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UNDERSTANDING THE LINKAGES OF BEHAVIOURAL OBSERVATION AND HEALTHY URBANISM IN DR. SOETOMO HOSPITAL'S PUBLIC SPACE, SURABAYA

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ABSTRACT

Activities and behaviours occurred in the street become the main factors to determine healthy public space. Especially for hospital area that has special requirements and treatments. However, planners often neglecting the healthy concept in the neighbourhoods and public space, focusing on the internal hospital only as a place for curing illness rather than prevent or decreasing appearance of diseases by healthy lifestyle and environments. The emergence of activities in the street with minor consideration on healthy urbanism will lead to many problems, including congestion, less safety and security, decreasing environmental quality, and reducing accessibility for patients. Hence, holistic approach on social and physical factors are needed to overcome the issues and improving the use of space in the hospital zone. This research used direct observation and mapping to understand human behaviour and interaction within the space. The intention of this paper is to conduct an in-depth field observation of accessibility, behavioural and activity patterns in the hospital area street in Surabaya and to better understand the linkages between public health and urban design. This study can benefit to encourage the successful and vibrant public space that are accessible, safe, sustainable and environmentally comfortable to promote a healthy and successful city.

INTRODUCTION

Dr. Soetomo hospital located at Surabaya city and classified as hospital type/class A[(1)]. It main function was medical service, and secondary function as education/training hospital, highest referral centre for the east region. Because of the completeness of the facilities provided, areas around the hospital developed alongside the expansion of Dr. Soetomo hospital.

Figure 1Study case location, RSUD Dr. Soetomo with its various facilities nearby: yellow dots indicates the research area, blue is education facilities, purple means government public facilities, green shows the public parks, whites are the study areas, while navy stated the commercial area such as shopping mall and hotels. (Google map, 2017)

In Figure 1, it was seen Dr. Soetomo hospital surrounded by many facilities which support the main function as medical care. Most encountered were facilities for the patient's families, hospital employee such as accommodation, laundry, and pharmacy. The location strategically placed between Dharmawangsa Street and Prof. Dr. Moestopo Street, which allows easy access for the locals or people outside of the town. Community and newcomers saw this phenomenon as opportunity to gain economic advantages.

Figure 2Condition of the public space shows: orange as misuse of the space such as unavailability of sitting area, illegal pedestrian crossing, and hawker'scentred location. While blue indicates traffic jams as a consequence, and red shows the destroyed public properties (Observation, 2017)

Looking at the public interest towards the attractiveness of health facilities, the local government creates a marketing strategy, stating Surabaya as a destination for health tourism[2]. Despite the ambitious vision, the development of facilities and public space around the hospital were not accompanied with strategic planning nor design. Some of them were difficulties in accessing facilities for the patient and the visitors, degradation of the public space qualities, and damages in street furniture provided (see Figure 2).

Furthermore, the death in Indonesia mostly were caused by lifestyle which were inadequate in terms of mental and condition of environment around the patient. Cardiac diseases, such as stroke and heart disease, were gradually increasing, while infectious diseases such as diphtheria, tetanus or TBC were essentially eliminated[3]. Architects and planners has always been proposed new urban solutions to challenge lifestyle diseases with walkable and cycling system on daily basis [4].

Current research shows that the people's overall health (physical and mental) has strong links with the regular physical activity[5]. People dependence on car, sedentary lifestyles,in their neccessity daily life were significant contributing factors to the deteriorating state of healthy living [6]. Hence, encouraging active travels (mainy walking and cycling) approach on urban design was needed to increase the level of physical activities[7]. There was growing evidence that attractive, well-designed public open space was restorative, reducing mental fatigue and stress[8].As the city's street network faces increasing pressure from an expanding population and private transportation, the public health promoting, with inclusive transport system, requires safer and easier walking and cycling for all elements of people, better public spaces, and cleaner environment[9].

Process in designing the city was a crucial aspect to create place where the qualities of people life could be increased, especially around the hospital area. Thus, boundaries between the provider of health services (hospital) and the environment should be vague and integrated[10; 11]. On the contrary, areas around Dr. Soetomo hospital were having environment declines which creates difficulties to patient, visitor, and the local communities[12].Some of the problems were traffic jam, drops on greeneries quality, defamation at some of the facade and facilities, along with decrease in public space's function.

Therefore, a research responding to healthy urbanism aspects happening at Dr. Soetomo public space was necessary to create holistic design approach which suitable for the characteristic and needs of the hospital public space. The engagement of human activities and ease of accessibility, which tells the character of a place, were the main components contribute to the healthy place[13; 14]. Consequently, there was an urgent need to understanding on the health as part of the decision-making in public space design which lead to a successful place[15; 16]. This study contributes to the development of public space regulation pertaining the hospital area as a part of sustainable cities.

