank serves as a unit responsible for ensuring the availability of safe and high-quality blood products for patients. Its duties encompass receiving, storing, distributing, tracking, and auditing transfusion products in accordance with applicable regulations. The blood bank also performs crossmatching, refers complex blood typing or crossmatching cases to Blood Transfusion Units, monitors transfusion reactions or other adverse events, and manages the return of non-compliant blood components.[4,5]

Blood products are vital to healthcare but are highly susceptible to degradation, making efficient transport and courier management essential.[6,7] Effective blood product transportation requires proper selection of transport methods, well-planned routing, and the use of technological support. To achieve this, information on operational costs, distance to Blood Transfusion Units, transport mode availability, courier capacity, and infrastructure readiness is necessary. Optimizing these factors can improve

Table 1. Identification and priorities of the problems during the observation period

No	Potential Problems	Potential Causes of Problems	Probable Consequences	Risk Analysis			Risk Level
				Probability Levels (a)	Consequence Levels (b)	(a x b)	
1	Unavailability of the drivers (couriers) trip report. Last reported in 2023	Increased workloads of blood bank staff, increased requests for blood products for Universitas Indonesia Blood Bank, lack of emphasis on the importance of courier trip reporting	Difficulties in obtaining data concerning the time and frequency of the courier's departure to the Blood Transfusion Unit of the Indonesian Red Cross	4 (frequent)	4 (high)	16	5 (very high)
2	Inadequate number of couriers (drivers) to assist the hospital's blood bank	Limited funds for workforce recruitment	Increased workloads for couriers and possible delays in the delivery of blood products to Universitas Indonesia Hospital	3 (not frequent)	3 (intermediate)	9	3 (intermediate)
3	Inability to store platelet concentrate in the hospital blood bank due to the unavailability of a platelet agitator	The sharp increase in the requests for platelet concentrates just occurred last month, and the lack of funding for the purchase of a platelet agitator	Decreased quality of platelet concentrates due to inappropriate storing conditions, and unavailability to store platelet concentrates for emergency & unprecedented purposes	2 (very unlikely)	2 (low)	4	2 (low)

supply chain efficiency by shortening delivery times, reducing costs, and enhancing user satisfaction.[6-8]

Platelet concentrates are among the most critical blood components, requiring storage at 20–24°C with continuous agitation using a platelet agitator. In March 2025, Universitas Indonesia Hospital experienced a steep rise in platelet concentrate requests. This increase created challenges due to the absence of a platelet agitator in the Hospital Blood Bank and a limited number of available couriers, who also serve simultaneously as ambulance drivers. Based on those mentioned above, this study aims to evaluate courier needs and determine optimal scheduling for transporting blood products from the Indonesian Red Cross Blood Transfusion Units to Universitas Indonesia Hospital, based on courier trip records and platelet concentrate demand.

METHODS

The authors conducted an observation in Universitas Indonesia Hospital Blood Bank for two weeks from 8 to 22 April 2025. During the observation period, the authors identified and inventoried problems in the courier and transport of blood products in the hospital blood bank. The issues were then analyzed so that they could be sorted according to the priority level, and it is expected that this risk analysis can assist in making necessary managerial decisions for improvement. During the risk analysis, the problems identified during observation were given a score based on the frequency of their occurrence and the impact of the consequences that may arise from those problems. The greater the frequency and effect, the higher the score given to the issues during the risk analysis process. The result of the risk analysis is listed in Table 1.

The first problem identified is the unavailability of the drivers and couriers' trip reports since 2024. This finding is thought to be caused by an increase in the workload of the staff and rising blood product requests in Universitas Indonesia Hospital Blood Bank. Lack of compliance in making drivers and couriers' trip reports also worsens this problem. An inadequate number of available couriers also became a significant finding in the observation. This problem may cause an increase in the couriers' workload and a risk of delayed distribution of blood products. At the same time, the blood bank couriers also serve as ambulance drivers for Universitas Indonesia Hospital. During each shift (three shifts in a day: Morning, afternoon, and night shift), there is one courier assigned for the delivery of blood products.

