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Estimating the cost of visiting hospital outpatient

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ABSTRACT

Objectives This study aims to investigate the cost incurred by people travelling to the neurology outpatient clinic of a large metropolitan hospital. As outpatients are a substantial portion of a hospital's demographic, we aimed to understand the patient experience of various commuters.

Methods We conducted an observational study collecting demographic details and travel information for how people attended the neurology clinic of Monash Medical Centre. Statistical analysis was performed using R. 165 participants were randomly selected and interviewed in-person. Data were collected via an anonymous questionnaire. The study was approved by the Monash Health Human Ethics Research Committee.

Results 155 responses were included in the analysis. Patients paid an average of $A16.64 to travel to Monash Medical Centre. Drivers paid on average $A16.70 and those taking public transport paid on average $A9.64, with the maximum cost overall being $A120.00. For patients driving to hospital, parking accounted for 60% of their travel costs. The average to Monash Medical centre was 20.82 km with the maximum being 190.88 km. Distance from hospital was correlated with a higher cost of travel ($p<0.001$, Spearman's rank correlation coefficient=0.48). There was also an inverse association between distance from hospital and socioeconomic status ($p<0.001$, Spearman's rank correlation coefficient=−0.26).

Conclusion Travelling to hospital can be a costly endeavour. Driving is the most popular form of transport, but a large portion of the cost involved is hospital parking. Further research should be conducted at other tertiary centres with larger samples.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Outpatient services are a substantial component of patient care at large tertiary hospitals. Many patients often must travel to outpatient clinics to receive specialist care.
⇒ Failure to attend these clinics not only impacts patient care but has large second-order consequences on the healthcare system.
⇒ The patient experience of travelling to these outpatient clinics has not been researched, with most studies solely focusing on primary care or acute and emergency services.

WHAT THIS STUDY ADDS

⇒ This study adds key insights into the time and financial burden placed on patients who need to travel to outpatient appointments at hospital. Most patients choose to drive to hospital and on average, pay $A16.70 for a one-way trip. Hospital parking accounts for 60% of this expense.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study provides quantitative data into how the patient experience of attending outpatient clinics may be optimised, ultimately improving accessibility and decreasing the financial burden which may prove a barrier to many patients, ultimately improving fail to attend rates.

INTRODUCTION

Outpatients and visitors serve a substantial portion of the patient demographic at metropolitan hospitals. With the requirement for patients to travel to the hospital to attend consultations, patients may often have to commute long periods of time and bear the financial burden of travel costs to receive necessary care. This variation in travel and constraints results in a shift in patient accessibility to healthcare in the context of public health and care equity. This is an area of health service—out-of-pocket cost to patients and visitors—that has been investigated minimally outside of cancer care.[1–7] Investigators have found that out-of-pocket costs including parking costs are one of many factors that prevent patients from visiting hospitals, even for cancer treatment. While patients with other chronic illnesses are likely to also require multiple hospital outpatient clinic attendances, we have not found similar analyses on this topic that are generalisable across the larger patient population.

By investigating this neglected area of patient care, we hope to open possibilities for further investigations and analysis to improve patient experience and minimise out-of-pocket expenses for those attending outpatient services. The impacts on patient well-being and experience from commuting long periods of time to hospital are not well appreciated. Our group will be using patient

demographic information to analyse the effects of visiting hospital. This will guide further decisions made to reduce the impact on patients making the journey to hospital and other measures to maximise patient outcomes, clinic attendance and satisfaction.

METHODS

Data collection

First, we used an in-person questionnaire to serve as a basis of data collection from hospital visitors. The questionnaire took approximately 5 min to complete and was designed to maximise anonymity and patient confidentiality while collecting necessary deidentified location, travel and demographic data. Patients and visitors were approached in the waiting rooms of a neurology outpatient clinic at a large tertiary centre. Written consent was obtained from each patient by the investigator. The inclusion criteria for the survey encompassed any patients, family or friends that visited the chosen hospital who consented to providing responses to the questionnaire. The exclusion criteria comprised participants who did not complete the questionnaire completely or correctly.

The data on patient demographics and associated travel time were deidentified. Data collected included demographics, postcode of primary residence, means of transport, time constraints, cost of parking, cost of commute, ambulatory status, time of arrival at the hospital, duration of stay and reason for visiting the hospital.