Research Questions:

1. How do the physical designs of public spaces and the people using them interact with their surrounding areas?
2. What were the patterns of use and accessibility in the study area?
3. How does accessibility and type of use influence the development of healthy urbanism in the area?

LOCATION OF RESEARCH

Dr. Soetomo hospital established at 1937 by the Dutch government, it's named *AL Central Burgerlijk Ziekenhuis (CBZ)*[17]. Initially, the hospital act as an extension to the existing Simpang hospital (currently functioned as a commercial building, Delta Plaza/Plaza Surabaya) because the lack of space to treat patient. The construction of *CBZ* was built simultaneously with *Nederlandsch Indische Artsen School (NIAS)* which at the present still maintain its original purpose as a medical faculty of Airlangga University. During the Japanese colonisation at the year 1942, the hospital was seized and renamed as *Kaigun* hospital, a naval hospital to the Japanese army. Just after the confederate army takeover in 1945, *CBZ* was reactivated and known as Marine Hospital Surabaya. A switch to General Centralized Hospital was done at August 7th, 1950 under the health department of Republic Indonesia until May 20th 1964, it's officially named Dr. Soetomo hospital. The summary of the past development of Dr. Soetomo Hospital can be seen in Figure 3.

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Figure 3Historical timeline of facilities connected to RSUD Dr. Soetomo hospital (previously known as CBZ) as an extension to the Simpang hospital (recent, Delta Plaza/Surabaya Plaza) and a learning hospital to Medical Faculty of Airlangga University (previously known as NIAS).(Google map, 2017)

The main land use of the area was health industry oriented because there were several hospital or health facilities, education and community housing in the development area[18]. Health facility buildings (Figure 4) supporting the main Dr. Soetomo hospital are: *Instalasi Rawat Darurat (IRD), Pusat Diagnostik Terpadu, Instalasi Rawat Jalan, Pusat Bedah Terpadu* building, and lastly *Graha Amerta*, can be seen in Figure. Furthermore, this area contains other facilities such as Husada Utama Hospital, East Java province Red Cross, and medical Department University of Airlangga.

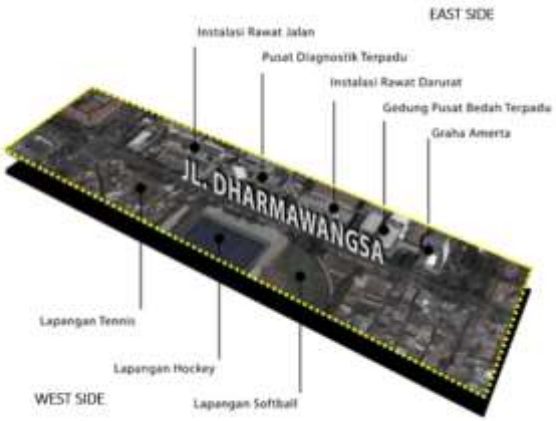

Figure 4Location of research at Dharmawangsa corridor contained several medical building with the relatively same function which are as health facilitators. (Observation, 2017)

The data presented was collected on the outdoor public area of Dr. Soetomo hospital. The selected area was chosen regarding to the high engagement between health services to the neighbourhood area and the outdoor space. However less research on the users of public space and only focusing on the hospital internal space remains the

gap in the urban planning and design of the public place. Therefore, there was a need to understand healthy environment and lifestyle in larger scale, especially in the street or other public space as there were high engagement and interaction between people happened there.

Dharmawangsa Street in Surabaya, which were recently dominated by pedestrian and car access, was selected as locus study in this research. This street was the main connection of the west gate to Dr. Soetomo hospital that makes many stopping area for patients and visitors for reaching hospital building as well as becomes the informal shopping area favourable by the local people.

RESEARCH METHODOLOGY

As stated in the introduction, the qualitative methods approach was needed to determine the everyday life of local community in public spaces and to distinguish activity spots and pattern[19; 4]. The primary tool for studying daily basis consisting mapping and direct observation, particularly focus on identifying the connection between the use of space with the spatial environments and the location it occurs. These methods were following the type of survey in the previous research performed by Gehl[20]collaborated with the tracing method conducted by Appleyard [21], which appraises on: (i) Classify type of activities, including necessary, optional and social activities, (ii) The pattern of activities accessibility, that can be collected through walk-by observation into several users,(iii) The spot and reason, involving factors such as comfort ability condition, aesthetic design, traffic congestion, and sociable environment.

Mapping observation was conducted to record the pattern and use of space and the location of engagement. The researcher walked through the street in study area and collected in the map sheet the activities of people engaged in, the behaviours, and the locations. People that were just passing by and not engaged in the activities on the street were not recorded. The pattern of activities was differentiated based on actual office-hour of the Dr. Soetomo hospital into morning, noon, and afternoon, excluding night activity because it has less influence to the hospital.