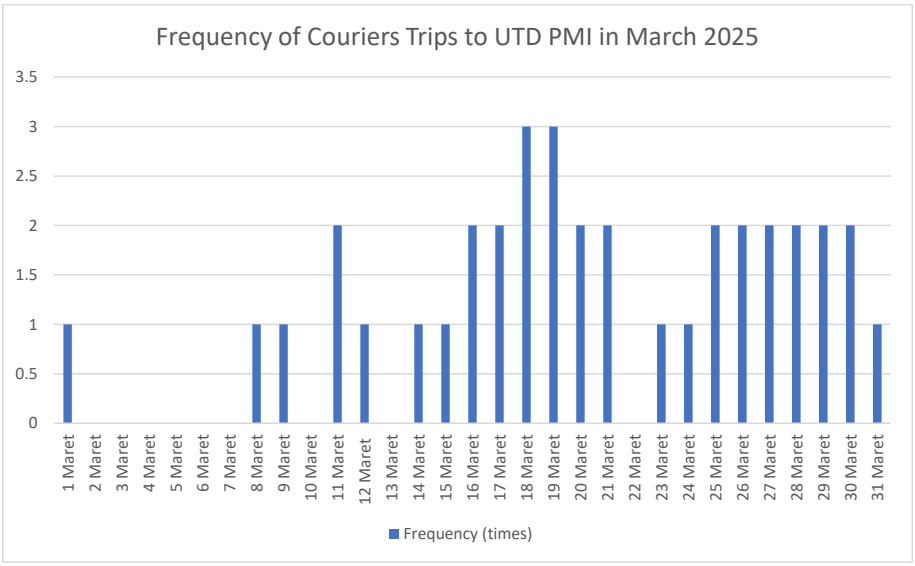

Figure 1. Frequency of couriers' trips to UTD PMI during March 2025.

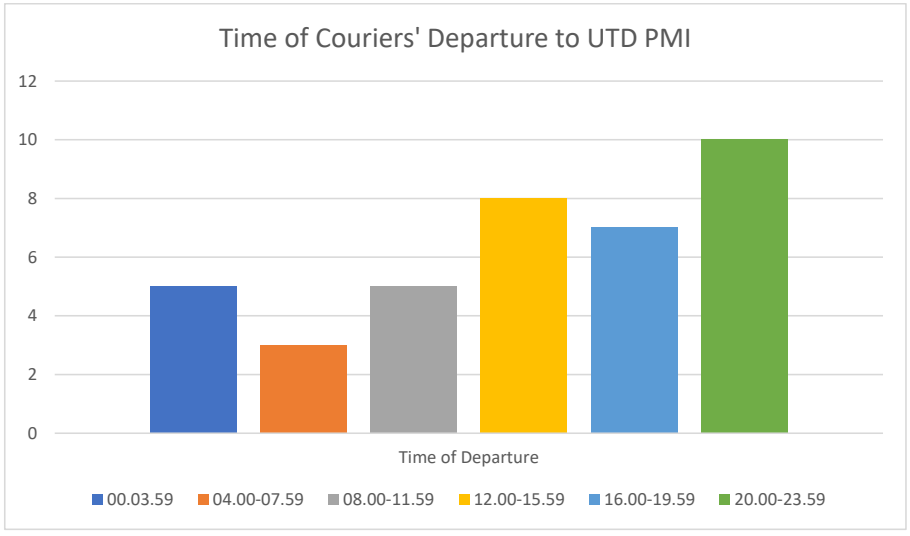

Figure 2. Time of couriers' departure to UTD PMI.

In early April 2025, two ambulance drivers were assigned to serve in the hospital managerial affairs transport team so that they could no longer help in the delivery of blood products to the hospital blood bank. In late April 2025, due to the limited availability of drivers, the sending of drivers to the Blood Transfusion Unit of Indonesian Red Cross (UTD PMI) was limited to just two shifts in a day: 08.00-10.00 in the morning and 21.00-23.00 in the evening. This worsens the existing problem of limited couriers for the blood products. Limited financial allowance for workforce recruitment causes this courier shortage.

Another problem identified is the absence of a platelet agitator in Universitas Indonesia Hospital Blood Bank. This problem is caused by a limited budget for the purchase of platelet agitators. This absence of a platelet agitator made it impossible to store platelet concentrate products in the blood bank. Platelet concentrates can only be maintained for 24 hours at room temperature in the blood bank without agitation since they were dispatched from their respective UTD PMI. In March 2025, the request for platelet concentrates increased sharply, so the need for couriers also increased. In the times when the request for platelet concentrates was not increased, no problem was encountered in the delivery of platelet concentrates.

RESULTS

During the observation period, a recording of couriers' trips during March 2025 was conducted to obtain the data concerning the frequency and the timing of couriers' departures to UTD PMI. Recordings were conducted by tracking the couriers' trip records in the *WhatsApp* messenger application communication groups and the record book for the blood products dispatched from Universitas Indonesia Hospital Blood Bank. The data from the record book provided the details regarding blood products, the courier responsible for the transport from their respective UTD PMI, and the time of the dispatchment from the hospital blood bank to help double-check the information obtained from the messenger communication group. During March 2025, there were 38 courier trips to UTD PMI. Since March 8-31, there were an average of 1,6 trips every day, with the frequency distribution illustrated in Figure 1.

