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RESEARCH ARTICLE

REVISED Patient waiting time in the outpatient clinic at a central surgical hospital of Vietnam: Implications for resource allocation [version 3; peer review: 2 approved]

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Abstract

Background: Patient waiting time is considered as a crucial parameter in the assessment of healthcare quality and patients' satisfaction towards healthcare services. Data concerning this has remained limited in Vietnam. Thus, this study aims to assess patient waiting time in the outpatient clinic in Viet Duc Hospital (Hanoi, Vietnam) in order to enable stakeholders to inform evidence-based interventions to improve the quality of healthcare services.

Methods: A cross-sectional study was conducted from June 2014 to June 2015 in the outpatient clinic at Viet Duc Hospital. Waiting time stratified by years (2014 and 2015), months of the year, weekdays, and hours of the day were extracted from Hospital Management software and carefully calculated. Stata 12.0 was employed to analyze data, including the average time (M± SD), frequencies and percentage (%).

Results: There was a total of 137,881 patients involved in the study. The average waiting time from registration to preliminary diagnosis in 2014 was 50.41 minutes, and in 2015 was 42.05 minutes. A longer waiting time was recorded in the morning and in those having health insurance.

Conclusions: Our results provided evidence that despite the decrease of waiting time from 2014 to 2015, waiting time was much higher among patients having health insurance compared to their counterparts. The findings suggest that human resources promotion and distribution should be emphasized in outpatient clinics and health insurance-related administrative procedures should be simplified.


Keywords

Patient waiting time, outpatient clinic, Viet Duc Hospital, health insurance

Open Peer Review

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15 Jun 2017		report
version 2		
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version 1		
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Any reports and responses or comments on the article can be found at the end of the article.

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Author roles: **Tran TD:** Conceptualization, Data Curation, Methodology, Writing – Original Draft Preparation, Writing – Review & Editing; **Nguyen UV:** Conceptualization, Data Curation, Formal Analysis, Methodology, Software, Writing – Original Draft Preparation, Writing – Review & Editing; **Minh Nong V:** Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Software, Writing – Original Draft Preparation, Writing – Review & Editing; **Tran BX:** Conceptualization, Formal Analysis, Methodology, Project Administration, Writing – Original Draft Preparation, Writing – Review & Editing

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REVISED Amendments from Version 2

This version contains some major changes in the introduction section, that we have added the definition of patient waiting time and the patient waiting time across countries. In the method section, we have clarified how we used secondary data instead of collecting primary data. We have also mentioned how we collected these data in the software. In the result section, we have added standard deviation for each measure in tables. Finally, we have rewritten the discussion and conclusion to fit the research question and results. We have also modified the conclusion in Abstract to be appropriate with the conclusion of the revised manuscript.

See referee reports

Introduction

Patient waiting time is defined as the time patients have to wait before meeting clinical staffs or using health service needed^{1–3}. Although patient waiting time has been defined as an important indicator in the assessment of healthcare quality¹ and patients' satisfaction towards healthcare services^{2,3}, lengthy outpatient waiting time has posed a great challenge to maximize healthcare quality⁴. The patient waiting time varies across settings. In Ireland, a study conducted in an outpatient clinic showed that 50% of patients waited 60% for their appointment⁴. In Nigeria, 60% patients had to wait 90–180 minutes for receiving examination⁵. Even in the USA, the average patient waiting time was from 60 minutes in Atlanta to 188 minutes in Michigan⁶. This issue is worse among countries with low provider-patient ratios⁷.

Vietnam is among highly populated countries that are fueled by patient overload, especially in the central hospitals⁸. Thus, extended waiting time has remained highly prevalent. In 2015, a study in Ha Dong General Hospital by Nguyen indicated the average time of medical examination was 96.91 ± 72.16 minutes. The average waiting time was 63.05 ± 62.96 minutes⁹. In 2012, a study by Le *et al.* conducted in an outpatient clinic suggested that the average time spent from registration to doctors' conclusions was 246.87 ± 104.55 minutes (4.11 ± 1.7 hours)¹⁰. Accordingly, patient waiting time is influenced by various factors, such as working procedure, patient overload and appointment schedule^{11,12}. Previous study suggests that appropriate operation of medical examinations could shorten patient waiting times¹³.