To understand the accessibility and physical factors determining the behaviours and activities in the public space, direct observation was also used in this study to perceive the design attributes that influencing interaction. In terms of conducting the direct observation, the researcher located himself in a discrete point that has maximum visibility of movement and activity for fifteen minutes. This counting methods and time of observation were based on the similar studies of Mehta[22]. The movement that were recorded including enter into or going out from the gate of Dr. Soetomo Hospital, pedestrian and vehicle traffic, crossing point, and type of transportation uses.

Face-to-face interview was also efficient as it involved actual visualization within the space. The direct interview provides information of user's feelings and perceptions toward the street ambience. The survey was used to get the reasons of why people performed the activities and correlate it with the observation outcome.

RESULTS AND DISCUSSION

The data gathered by behavioural mapping observation and interview presented a photograph of social life in the street. This study tried to determine the healthiness level of Dharmawangsa Street based on the movement and the activities happened in the street. Then, this part will be elaborated with compelling factors leads to healthy street.

1 Behaviours and Activities

1.1 Necessity Activities

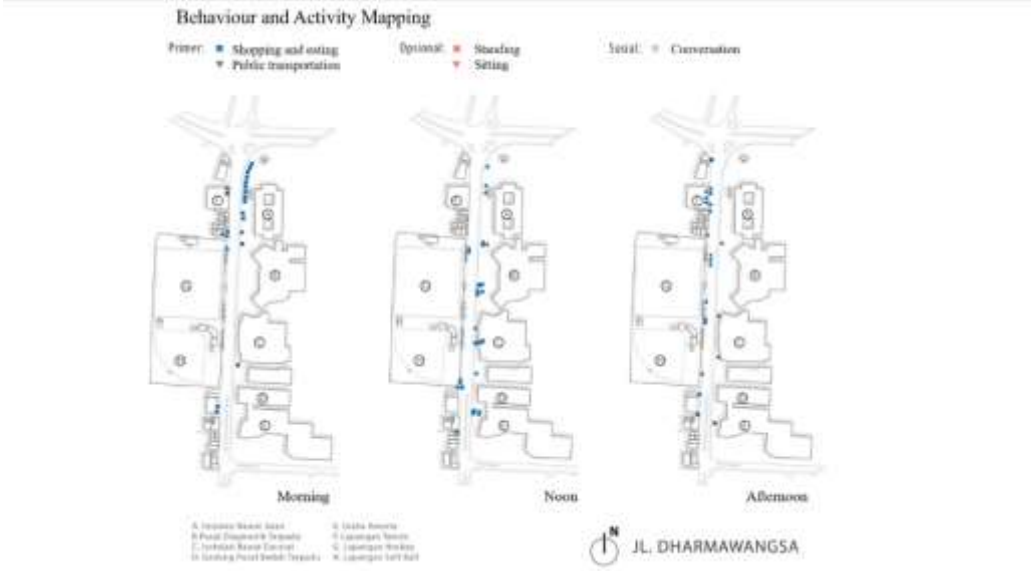

Figure 5Optional activities take place at Dharmawangsa corridor indicated by blue dots. Square dots shows people standing and triangle dots means people sitting.(Observation, 2017)

At Dharmawangsa Street the majority of primer activities were observed in the junction and near the bus stop. Based on the behavioural mapping, there was a pattern of necessary activities happened in the street.

Figure 6Trading activities occurs without the availability of a tent in front of the IRD building. (Observation, 2017)

During morning time, shopping and buying near the local housing area were more popular because household activities were dominant in this time. Also, the municipal police (*satpol PP*) usually came around 9.00 am in the morning swiped the area as a sign to prohibit street hawkers selling in the pedestrian area and forced them to move their carts. Therefore, buying and selling activities started from early in the morning before the municipal police came. The favourite spots for those activities were under the shelter, trees, or in the front gate to the hospital area.

Figure 7passengers were waiting to be picked up at the bus stop, while at the pedestrian way locals and visitors are having a lunch by the food hawkers nearby. (Observation, 2017)

In the noon, the activities were likely to be scattered places. The visitors often bought their own food and having lunch in the sidewalk or buying food from nearby street vendors. This became the main factors of internal vendors filled the sideway of Dr. Soetomo Hospital. The public transportation started to stay in the both side of the street and waiting for the visitors or workers who were going to home. The vehicle traffic point was basically caused by

the vehicle that stopped by in the street.

Figure 8People are seen to be waiting for their transportation and afternoon hawkers mostly sells refreshment snack which are easy to eat on the go. (Observation, 2017)

The busiest time for the primary activities at Dharmawangsa corridor happens during afternoon. It was the end of office hours and patient visitation times, traffic jam were the results from public vehicle parks by the edge of pedestrian way. Most vehicle does not park in front of the hospital but across the street, near Tennis Park, bus station, hockey and softball field.