From the analysis, it was identified that the number of courier trips to UTD PMI increased approaching the end of March 2025. The purpose of the trips was mainly to transport platelet concentrates. One trip each on the 18th and 28th of March was to take blood products requests forms and deliver samples for the Coombs test. In March 2025, there were 146 requests for platelet products in Universitas Indonesia Hospital Blood Bank. From the analysis, we also identified the timing of couriers' departure to UTD PMI, as displayed in Figure 2.

It was found that the couriers' departure to the respective UTD PMI occurred during the evening (20.00-23.59), followed by the afternoon (12.00-15.59) and later (16.00-19.59). The most frequent UTD PMI visited by the couriers is the one in South Jakarta (UTD PMI Jakarta Selatan), as displayed in Figure 3.

DISCUSSION

During the observation period, it became evident that the hospital lacked documented records of couriers' trips to UTD PMI. The absence of these records created difficulties in gathering essential information on the transport of blood products to Universitas Indonesia

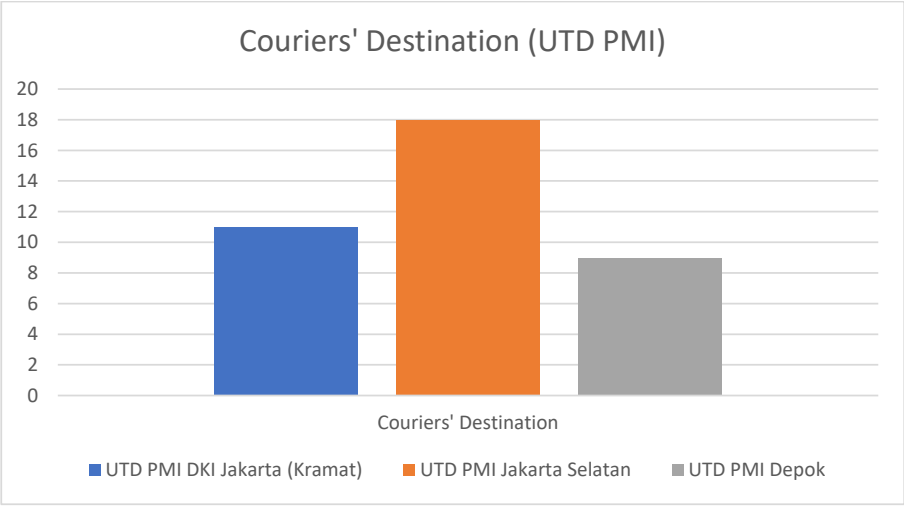

Figure 3. Indonesian Red Cross Blood Transfusion Units were visited by the couriers to take blood products.

Hospital, which is required for making informed managerial decisions. As stipulated by the Indonesian Ministry of Health, hospital blood banks must maintain documentation of blood product requests and receipts from UTD PMI, clinician requests for blood components, results of pre-transfusion testing, distribution and dispatch of blood products, transfusion reactions, and the return of unused products.[4] Although RSUI's blood bank already adheres to these mandatory requirements, data regarding courier departures and destinations, crucial for optimizing transport efficiency and reducing courier frequency, are not currently regulated and therefore were not available.

To address this deficiency, courier trip data for March 2025 were retrospectively compiled, and the blood bank was instructed to begin prospective documentation starting in April 2025. A total of 38 courier trips to UTD PMI were recorded in March, most of which involved transporting platelet concentrates to Universitas Indonesia Hospital. The majority of these trips occurred from mid- to late March. Analysis of departure times showed that most courier trips took place in the evening (20:00–23:59), followed by the afternoon to early evening period (12:00–19:59). However, from 21 April 2025 onward, courier support was limited to only two scheduled shifts, 08:00–10:00 and 21:00–23:00, resulting in a misalignment between courier availability and peak demand, potentially hindering requests made outside these designated hours.

Operationally, hospital blood banks are required to establish cooperation agreements with blood transfusion units, encompassing support for meeting blood product needs, return of damaged or near-expiry units, and collaboration during periods when the hospital blood bank cannot meet transfusion demands.[4,5] Universitas Indonesia Hospital currently has agreements with UTD PMI Depok and UTD PMI Kota Tangerang for blood product deliveries, and with UTD PMI Jakarta Selatan and UTD PMI DKI Jakarta for blood services and testing. The hospital may consider negotiating expanded support from these UTD PMIs, such as including platelet concentrate transport in routine delivery schedules.

Another issue identified was the insufficient number of couriers available to support the blood bank's transport requirements. Only four couriers are assigned to cover three daily shifts, with one courier per shift. As platelet concentrate requests increase, the corresponding transport workload also rises, placing additional strain on the limited courier workforce and potentially compromising performance due to fatigue.