The questionnaire was conducted at the neurology outpatient clinic of Monash Medical Centre (MMC) in Clayton. MMC is a 640-bed teaching and research hospital located in Victoria, Australia. It is the largest tertiary teaching hospital of Monash University and is a referral centre.[8]

All data were collected specifically regarding patients' one-way trip to their outpatient neurology appointment. The return journey was not part of the questionnaire given the survey was conducted in the clinic waiting room, and it was assumed all patients would return to their home residence afterwards.

Statistical analysis

Data were initially cleaned and prepared for analysis. First, responses who were incorrect due to errors filling out the questionnaire were removed. Second, participants who drove to hospital as per the survey provided data regarding the model and make of their car. This information was used to estimate fuel costs per kilometre using data from a publicly available car performance database that provided individual fuel efficiency metrics for each model, make and fuel type—gasoline, diesel or electric—into account.[9 10] Alongside motor vehicle data, drivers were asked about the cost of parking they incurred for their hospital visit. Given the survey was conducted in waiting rooms and participants were yet to return to their cars, participants were asked whether they had used hospital or street parking and how long they had been at the hospital since parking. This duration was then priced according to MMC's parking fares. Publicly available postcode data were then used to calculate the centroid location of each participant's local postcode, allowing the approximate linear distance travelled by each respondent to MMC to be calculated.[11 12] Thus, by using fuel cost data and distance, an approximate cost for each driver's commute was calculated. Using publicly available public transport prices, the costs for other participants were also calculated with this distance data.[13 14] Participants who took the taxi to hospital were asked to select a range within which their travel cost fell as many had difficulty reporting exact prices. Some patients travelled to MMC using hospital transport. This refers to patients who were unable to travel to the hospital independently and required a clinic car or ambulance for the commute. In Victoria, the patient covers this cost when using hospital transport to attend non-urgent outpatient clinics. Postcode data were further used to infer the socioeconomic background of participants using the Australian Bureau of Statistics Socio-Economic Indexes for Areas dataset.

The Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) was used to allocate a percentile index for each participant's postcode, relative to other postcodes located in Victoria.[15]

Finally, linear regression and geospatial analysis was performed in the R programming language to establish relationships between questionnaire variables. Analyses were visualised performed using the library ggplot2.[16] The tmap and leaflet libraries were also used to visualise geographical data into a choropleth map.[17 18]

RESULTS

The questionnaire was distributed to people attending MMC neurology clinic in May 2019 by investigators. 165 respondents completed the questionnaire and 155 responses matched the inclusion criteria. 131 of the participants were above the age of 40 (85%) and the vast majority were outpatients (102, 67%) and visitors (52, 33%). Demographic, cost and distance data for the participants are shown in table 1.

On average, participants paid $A16.64 to travel to the hospital. Drivers paid an average of $A16.70 whereas commuters who took a taxi paid $A19.00, those taking public transport paid $A9.64 and the one commuter who used hospital transport (non-emergency patient transport (NEPT)) paid $A120.00 per pay period. The majority (86%) of patients travelled by car (figure 1). No patients surveyed were required to pay for any air travel or overnight accommodation out of pocket.

When grouped by ambulatory status, most participants were unassisted. Those who were wheelchair-bound had the highest mean and median costs of $A53.00 and $A20.01, respectively, followed by people who mobilised with a walker (mean $A16.89 and median $A19.00) (figure 2).

Table 1 Demographic and average travel cost data of the surveyed participants at Monash Medical Centre (MMC), grouped by mode of transport

