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Review of Malaysian current practice in supply/demand of parking in the hospital

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Abstract. Parking has long been an issue in government hospital, especially the one which are located within urban environment. In view to the fact that private cars are the preferred mode of choice for commuting in Malaysia, the issue could not get any better. This technical paper attempts to evaluate the supply and demand of parking in public hospital. Secondary data are obtained from various parking guidelines. License Plate method is used to collect the parking demand data as a primary data for a period of 12 hours at public hospitals. The actual parking demand is found to be higher than the provided parking space at all public hospitals under investigation. The actual parking demand is found in close trend with parking requirement by JPBD.

1. Introduction

Parking has long been an issue in government hospital, especially the one which are located within urban environment. In view to the fact that private cars are the preferred mode of choice for commuting in Malaysia, the issue could not get any better. Parking facilities are also costly and space intensive. The problems of getting a car park had been a great concern to general public, authorities and policy makers especially at public hospitals. Based on a publication by Ministry of Health, the total annual visit for outpatient attendances and admissions in government hospital summed up to the figure of 23,231,994 visit which obtained all over Malaysia [1]. This 8-digit figure itself shows the substantial turnover to the hospitals for the available parking facilities provided.

The questions of are we providing enough parking space to satisfy the demand has been the topic of discussions among public and transport planners. Excessive number of parking will increase development cost while limited number of parking will cause congestion and increase the risk to public. It is observed that parking is still a big issue in our country that needs an appropriate management strategy. However, documented Transportation Demand Management (TDM) practices are mostly come from the developed world, and contrast markedly with Malaysia, which lacks an organized public transport sector and effective law enforcement and also has a higher car ownership [2-5].

The main reason why parking issues in public hospitals remains unsolved is due to the absence of parking demand data as a basis for analysis in infrastructure management. Therefore, this study attempts to evaluate parking demand and supply in public hospitals in Malaysia. The provided parking spaces are



also compared to the various parking generation guidelines to evaluate the current parking demand in government hospitals.

2. Methodology

In this study, the first stage of the work involved putting together the available secondary data from various parking norms and guidelines. In succession, data on the variables were also obtained, which then tabulated and plotted in graph to show the parking generation and requirement trends.

The second stage of the work involved the process on collecting the primary data which is the actual parking demand data. This is the most important part of the study since there are no currently relevant available statistical data in Malaysia. License Plate method was conducted, and the result tabulated and analyzed against the previously analyzed parking trends. Figure 1 below shows the flow chart of the study methodology.

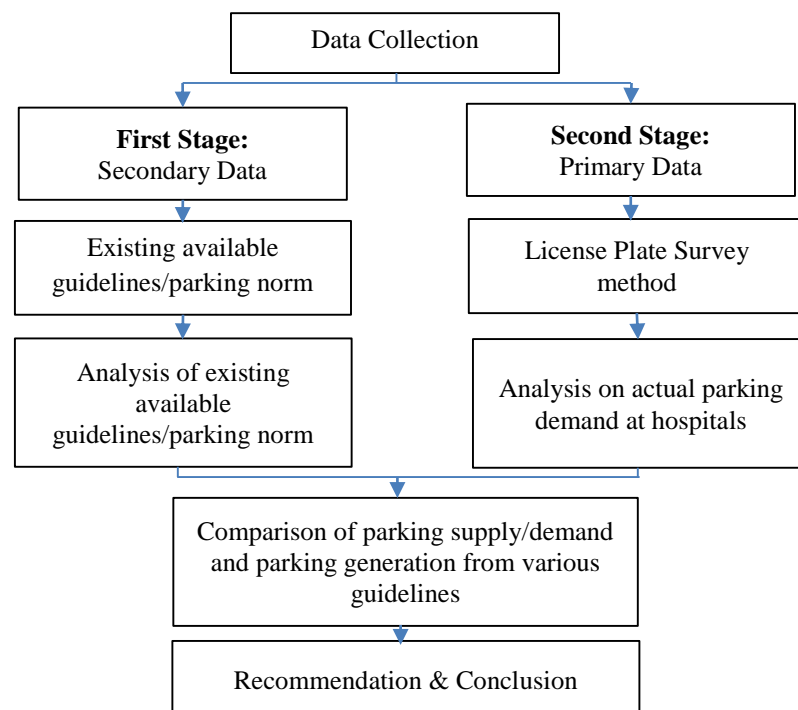


Figure 1. Methodology adopted

2.1 Parking Requirement

In order to get to the quantitative derivation for the parking generation, several parking guidelines available in Malaysia, as well as the one established by ITE [6] is referred to. Table 1 below shows the parking requirement based on independent variables such as number of Bed, Number of Professional in the hospitals, as well as number of available Support Staffs for various guidelines.