Viet Duc is a central hospital, with the aim of ensuring health for Northern Vietnamese patients. The outpatient clinic welcomes hundreds of patients on a daily basis and is often overloaded. Thus, Viet Duc Hospital is always seeking evidence-based solutions to enhance the quality of healthcare services. However, data on patient waiting time in the outpatient clinic at Viet Duc Hospital remains limited. Thus, the aim of this study was to examine patient waiting times in the outpatient clinic, Viet Duc Hospital, thereby enabling the hospital administration to design evidence-based interventions to improve the satisfaction of patients.

Methods

Study design and settings

A cross-sectional study was conducted from June 2014 to June 2015 in the outpatient clinic of Viet Duc Hospital (Hanoi, Vietnam). It is the largest surgical center of Vietnam, with approximately 1300 beds and approximately 150,000 patients using outpatient services annually.

Participants

All patients that underwent a medical examination during this time were eligible for the research. There were no specific exclusion criteria used in this study. Data from a total of 137881 patients were extracted for final analysis.

Data collection and measurements

Time data was collected via Hospital Management Software, which was developed to support hospital management in Viet Duc Hospital. Data concerning the waiting time for utilizing service was computed as the time that patients met the physicians minus the time that the patient registered. These data were automatically recorded when the patients registered and when they met the physicians. We used secondary data instead of primary data in order to get the accurate data for the analysis. By using time record function from the software, we could identify exactly when the patients used their services needed. Due to using secondary data, we did not collect and report the demographic characteristics of patients.

In this study, variables of interest included health insurance status, the waiting time for health service use, year (2014 and 2015), months of the year, weekdays and hours of the day.

Statistical analysis

Data was extracted in Microsoft Excel form and Stata 12.0 was employed to analyze data: the average time ($M \pm SD$), frequencies and percentage (%). Mann-whitney test was used to test the differences of waiting time among variables. P-value < 0.05 was considered statistical significance. Since we extracted data from the software, there was no bias in this study.

Ethical approval

The study was approved by the IRB of Viet Duc Hospital, Hanoi, Vietnam. Data collection procedures and the use of data for analysis were also approved by the directors of Viet Duc Hospital. No personal data concerning patients was collected in this study.

Results

Table 1 illustrates the average waiting time of patients in the outpatient clinic of Viet Duc Hospital. There was a total of 137881 patients who had a medical examination during the time of conducting the research, in which 38298 patients had health insurance, accounting for approximately 27.8%. The average waiting time from registration to preliminary diagnosis in 2014 was 50.41 minutes and in 2015 was 42.05 minutes.

Patient waiting time regarding the hours of the day are presented in **Table 2**. The largest number of patients having a medical examination were in the hours 7:00–8:00 and 8:00–9:00. The lowest number of patients having medical examination were in the hours 11:00–12:00, 15:00–16:00 and 16:00–16:30 (because the hospital was closed at 16:30). The longest patient waiting time was at 6:30 to 7:00, and the time among those having health insurance was 81.54 minutes, while the longest patient waiting time among those who did not have health insurance was 70.63 minutes.

Table 3 shows patient waiting time regarding weekdays. The largest number of patients having a medical examination was on Monday, Tuesday and Wednesday. There were fewer patients on Thursday and Friday. The shortest waiting time was on Thursday, while the longest waiting time was on Tuesday.

Table 4 demonstrates patient waiting time regarding the month of the year. Generally, few patients had medical examinations in February, 2015. The longest waiting time was in July, August, and September for both insured and uninsured patients.

Table 1. Patient waiting time over a two-year period grouped by health insurance.

Year	Health insurance			No health insurance			Total		
	N	%	Waiting time (mins) (SD)	N	%	Waiting time (mins) (SD)	N	%	Waiting time (mins) (SD)
2014	26174	68.34	52.12 (37.15)	49192	49.40	49.51 (36.26)	75366	54.66	50.41 (36.51)
2015	12124	31.66	50.71 (33.97)	50391	50.60	39.96 (33.74)	62515	45.34	42.05 (33.76)
Total	38298	100	51.67 (36.66)	99583	100	44.68 (35.19)	137881	100	46.62 (35.50)
p-value	>0.05								

Table 2. Patient waiting time regarding hours of the day grouped by health insurance.