Variables	Public transport	Taxi	Car	Hospital transport
Type of Visitor				
Outpatient	12 (70.6)	4 (100.0)	84 (63.2)	1 (100.0)
Friend/family visitor	5 (29.4)		46 (34.6)	
Inpatient			3 (2.3)	
Age				
18–29			14 (10.5)	
30–39	1 (5.9)		11 (8.3)	
40–59	5 (29.4)		34 (25.6)	1 (100.0)
60–79	8 (47.1)	3 (75.0)	66 (49.6)	
80+	3 (17.6)	1 (25.0)	8 (6.0)	
Ambulatory status				
Unassisted	16 (94.1)	2 (50.0)	117 (88.0)	
Walking stick	1 (5.9)		9 (6.8)	
Walker assisted		1 (25.0)	6 (4.5)	
Wheelchair		1 (25.0)	1 (0.8)	1 (100.0)
Travel time				
<20 min	3 (17.6)	2 (50.0)	33 (24.8)	
20 min–1 hour	10 (58.8)	2 (50.0)	71 (53.4)	1 (100.0)
1 hour–2 hours	3 (17.6)		26 (19.5)	
> 2 hours	1 (5.9)		3 (2.3)	
IRSAD state percentile				
Mean (SD)	55.2 (32.4)	52.0 (34.3)	58.0 (28.0)	43.0 (NA)
Distance to MMC (km)				
Mean (SD)	17.0 (27.6)	4.9 (3.3)	21.7 (26.3)	22.8 (NA)
Cost of travel (AUD)				
Mean (SD)	9.60 (5.4)	19.00 (0.0)	16.70 (12.9)	120.00 (NA)

IRSAD, Index of Relative Socio-Economic Advantage and Disadvantage; NA, not available.

84 patients (54%) took between 20 min and 1 hour to travel to the hospital (figure 3). As travel time was self-reported categorically by participants, regression analyses could not be performed. However, Kruskal-Wallis indicated statistically significant differences between the groups (p<0.001).

Regression analysis was performed on a subgroup of drivers (figure 4). This revealed an association between the distance from MMC and the cost incurred by the driver (Spearman's r=0.4788, p<0.001). On average, this

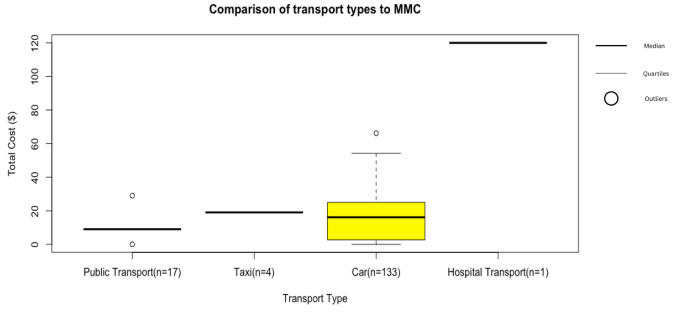

Figure 1 Box plot of the four transport types chosen by respondents travelling to Monash Medical Centre (MMC). There is no IQR for public transport as there are set rates for public transport in Victoria within zones. There is no IQR for taxi or hospital transport total costs due to homogeneous values.

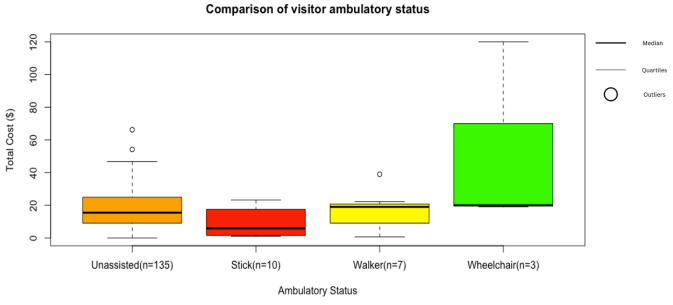

Figure 2 Box plot of ambulatory status, self-reported by questionnaire respondents.

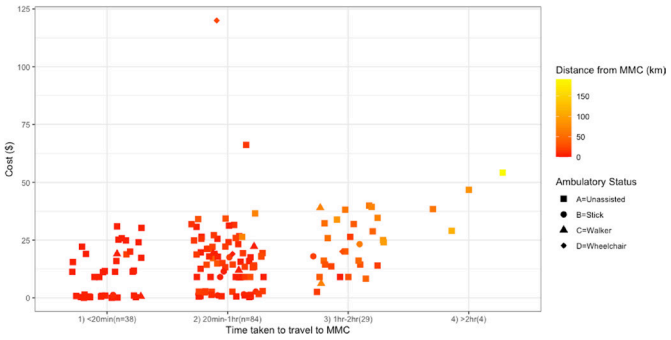

Figure 3 Scatter plot of travel time taken to Monash Medical Centre (MMC) and cost of travel. Shape of each point indicates ambulatory status.

subgroup of drivers spent 60% of their total travel cost on hospital parking (average cost for drivers=$A16.70, average cost of parking=$A10.02).