Data indicate that the demand for platelet concentrates in March 2025 exceeded that of January and February, with a similar trend observed in 2024, where usage increased in March and April. This seasonal rise may be linked to heightened clinical interventions or a surge in dengue fever cases during periods of increased rainfall, leading to thrombocytopenia and greater demand for platelet transfusion.

Recruiting additional couriers would be an ideal solution, and options such as freelance or short-term contractual staff during high-demand months (e.g., January to April) could be considered. If recruitment is not feasible, reorganizing courier schedules may help align availability with peak transport needs. The mismatch between transport demand and courier assignment hours underscores the need for such adjustments.

A revised schedule, such as allocating courier assistance during 12:00–14:00 and 21:00–23:00 based on March 2025 peak activity, may be beneficial. Before implementing any new schedule, an up-to-date analysis of current transport demand patterns is required, followed by a discussion with hospital leadership to support informed policy changes.

At present, platelet concentrates can only be stored at room temperature in the blood bank due to the lack of platelet agitators. Regulations mandate that platelet products be stored at 20–24°C with continuous agitation; without this, they are in a transport state and can only remain viable for up to 24 hours.[5] Acquiring a platelet agitator would allow proper storage, improve emergency readiness, and decrease reliance on frequent transport from UTD PMI. Prior to procurement, organizational and financial evaluations should be conducted. Emphasizing operational adjustments and cost-efficiency measures before pursuing equipment purchases or workforce expansion may reduce long-term costs and bureaucratic delays.

Strategic adjustments, such as optimizing courier schedules, modifying shift structures, or strengthening cooperation with transfusion units, are particularly valuable for health facilities in remote regions or in areas with logistical challenges due to natural disasters or socioeconomic instability. These approaches can reduce transport frequency and enhance efficiency. Such measures are also relevant for hospitals

with limited financial resources or complex administrative pathways, including public or smaller private facilities. In contrast, larger urban hospitals may find it easier to recruit additional staff and procure equipment such as platelet agitators.

CONCLUSION

The observation conducted in the hospital blood bank in April 2025 identified three main issues concerning the transport of blood products: The absence of the recording of couriers' trips to blood transfusion units, limited courier availability, and the absence of platelet agitators for the storage of platelet concentrates. Corrective actions conducted include restarting the recording of couriers' trips, evaluating couriers' assignment schedules, and suggesting the purchase of supporting instruments. Adjustment to courier schedules, working shifts, and cooperation with blood transfusion units may lead to decreased frequency of blood product transport and increased efficiency in the transport process. These steps are helpful, especially in healthcare facilities where workforce recruitment and equipment procurement are challenging.

ETHICAL CONSIDERATIONS

This observational study did not involve sensitive data and did not involve human or animal subjects. Hence, ethical approval was not applicable.

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CONFLICT OF INTEREST

The authors have no conflict of interest.

Author Contributions

Each author contributed equally during the study conceptualization, data acquisition and analysis, composing, and supervising this manuscript.

REFERENCES

1. Rumah Sakit Universitas Indonesia. Mengapa RSUI [Available at: https://rs.ui.ac.id/umum/tentang-rsui/mengapa-rsui] [Accessed at: 25 April 2025].
2. Rumah Sakit Universitas Indonesia. Laboratorium, [Available at: https://rs.ui.ac.id/umum/layanan/laboratorium] [Accessed at: 25 April 2025].
3. Rumah Sakit Universitas Indonesia. Keputusan Direktur Utama Rumah Sakit Universitas Indonesia Nomor 117/SK/DIRUT/RSUI/2020 tentang Pedoman Pelayanan Laboratorium Terpadu. 117/SK/DIRUT/RSUI/2020, Depok. 2020.
4. Menteri Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 83 Tahun 2014 tentang Unit Transfusi Darah, Bank Darah Rumah Sakit, dan Jejaring Pelayanan Transfusi Darah. Jakarta: Kementerian Kesehatan Republik Indonesia, 2014.
5. Menteri Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 91 Tahun 2015 tentang Standar Pelayanan Transfusi Darah. Jakarta: Kementerian Kesehatan Republik Indonesia, 2015.
6. Rusman M, Mulyadi M, Mudiastuti RD. Perencanaan optimasi distribusi darah di kota Makassar. In: Seminar Nasional Teknik Industri BKSTI. Hasanuddin University Repository. 2014.
7. Sied A. A study on essential of effective transportation system for supply chain efficiency, cost reduction and enhancing customer satisfaction. *Global Scientific Journals*. 2024;12(5):8-13. doi:10.5281/zenodo.11124157.
8. Mandagiri DR, Nazaruddin N, Nur M. Optimalisasi rute kendaraan menggunakan metode saving matrix sebagai penentuan rute distribusi darah di UTD PMI Kota Pekanbaru. Jurnal Perangkat Lunak. 2025;7(1):21–31. doi:10.32520/jupel.v7i1.3729.

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