Hawkers were rarity, they sell around *Graha Amerta* building and Kimia Farma pharmacy. It's because some of the building in the hospital complex closed at afternoon, none were interested to make transaction anymore. Thus, there were no activities happens at Dharmawangsa corridor.

1.2 Behaviours or Optional Activities

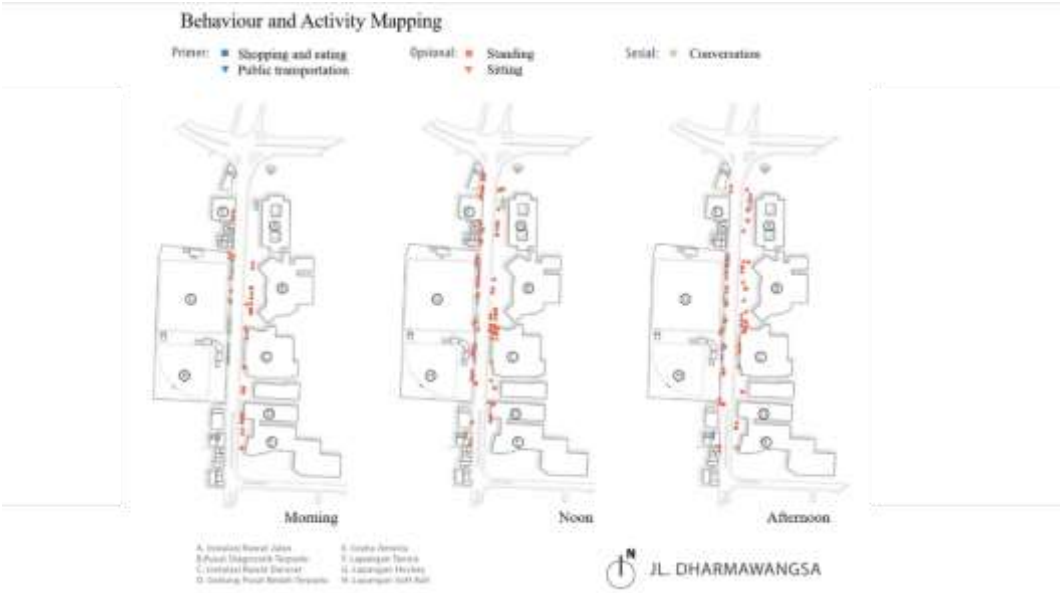

Figure 9Optional activities take place at Dharmawangsa corridor indicated by orange dots. Square dots shows people standing and triangle dots means people sitting.(Observation, 2017)

Optional activities occurred when there were physical and environmental conditions that supported those behaviours or uses[4]. Optional activities spotted at Dharmawangsa corridor were standing, sitting, some people waits for *angkot* (public transportation car), smoking, some were unwinding at the outdoor area or even to just gyrate around the public space just to see the lively road. Users mostly choose to sit without decent street furniture.

Figure 10Optional activities around Pusat Diagnostik Terpadu and IRD building (Observation, 2017)

There were not much they can do to support the optional activities during morning time, therefore many choose to spent a rather short time at the vicinity. The existence of fence brings advantages to the people whom want to rest by leaning on it. Most of the activities were done by standing around *Pusat Diagnostik Terpadu* building, and near *Graha Amerta* building.

Figure 11Liveliness on the pedestrian way in front of the hockey field and IRD building. (Observation, 2017)

Noon was the busiest time for local optional activities, especially shopping, waiting for vehicle, and looking for lunch. The highest density was seen in front of Instalasi Gawat Darurat building. From field observation, the presence of hawkers brings streets as a potential public space which were lively and dynamic, it also brings social interaction. Unfortunately, there were lousy side effect such as traffic jam, garbage pollution thus making poor quality of the public space, and the inaccessibility for the pedestrian especially to the disabled.

The majorities were noticed to be hanging around RSUD Dr. Soetomo building, like IRD. The non-existence sitting area, forced visitors to stand, additionally hawkers occupies the potential resting area which provide the barest shade from the sun. In front of the hockey and softball field, there were elongated seat which functioned as a border for the greeneries. Most people were found to be sitting around this seating arrangement, but a lot of them still chose to sit on the border of the pedestrian way in front of the hospital building.

Figure 12Almost deserted pedestrian way at Dharmawangsa corridor around the IRD building and bus stop. (Observation, 2017)

People became more docile comes the afternoon, some of them mostly were sitting and standing. There were no primary activities which backs these optional activities such as eating or shopping, a lot of them were waiting for passenger, public transportation, private vehicle, or to rest in the outdoor.East and west side of the corridor were both utilized and crowded. The impacting factors were comfort from the climate and environment. Small specks of primary activities supposedly support the optional activities were creating a passive atmosphere than the morning and noon time.