From Table 1, in the Malaysian very own guideline context, the parking norm by Ministry of Health (MOH Norm) should yield the highest parking generation with the requirement of one parking per one bed. This will be followed by JPBD Norm of one parking per four beds, and lastly the EPU Norm of one parking per five beds. US ITE Norm on the other hand outlined higher requirement with 3.5 parking per one bed. Other variables considered are the number of professional staffs and supporting staff which are relevant to all three Malaysian Requirements.

Table 1. Parking requirement based on available parking guidelines

EPU NORM	JPBD NORM	MOH NORM	ITE NORM
<ul style="list-style-type: none"> • 1 Parking / 5 Bed • 1 Parking / 3 Professional Staff 	<ul style="list-style-type: none"> • 1 Parking / 4 Bed • Additional 1 Parking / 1 Professional Staff • Additional 1 Parking / 3 Support Staff • Additional 20% Parking Space for Motorcycle • 5 Parking Space for Taxi 	<ul style="list-style-type: none"> • 1 Parking / 1 Bed • 1 Parking / 1 Professional Staff • 1 Parking / 3 Support Staff • Additional 20% Parking Space for Motorcycle • 5 Parking Space for Taxi 	<ul style="list-style-type: none"> • 3.5 Parking / 1 Bed

Notes: EPU = Economic Planning Unit

JPBD = Jabatan Perancang Bandar dan Desa (Federal Department of Town and Country Planning)

MOH = Ministry of Health

ITE = Institution of Engineers

Table 2 below shows the obtained information from Engineering Service Department, Ministry of Health Malaysia to be considered as the independent variables [7].

Table 2. Available information from State Hospital in East Malaysia

NO.	HOSPITAL	NUMBER OF BEDS (A)	HOSPITAL STAFF		TOTAL STAFF	TOTAL DAILY OUTPATIENT
			PROFESSIONAL (B)	SUPPORT STAFF (C)		
1.	Hospital Kangar	404	478	1402	1880	572
2.	Hospital Alor Setar	856	1037	2653	3690	1600
3.	Hospital Pulau Pinang	1090	1197	3000	4197	3059
4.	Hospital Ipoh	990	1047	3084	4131	1593
5.	Hospital Klang	1094	1079	2790	3869	2506
6.	Hospital Seremban	1200	1017	2664	3681	1363
7.	Hospital Melaka	901	925	2605	3530	220
8.	Hospital Johor Bahru	989	452	3013	3465	1334
9.	Hospital Kota Bharu	920	1004	2649	3653	1057
10.	Hospital Kuantan	793	838	2419	3257	780
11.	Hospital Kuala Terengganu	821	1046	2633	3679	1251

Based from these two tabulations, the parking generation for each guideline can be substantiated. From the site visit, five out of eleven hospital sites were ruled out from the potential list of suitable study area, due to the undergoing of building construction that in apparent will yield abnormal traffic behavior.

2.2 License Plate Method

Then, parking study was conducted to obtain the parking demand in the hospitals. License Plate method was carried out for 12 hours (7am – 7pm) with 30-minute interval. For the data collection, the parking facility were subdivided into zones, where team of enumerators were designated at each location, supervised and coordinated by an engineer. The License plate survey method carried out at site by using portable video recorder (Handycam). This apparatus gives advantage over the conventional in-situ plates number note-taking; it gives recorded prove for subsequent validation (if the need arises), as well as expedite the data collection process, where enumerators can cover bigger study area (Figure 2).



Figure 2. License Plate Survey Method, using portable video recording devices

3. Data Analysis and Findings

The Parking Generation for the state government hospitals were tabulated based on the information obtained for each parking requirement (Table 1). The independent variables given out by Ministry of Health were used accordingly (Table 2). As the result, Table 3 below shows the output in term of parking generation, based on the various guidelines considered.