Regression analyses were also performed between cost and IRSAD percentile, as well as distance to hospital and IRSAD percentile. There was no statistically significant correlation between the cost of travel to MMC and IRSAD percentile (Spearman's rank correlation coefficient=−0.15, p=0.144). However, there was a significant negative association between distance from hospital and IRSAD percentile (Spearman's rank correlation coefficient=−0.26, p<0.001) (figures 5 and 6).

DISCUSSION

We chose to investigate the variation in out-of-pocket costs and travel time incurred by general visitors and outpatients travelling to the neurology clinic at MMC, a large tertiary hospital. Despite the increased use of techniques such as journey mapping being used to understand patient experience within the hospital, important costs and experiences of commuting to hospital have only been covered in the context of cancer care and the transport of critically ill inpatients.[5 6 19–22]

Our results indicated that the majority of patients (86%) chose to travel by car. Driving to clinics and hospitals

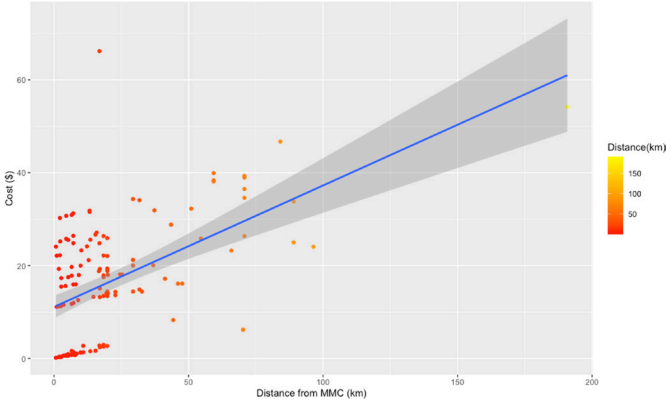

Figure 4 Scatter plot of distance travelled to Monash Medical Centre (MMC) in kilometres and cost in AUD. Trend line indicated in blue is locally estimated scatter plot smoothing.

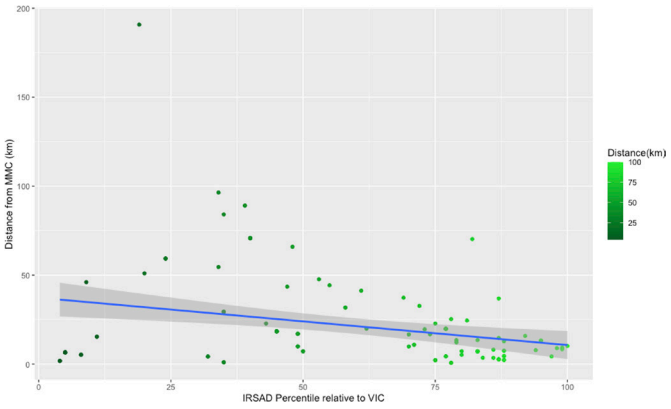

Figure 5 Scatter plot of distance travelled to Monash Medical Centre (MMC) in kilometres and state percentile of Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD). Trend line indicated in blue is locally estimated scatter plot smoothing. VIC, Victoria.

has been noted as an increasingly popular method of travel since the late 1960s as practitioners consolidated their locations of care into larger centralised clinics and hospital centres, rather than practicing out of smaller, one-person satellite clinics.[23 24] For drivers, hospital parking was a large contributor to costs incurred, with 60% of their total travel cost being parking fees. Parking at hospitals tends to be an internationally negative experience yet broadly accepted by visitors. This is due to the severe undersupply of hospital car parks and the high out-of-pocket costs.[25–28] Related to the cost of parking is the link with wait time in outpatient and patient satisfaction.[29] Notably, higher average costs (mean=$A53.00) were incurred by non-ambulatory patients requiring the aid of a wheelchair. This is likely due to the need for these patients to use NEPT to commute to hospital. Non-emergency road transport by clinic car costs patients $A120.00 in Victoria.[30]