1.3 Social Activities

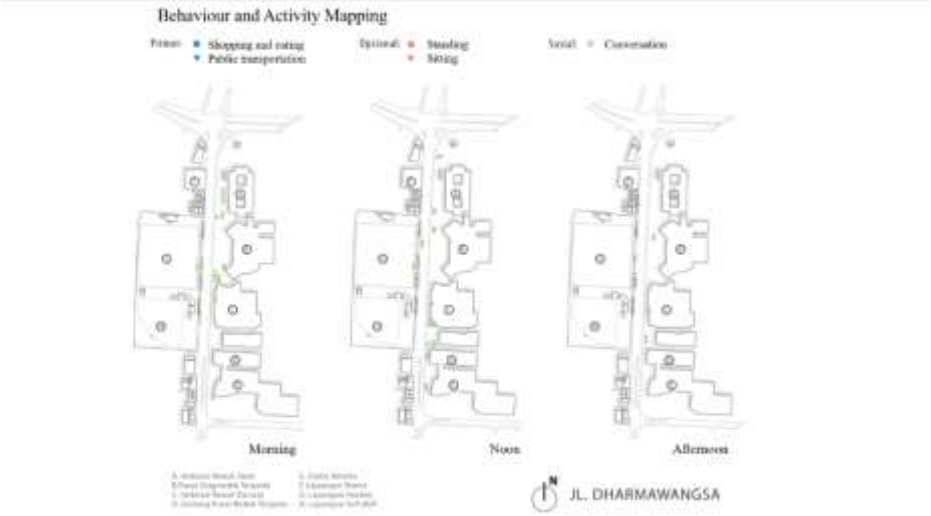

Figure 13Social activities take place at Dharmawangsa corridor indicated by green dots.(Observation, 2017)

Some of the social activities that manifest at Dharmawangsa corridor were differentiated by three different time zone, such as morning, noon, and afternoon (Figure 13). These were the results of some different phenomenon that only present itself around certain times. For example, night hawkers who only shows up at the late of the afternoon to start selling their trades, the appearance of *satpol PP* in morning time makes hawkers avoid that particular area to avert mishaps.

Figure 14People are seen to sit idly and having relaxing conversation, morning dew settled on the pedestrian floor (1); Morning hawkers who sells semanggi Surabaya, perfect for breakfast meal. (Observation, 2017)

During the field observation done at Dharmawangsa Street, there's no children activities. The main reason was caused by the high density of motorized vehicle, lack of supporting facilities which qualified to make social activities happens, and poor rate of safety and comfort aspects required to play. Therefore, throughout the research only conversation take place as the social activities at Dharmawangsa Street.

In the morning time, more social activities seen in front of *Pusat Diagnostik Terpadu* building, *Instalasi Rawat Jalan*, and *Instalasi Rawat Darurat*. Some people found to converse around the hockey field. Some of the primary activities were the trigger which invite social activities, proven by the same zoned area.

Figure 15Hawkers sells heavier meals such as satay and mixed rice to provide lunch for the patient families and hospital employees (1); Some patient family are forced to have lunch picnics on pedestrian way because of the unavailability of outdoor rest area (2); taxi motor bike are ready to deliver, both lunch and passengers (3); People takes shelter from the sun in front of the hockey field (4). (Observation, 2017)

At noon time, most activities centred on the hawkers which settled outside the *IRD*, *Pusat Bedah Terpadu*, and *Graha Amerta* buildings. The majorities come from the patient family, coincidence with visitation time, seeking for lunch. Some people also seen waiting to be pick up or dropped off at the entrance of the hospital. Thus, there were some taxi motorbike looking for opportunistic income from visitors needs to be delivered somewhere.

Although, the building has air conditioned circulation, it seems ineffective to cool down the air. In front of the hockey field, where the trees were dense pedestrian appears to take shelter below the shadow. Unfortunately, the public space doesn't provide enough sitting area resulting many people forced to sit on the floor and the shrubbery borders.

Figure 16Locals came out of their house to enjoy the afternoon scene while some people are seen to be going home (1); City cleaner officers are sweeping the pedestrian way from the day debris (2); hospital visitors are hanging out around the greeneries behind the fence, a relatively relaxing activity (3). (Observation, 2017)

As the sun went down, social activities were dwindling and had relax activities. People were going home and workers do their job to clean the pedestrian way. Some locals were seen sitting around the area, looking at the road and enjoying the afternoon scene. The dots of social activities lumbered around the entrance area of the hospital and in front of local sellers, especially the one near the entrance to a kampong.

To sum up the diverse type and time uses of space in Dharmawangsa Street, hence this table 1 will help to classify the factors of behaviour and activity occurrence in the space. Also, this will summarize the needed requirements and conditions for creating healthy and mixed-uses public space.

Table 1Summary of activities around the Dharmawangsa corridor.