Table 3. Parking generation based on various guidelines

NO.	HOSPITAL	NUMBER OF PARKING TO BE PROVIDED				PROVIDED PARKING IN HOSPITAL
		EPU NORM (A/5) + (B/3)	JPBD NORM (A/4) + B + (C/3)	MOH NORM A + B + (C/3)	ITE NORM (Ax3.5)	
1.	Hospital Kangar (HTF)	240	1046	1349	1414	670
2.	Hospital Kuantan (HTAA)	438	1843	2437	2776	964
3.	Hospital Melaka	489	2019	2694	3154	1401
4.	Hospital Alor Setar (HSB)	517	2135	2777	2996	1736
5.	Hospital Kota Bharu (HRPZII)	519	2117	2807	3220	692
6.	Hospital Seremban (HTJ)	579	2205	3105	4200	1813

To give better graphical representation, the above information was then plotted into graph to show the data variation and how each parking generation trend lines coincide with each other. Figure 3 shows parking generation trend obtained from various parking generation guidelines and the provided parking spaces.

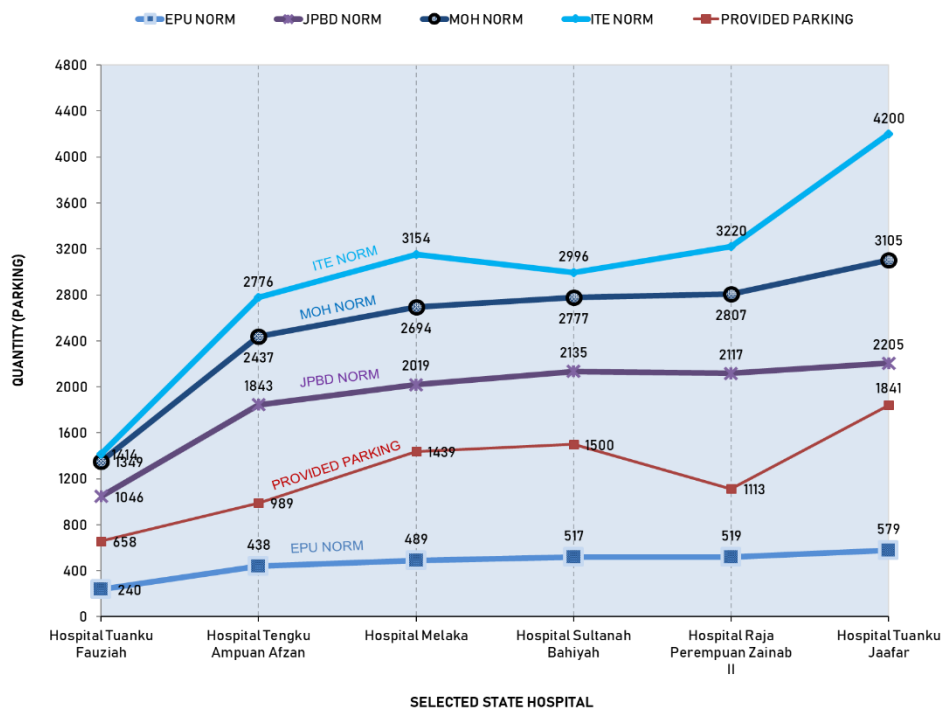


Figure 3. Parking supply and parking generation from various guidelines for each hospitals

The above graph in Figure 3 shows ITE norm leads the trend, followed by MOH norm and JPBD norm, while EPU norm bound to be the lowest trend lines among all. The provided parking at hospitals is shown higher than the numbers required by EPU guideline, but lower than recommended by JPBD.