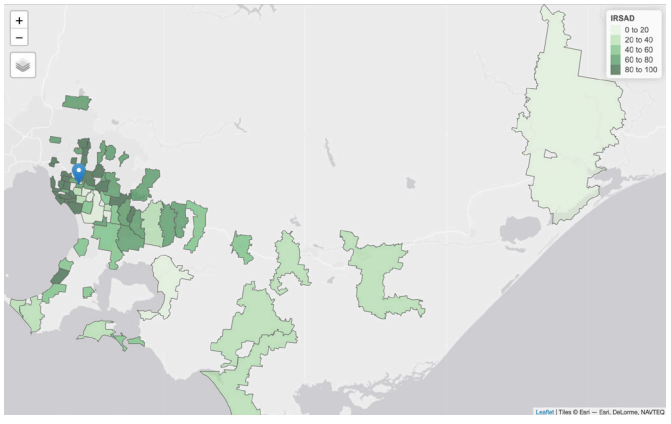

Figure 6 Choropleth of state percentile of Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) by postcode region. IRSAD percentiles are calculated relative to other postcode regions in Victoria, Australia. A larger, interactive view of this map can be viewed here: https://rpubs.com/Mango117/average-irsad-state-percentile.

As shown in figures 5 and 6, increased distance from hospital is negatively associated with socioeconomic status (p<0.001). In many cases, these patients with less accessibility to healthcare services are the ones who require care the most.[31] This is a well-established phenomenon, with rural and regional patients worldwide having poorer access to care and thus poorer outcomes in comparison to those living in metropolitan regions.[32 33]

These data are useful when considering the importance of outpatient clinics bridging primary care and acute services. In a 2003 *Australian Health Review* paper by Collins *et al*, patient opinions about travelling to hospital were the major reason for fail to attend rates (FTA) to outpatient clinics.[34] FTAs not only impact patient care, but they also have much broader second-order consequences to the wider healthcare system of increasing costs, lengthening appointment wait times.[35] In this study, we focused on neurology patients and their support. The result is likely to be generalisable to travel experiences for outpatients across other practices such as dental, ophthalmology and endocrinology.[36]

Patients seem to be receptive to the concept of making transport to clinics and hospitals more accessible.[37] Implementing solutions such as shuttle buses from public transport hubs and increasing accessibility to affordable hospital parking options may have a many-fold effect of reducing FTAs, improving patient experience and ultimately improving patient care and health outcomes.

Limitations

Our study only included 155 patients from MMC for this analysis. Given large variations in the sizes of hospital catchment areas in Victoria, our results may not be generalisable to other tertiary centres or other outpatient clinics. Participants were surveyed in the neurology outpatient clinic waiting room, sometimes prior to their appointment. This meant that reported parking costs were likely an underestimation of the actual cost of parking as the total duration of time at hospital would be unknown. As we did not collect more detailed data on reasons for patient visit, stratification of the cost and number of patients by specialty service could not be analysed. Furthermore, to ensure ease of use when completing the survey, categorical data were collected for variables such as time taken to travel to the hospital and the cost of commute via taxi, meaning that regression analyses could not be completed for these variables. To calculate averages from these categories, the midpoint approach was used, although this approach is subject to binning error. To maintain participant anonymity, postcodes were the only geographical data requested from respondents. While centroid locations could be used with this data, this meant that only straight-line distances were calculated for patient commutes, possibly delivering less accurate results than if specific locations had been provided and thus, driving distance calculated instead.

CONCLUSION

Our study provides analysis on the experience and cost of outpatient visitors to hospital. Future research should be performed with larger, more varied and more detailed datasets, ensuring they are applicable to the larger hospital demographic and thus direct improvements in patient experience.

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Contributors MLA was the primary author and guarantor who completed data analysis and wrote the paper and acts as the guarantor. TP conceived the project, planned, acquired ethics approval and organised data collection. HM and SS were scientific advisors who reviewed the original research proposal and drafts of the paper prior to submission. WCT and RZ assisted with data collection and reviewed the paper during the editing process.

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Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Monash Health Human Ethics Research Committee, NMA HREC Reference Number: 53234, Monash Health Ref: RES-19-0000375L-53234. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available on reasonable request. Survey data can be provided on request.

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