Time	Health insurance			No health insurance			Total			p-value
	N	%	Waiting time (mins)	N	%	Waiting time (mins)	N	%	Waiting time (mins)	
6:30–7:00	3507	9.16	81.54 (35.79)	13704	13.76	70.63 (35.85)	17211	12.48	72.85 (35.93)	<0.05
7:00–8:00	11498	30.02	60.95 (38.17)	26512	26.62	55.01 (36.98)	38010	27.57	56.80 (37.25)	>0.05
8:00–9:00	10631	27.76	47.34 (34.74)	24506	24.61	38.48 (33.54)	35137	25.48	41.16 (33.84)	>0.05
9:00–10:00	5238	13.68	40.84 (27.96)	15165	15.23	32.85 (26.33)	20403	14.80	34.90 (26.63)	<0.05
10:00–11:00	2339	6.11	39.08 (26.55)	5891	5.92	30.06 (27.25)	8230	5.97	32.62 (27.11)	>0.05
11:00–12:00	727	1.90	74.87 (65.77)	1418	1.42	60.21 (54.36)	2145	1.56	65.18 (57.64)	<0.05
13:00–14:00	2177	5.68	34.32 (27.32)	6140	6.17	27.73 (28.48)	8317	6.03	29.45 (28.33)	>0.05
14:00–15:00	1336	3.49	26.26 (24.83)	4304	4.32	20.56 (24.84)	5640	4.09	21.91 (24.88)	>0.05
15:00–16:00	774	2.02	20.91 (27.39)	1743	1.75	24.71 (25.67)	2517	1.83	23.54 (26.01)	>0.05
16:00–16:30	71	0.19	45.51 (23.60)	200	0.20	87.48 (45.45)	271	0.20	76.48 (44.49)	<0.05

Table 3. Patient waiting time regarding weekdays grouped by health insurance.

Weekdays	Health insurance			No health insurance			Total			p-value
	N	%	Waiting time (mins)	N	%	Waiting time (mins)	N	%	Waiting time (mins)	
Monday	8655	22.60	52.38 (44.71)	23484	23.58	46.50 (43.67)	32139	23.31	48.08 (44.38)	>0.05
Tuesday	9647	25.19	55.00 (38.01)	22931	23.03	46.91 (35.64)	32578	23.63	49.30 (36.12)	<0.05
Wednesday	8123	21.21	48.89 (36.69)	19302	19.38	43.25 (35.72)	27425	19.89	44.92 (35.92)	>0.05
Thursday	6440	16.82	47.98 (35.75)	16746	16.82	42.21 (34.50)	23186	16.82	43.81 (34.77)	>0.05
Friday	5433	14.19	53.18 (35.55)	17120	17.19	43.22 (33.88)	22553	16.36	45.62 (34.24)	<0.05

Table 4. Patient waiting time by month of the year grouped by health insurance.

Year	Month	Having health insurance			No health insurance			Total			p-value
		N	%	Waiting time (mins)	N	%	Waiting time (mins)	N	%	Waiting time (mins)	
2014	6	3585	13.70	52.45 (38.24)	6966	14.16	51.69 (36.41)	10551	14.00	51.95 (37.05)	>0.05
	7	4212	16.09	59.23 (37.83)	8124	16.51	58.77 (37.34)	12336	16.37	58.93 (37.34)	>0.05
	8	3417	13.05	57.79 (37.55)	6925	14.08	58.20 (37.52)	10342	13.72	58.06 (37.54)	>0.05
	9	3524	13.46	57.93 (37.42)	6901	14.03	56.55 (33.71)	10425	13.83	57.02 (37.95)	>0.05
	10	4078	15.58	53.50 (37.49)	7541	15.33	47.41 (35.89)	11619	15.42	49.55 (36.47)	>0.05
	11	3667	14.01	42.19 (33.60)	6200	12.60	36.90 (33.34)	9867	13.09	38.87 (33.46)	>0.05
	12	3691	14.10	41.23 (36.15)	6535	13.28	33.38 (30.23)	10226	13.57	36.21 (30.23)	>0.05
2015	1	2042	16.84	47.47 (34.28)	7747	15.37	33.02 (31.43)	9789	15.66	36.04 (32.14)	<0.05
	2	796	6.57	42.23 (35.19)	4574	9.08	33.93 (31.32)	5370	8.59	35.16 (31.32)	<0.05
	3	2343	19.33	50.02 (39.22)	9986	19.82	37.72 (34.83)	12329	19.72	40.06 (34.83)	<0.05
	4	2082	17.17	49.79 (34.63)	8557	16.98	39.93 (31.90)	10639	17.02	41.86 (32.30)	<0.05
	5	2387	19.69	52.22 (40.12)	9271	18.40	43.40 (34.66)	11658	18.65	45.21 (34.66)	<0.05
	6	2474	20.41	56.06 (36.17)	10256	20.35	47.00 (35.00)	12730	20.36	48.76 (34.98)	<0.05