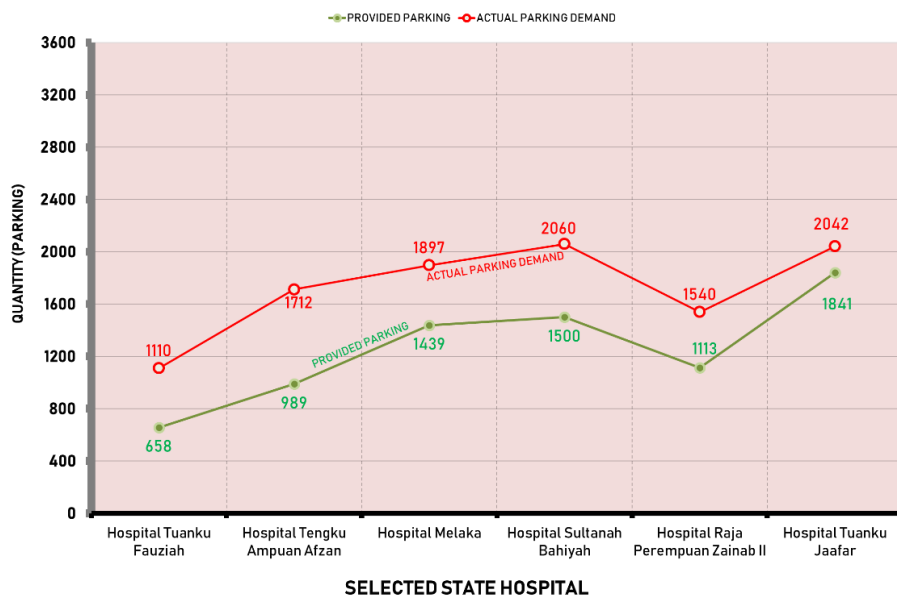


Figure 4. Parking supply and demand at public hospitals

Data collection at each respective hospital were carried out to determine the actual parking demand. This to justify whether the provided parking is sufficient or otherwise. Figure 4 below shows the information on the actual parking demand, overlaid onto the graph of provided parking by hospitals.

With the current situation, parking demand is found to be higher than the provisioned parking, the red line shows the actual demand figure compared to number of parking actually made available

Comparing all the Parking Generation from various guidelines with the provided parking and actual parking demand, the actual parking demand is above the actual parking provided and in close trend with JPBD guideline as shown in Figure 5.

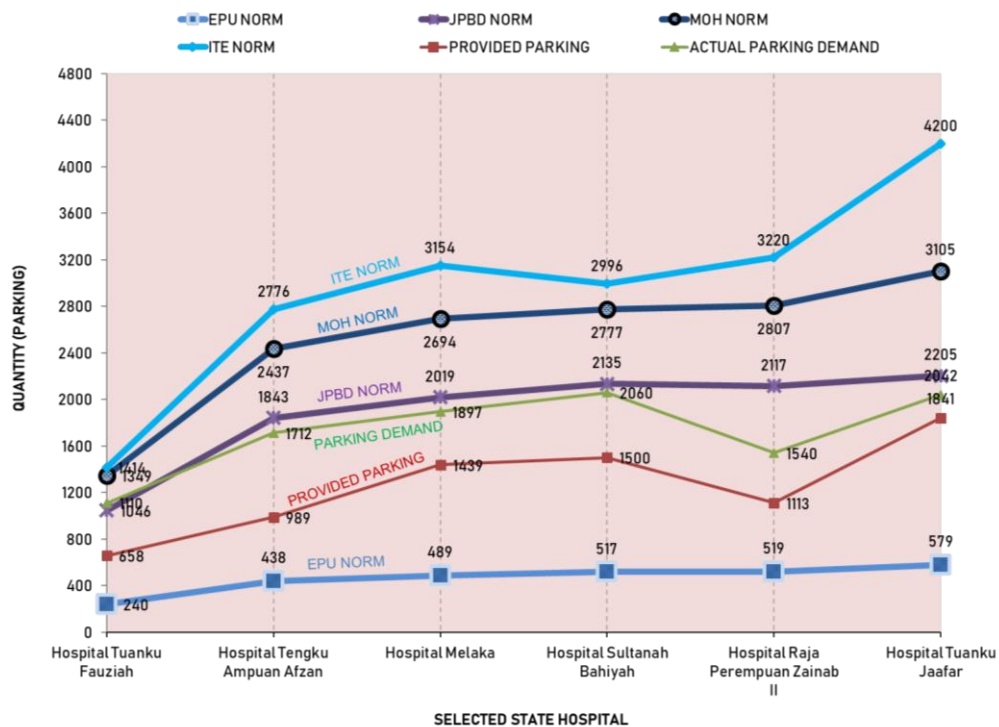


Figure 5. Parking supply-demand trends and parking generation from various guidelines

4. Conclusions and Discussions

As seen in Figure 3, the actual numbers of parking space provided by the hospitals are well below the required amount by JPBD, MOH and ITE. The only Parking generation requirement exceeded over is the EPU norm, which is ranked as the lowest in parking provision criteria. This could be the reason why shortage of parking always been an issue for hospital visitors.

There could be many reasons to the shortage; one of the reasons being is the lacked available land to provide the parking spaces. The potential approach is to provide multi-story car parks as introduced in instance of Hospital Pulau Pinang and Hospital Seremban. But to what extent the potential solution really solves the parking deficiency and illegal parking is yet to be validated. Parking demand study is a recommended approach to get to know to the basis of problem issues as well as to quantitatively get the actual parking shortage at each respective study site.

For further study, the impact of public transportation improvement, as well as the e-hailing services to be deliberated and analyzed. Statistical parking model from the correlation of studied variables can also be formed to further enhance the understanding on the parking supply and demand within the study scope.

5. References

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