Necessary Activity	Optional Activity	Social Activity	Conditions and Locations
• Hawkers and taxi motorbike stationed outside the perimeter are the most visible aspects which triggers activities such as eating and waiting for transportation. • There are no centralized zone for both aspect creating an unorganized public space.	• High demand on seating area does not provided by adequate public seating • Waiting while standing or walking were influenced by the environmental, climate, and the availability of space in pedestrian way.	• People around the Dharmawangsa corridor are mostly patient families, employee, and local hawkers • Therefore, conversation are easy to be maintained because of the common topics, and a culture providing a sympathetic ears. • The activity happens on the pedestrian way which sometimes causes traffic jam.	• Entrance to the hospital and community housing appeal more informal sellers and place for any transport to stop by because the passengers / buyers mostly coming from the hospital • Bus stop also becomes the core point for public transport • Under the trees or shelters were the comfortable place for eating

ACCESSIBILITY

For public spaces in hospital area, it was urge to give priority to non-vehicle movement, walking and cycling, rather than the cars. According to the methodology, this research attempted to diagnose the transportation modes, the safety and comfort ability when accessing the space, and the traffic congestion. The requirement leads to healthy street attributes in accessibility were recorded and explained with physical environment condition.

Transportation Modes

Dharmawangsa Street connected the local network with the city centre hence, hierarchically, it categorized as collector / minor arterial roads. Based on the quarter hour of observation, motorbikes were dominant mode of transportation in this street (Figure 17). The precise measurement for motorcycle that passing the street in 15 minutes was 489 for the west side and 413 on the east side. Cars, become the second option of transport modes, also we witnessed that the combination of motorbikes and cars domination in the street was leading to congested space, less safe and secure, and unhealthy living.

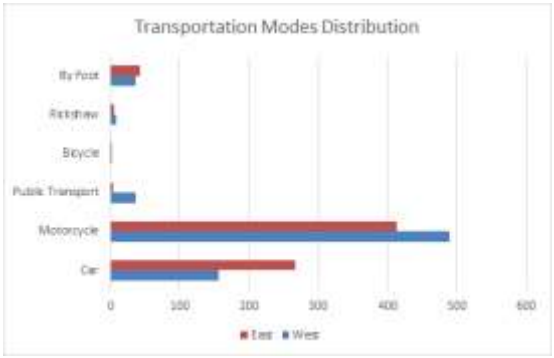

Figure 17Data of traffic modes distribution in Dharmawangsa Street (Observation, 2017)

Public transports, however, could not provide the needs of the community. Only thirty-seven public transport in the west side was seen, including bus and taxi motorbike / car, while less than ten were recorded in the east side. In the west side of Dharmawangsa Street had shown more favourable uses on public transportation than on the east side. The outcomes basically produced because there was a bus stop location in the west side of the street, allowing people to reach the bus from that certain area. Unlike west side, in the east side there were inappropriate bus stop for passengers. Moreover, taxi and *angkot* (local public transport with limited facilities but cheap price) did not provided with such specific place where they can take the passengers from and into the street. Therefore, many cars, public and private, have seen to be filled up the street for long period of time and highly contributed to the traffic congestion, especially in working days and noon to afternoon hours were the most possible peak time of traffic congestion (Figure 18).

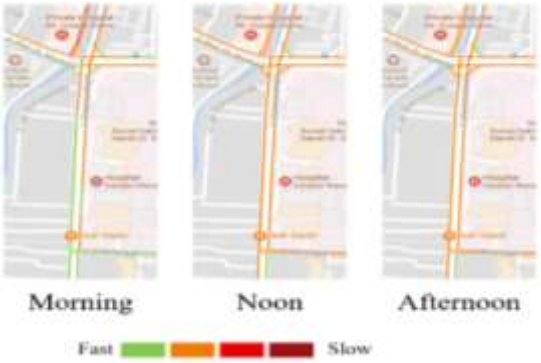

Figure 18Typical traffic comparison in weekdays, from left to right: morning, noon and afternoon. Green line to dark red line indicates slower traffic / highest possibility in traffic congestion (Google Map, 2017)

For closer movements, rickshaw still becomes the preferable transportation than bicycle. In both side of the street, less than 10 rickshaw and bicycle were recorded. Pedestrian, however, showed constant number in both side. Around 40 people in each side of the street has been recorded passing through the sidewalks. Thus, this insignificant amount of sustainable and healthier transportation, should be encouraged through safer and more comfortable lanes in the future.

This data indicates that more people tend to use motorbikes when passing through this road. It somewhat conflicting with the healthy urbanism concept that the city government wants to pursue. More motor vehicle uses revealed that the environment has contaminated air, noisy, and away from relaxing atmosphere for people. This becomes the main indicators to encourage the government to increase the facility and use on public transport as committed as to the pedestrian way.

Safety

As the traffic flow took more priority in arterial roads, the pedestrian motion including crossing should be limited by creating controlling crossing points and with barriers or railings[14]. Unexpectedly, in the observation of 15 minutes there were more people crossing the street without crossing facility support such as bridges, light-controlled, or through crossing permitted lines than the people who crossed in the allowance place. To be exact, the total of 46 people was observed going through the street without proper crossing lines. In comparison, 36 were recorded crossing through the formal lanes.