Dataset 1. Raw data used in the construction of Table 1–Table 4

<http://dx.doi.org/10.5256/f1000research.11045.d157112>

Data from June 2014–June 2015 detailing waiting times of patients and if health insurance was present.

Discussion

The purpose of this study was to assess the patient waiting time in an outpatient clinic, Viet Duc Hospital, Hanoi, Vietnam. Our findings indicate that the average waiting time from registration to preliminary diagnosis was decreased in a period of two years from 2014 to 2015. Findings also suggest the difference regarding waiting time between the morning and the afternoon, those having health insurance compared to those that did not have health insurance.

The average waiting time was lower than previous studies at Ha Dong General Hospital (Hanoi City)⁹, Trung Vuong Emergency Hospital (Ho Chi Minh city)¹⁰, and Nguyen Trai Hospital (Ho Chi Minh City)¹⁴. However, our findings were higher than studies by Vu at the National Hospital of Tropical Diseases (Hanoi City)¹³, and Cole in Australia¹⁵. It could be hypothesized that the outpatient clinic at Viet Duc Hospital is well-qualified (with skilled physicians and advanced medical technologies), patients directly come to the Hospital without visiting healthcare facilities at grass-roots levels, leading to overload. In fact, each department at the hospital receives approximately 130,000 medical visits every year; therefore, overload frequently happens. The study in Trung Vuong Emergency Hospital was conducted in 2011 when the decision 1313/QĐ-BYT related to the medical examination procedure was not implemented. Therefore, patient waiting time might be prolonged.

The higher number of visited patients in the morning and the afternoon observed in our study could be potentially explained since patients prefer to have health consultations in the morning, as they could receive the results of clinical tests within the day. A study by Han *et al.* also indicated that the number of patients that visit An Giang Cardiovascular Hospital (An Giang Province) in the morning is higher than the afternoon¹⁶. Thus, our study highlights the essential need for well-distribution of human resources to shorten patients' time of medical consultations.

Noticeably, those having health insurance had to wait for their turn longer than those that did not have health insurance. This may

potentially reflect shortcomings regarding complicated administrative procedures that could extend waiting time⁹. In fact, cumbersome administrative procedures related to health insurance remain the pressing issue in Vietnamese healthcare system¹⁷. Since this strategy may be hampered by health insurance-related procedures, stakeholders should pay attention on simplifying administrative procedures for insured patients.

Conclusions

Our results provided evidence that despite the decrease of waiting time from 2014 to 2015, waiting time was much higher among patients having health insurance compared to their counterparts. The findings suggest that human resources promotion and distribution should be emphasized in outpatient clinics and health insurance-related administrative procedures should be simplified.

Data availability

Dataset 1: Raw data used in the construction of Table 1–Table 4. Data from June 2014–June 2015 detailing waiting times of patients and if health insurance was present. doi, [10.5256/f1000research.11045.d157112](https://doi.org/10.5256/f1000research.11045.d157112)¹⁸

Author contributions

TDT, UVN, BXT conceived, designed and conducted the experiments; **TDT, UVN, VMN** collected the data; **TDT, UVN, BXT, VMN** analyzed and interpreted the data; **TDT, UVN, BXT, VMN** wrote the paper. All authors read and revised the manuscript.

Competing interests

No competing interests were disclosed.

Grant information

The author(s) declared that no grants were involved in supporting this work.