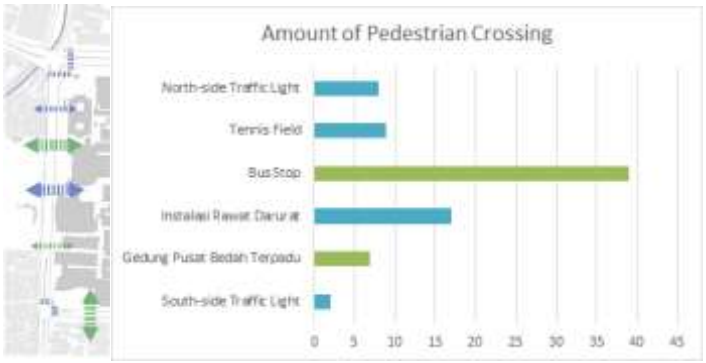

Figure 19Average of people crossing the street. Green line indicates informal crossing (without crossing lanes and facilities), while blue line indicates formal crossing area. Arrows and lines indicate how often people uses the crossing area, bigger means more often and smaller means less often of uses. (Observation, 2017)

Formal crossing points situated in Dharmawangsa Street were in north side and south side traffic light, in front of tennis field and *Instalasi Rawat Darurat* building, which can be seen from Figure 19. Unfortunately, through investigation were found more people crossings in improper area. People were dominantly passing through the street coming from and to the bus stop, considering as the place where most public transportation gathered. Other informal crossing often uses was in the front of *Gedung Pusat Bedah Terpadu*. In both area, crossing facility was crucial to support the users need and to deliver people in secure and pleasant ambiance.

In this study, classifying the users of crossing area was essential to figure the dominant crossing pedestrians. The equality in receiving the same safety and security while using the space was meaningful as the planners should recognizes people in needs or patients, street vendors, workers and people living in the surrounding areas. From the field study, we recognized visitors or patients, coming and into the hospital, and people who works in the hospital and other facilities nearby were the prominent crossing users, especially in front of the Bus Stop and *Instalasi Rawat Darurat* building.

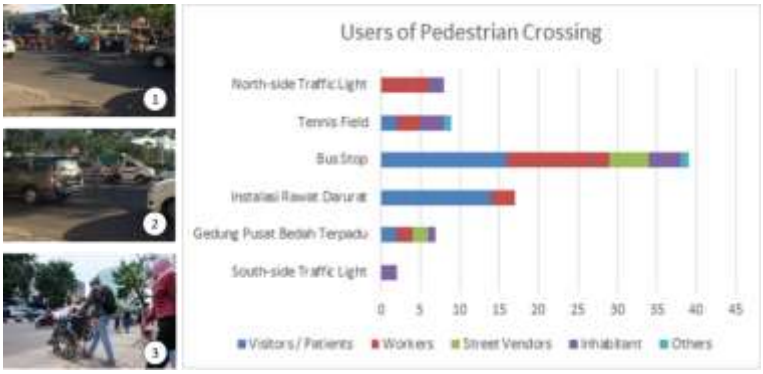

Figure 20the users of pedestrian crossing categorized. Types of people crossing the street that directly influenced Dr. Soetomo Hospital: (1) Street vendors; (2) Workers; (3) Visitors or patients. (Observation, 2017)

As consequences, the major vehicle road often seen as a negative and passive living environment which contradict with healthy and walkable street theory. The difficulties of crossing the street ultimately becomes one factor contributing to unhealthy environment. Some of the impacting aspect are almost the same as other illegal development which are not supervised by the government, especially the one around the railway area and hospital's public space[23]. Through this paper, the researcher encourages that the existing street networks need to be modified and there was a need on creation for medium-speed vehicle to achieve safer and healthier street for

all. To break the high-speed movement, traffic-calmed idea was a common idea in hospital area and can be applied in Dharmawangsa Street to gain high level of safety especially for pedestrians.

CONCLUSION

The uses and accessibility in the public space were the core factors determining the healthy urbanism concept. The study of behaviours and activity can indicate the level of accessibility, equity, safety, and comfort ability. Based on the tracing and mapping behaviour observation, the study proves that considering the user needs and activities playing a major role in improving health and deliberate it in the urban decision making. The healthy city consideration based on larger scale and massively influenced on people behaviour, not only emphasize on curing patients solely.

There were essential conclusion from our study that need to be considered for future recommendation and improvement, such as the activities and accessibility aspects regarding Dr. Soetomo public space. The mandatory activities, such as shopping, eating, and waiting for public transportation haven't provided with proper furniture and facilities. The streets needs more places where people can sit comfortably sheltered from the sun/rain with coverage according to the marked place from the research. A specific space for taxi/*angkot* to linger should be made available in order to manage streetscape and avoids congestion. Secondly, access should be equal for all communities, including patient, disabled, and elderly. A diverse option of transportation mode ought to be catered mainly because in Dharmawangsa corridor, people preferred to use motorcycle and cars than cycling, walking, even commuting.

There were some niches in findings and need future research to overcome those problems based on the study. The solutions found can be applied to improve and redesign the public space in Dharmawangsa Street and the neighbourhood, also the master plan of Dr. Soetomo hospital public space. Improvement regarding the public space are required to brings the liveliness of the community around the area which eventually will led to a healthier people and the city.

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REFERENCES

1. Menteri Kesehatan Republik Indonesia. Nomor 1204/Menkes/SK/X/2004 : Persyaratan Kesehatan Lingkungan Rumah Sakit (in Bahasa). Jakarta : Menteri Kesehatan Republik Indonesia, 2004.
2. Hakim, Abdul. SHS Ajak Warga Surabaya Biasakan Hidup Sehat. antarajatim.com. [Online] antarajatim, 26 April 2017. [Cited: 25 June 2017.] http://www.antaranews.com/berita/554271/rumah-sakit-se-surabaya-tawarkan-diskon-layanan-kesehatan.
3. Rambe, A. S. Stroke: Sekilas tentang definisi, penyebab, efek, dan faktor resiko (in Bahasa). [Online] 2006. [Cited: 4 July 2017.] http://repository.usu.ac.id/handle/12.
4. Gehl, J. and Svarre, B. How to Study Public Life. Johanneshov : MTM, 2014.
5. The Built Environment and Human Activity Patterns: Exploring the Impacts of Urban Form on Public Health. Frank, L. D. and Engelke, P. O. 02, 2001, Journal of Planning Literature, Vol. 16, pp. 202-18.
6. Planning Institute of Australia. Healthy Spaces and Places. Kingston : Planning Institute of Australia, 2009.
7. Walking and cycling to health: a comparative analysis of city, state, and international data. Pucher, J., et al. 2010, American journal of public health, Vol. 100, pp. 1986-1992.
8. Maller, C., et al. Healthy Parks Healthy People: The Health Benefits of Contact with Nature in a Park Context. Melbourne : Deakin University and Parks Victoria, 2002.
9. Transport for London. Healthy Streets for London. London : Greater London Authority, 2017.
10. Fang, E. C. Y. and Prysi, S. S. The Hospital and the City. Stockholm : International Academy for Design and Health WCDH, 2000.
11. CABE. Future health: Sustainable places for health and well-being. London : Commission for

Architecture and the Built Environment (CABE), 2009.
12. Pras. realita.co. [Online] 2016. [Cited: 15 June 2017.] http://www.realita.co/akses-keluar-masuk-sulit-rsud-dr-soetomo-bakal-direnovasi.
13. Gehl, J. Life Between Buildings: Using Public Space. London : Island Press, 1987.
14. Carmona, M., et al. Public Places Urban Spaces: The dimension of urban design. 2. New York : Routledge, 2010.
15. Canter, D. V. The Psychology of Place. London : Architecturaal Press, 1977.
16. Making a City: Urbanity, Vitality and Urban Design. Montgomery, J. 1, s.l. : Journal of Urban Design, 1998, Vol. 3.
17. Buana Varia Komputama. Sejarah Singkat RSUD Dr. Soetomo Surabaya. http://www.bvk.co.id. [Online] Buana Varia Komputama, 15 January 2017. [Cited: 26 June 2017.] http://www.bvk.co.id/artikel/berita/186-sejarah-rsud-dr-soetomo. 186.
18. Surabaya Goverment. Perda Kota Surabaya : Rencana Tata Ruang Wilayah Kota Surabaya Tahun 2014-2034 (in Bahasa). Surabaya : Surabaya Goverment, 2014.
19. Shamsudin, S. Townscape Revisited: Unravelling the character of the historic townscape in Malaysia. Johor, Malaysia : Universiti Teknologi Malaysia Press, 2011.
20. Gehl, J. Public Spaces and Public Life City of Adelaide. Adelaide : Adelaide City Council, 2002.
21. Appleyard, D. Livable Streets. Berkeley and Los Angeles : CA: University of California Press, 1981.
22. Lively Streets: Determining Environmental Characteristics to Support Social Behaviour. Mehta, V. Journal of Planning Education and Research : 165-187, 2007, Vol. 27.
23. Adaptation of The Public Space to The Challenge of Limited Indoor Space by The Immigrant: A Case of Informal Settlement Around The Railway Terrace, Surabaya, Indonesia. Endang, Sunarti Titi and Annisa, Tribhuwaneswari B. October 2016, Surabaya : Global Journal of Engineering Science and Research Management, 2016, Vol. 3(10). ISSN 2349-4506.