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Ozayr H. Mahomed

Public Health Medicine, University of KwaZulu-Natal, Durban, South Africa

Introduction- "The patient waiting time varies across settings. In Ireland, a study conducted in an outpatient clinic showed that 50% of patients waited 60% for their appointment"

What does 60% mean or is this an error that required minutes?

Results: The average waiting time from registration to preliminary diagnosis in 2014 was 50.41 minutes and in 2015 was 42.05 minutes- Please write the SD in the text

In table 2 you have p values calculated but there is no mention of this in the text when describing the waiting times in each time category. Were they significant or not?

Your tables are not presented in the conventional manner. We do not place p values in tables. We highlight significance by * for $<0,05$ and ** $p=<0,01$ and have the notion at the bottom.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Health system strengthening, quality improvement

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 2

Reviewer Report 22 May 2017

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**Ozayr H. Mahomed**

Public Health Medicine, University of KwaZulu-Natal, Durban, South Africa

Thank you for providing me the opportunity to review the article. An important topic indeed. However, I think that the introduction is very superficial without adequately contextualising the waiting time problem.

Methodology is very superficial indeed. There is no indication of what additional parameters were added to the hospital management system. What parameters were used to obtain the data? Who enters the data? When is patient waiting time measured from?

Why did the authors do a secondary data analysis and did not conduct primary data collection?

Results - There is no general profile of the patients provided. There is no standard deviation or confidence intervals provided. The results could be better presented using histograms for times of the day.

Discussion - This is highly superficial. There is no mention of queuing theory or application thereof. The study does not provide any human resource data and therefore cannot link the discussion on human resources requirements. The findings were not disaggregated by health insurance and therefore the last paragraph of the discussion cannot be linked to relevant data.

Conclusion - Are tailored to suit the authors agenda but not based on the findings of the study or the aims.

Is the work clearly and accurately presented and does it cite the current literature?

No

Is the study design appropriate and is the work technically sound?

No

Are sufficient details of methods and analysis provided to allow replication by others?

No

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Health system strengthening, quality improvement

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 10 Jun 2017

Vuong Nong Minh, Duy Tan University, Da Nang, Vietnam

Dear Dr.Mahomed,

Thank you very much for your comments. We have carefully clarified and added more details in the updated manuscript. We believe that this version is sufficient for your acceptance.

Sincerely,

Minh Vuong and co-authors

Comments:

1) However, I think that the introduction is very superficial without adequately contextualising the waiting time problem.

Response: We have added more literatures in this section

2) Methodology is very superficial indeed. There is no indication of what additional parameters were added to the hospital management system. What parameters were used to obtain the data? Who enters the data? When is patient waiting time measured from? Why did the authors do a secondary data analysis and did not conduct primary data collection?

Response: We have added more details and clarified why we used secondary data in this section.

3) Results - There is no general profile of the patients provided. There is no standard deviation or confidence intervals provided. The results could be better presented using histograms for times of the day.

Response: We have added standard deviation in each table.

4) Discussion - This is highly superficial. There is no mention of queuing theory or application thereof. The study does not provide any human resource data and therefore

cannot link the discussion on human resources requirements. The findings were not disaggregated by health insurance and therefore the last paragraph of the discussion cannot be linked to relevant data.

Response: We have discussed more the result. The findings have been disaggregate by health insurance, therefore we believe that we can draw the implications as in the discussion.

5) Conclusion - Are tailored to suit the authors agenda but not based on the findings of the study or the aims.

Response: We have rewritten the conclusion in order to be appropriate with the result.

Competing Interests: No competing interests were disclosed.

Reviewer Report 16 May 2017

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Duong Minh Duc 

Department of Reproductive Health, Hanoi University of Public Health, Hanoi, Vietnam

Thanks for the revision. The paper has adapted to my previous comments.

Is the work clearly and accurately presented and does it cite the current literature?

No

Is the study design appropriate and is the work technically sound?

No

Are sufficient details of methods and analysis provided to allow replication by others?

No

If applicable, is the statistical analysis and its interpretation appropriate?

No

Are all the source data underlying the results available to ensure full reproducibility?

No

Are the conclusions drawn adequately supported by the results?

No

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

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Duong Minh Duc 

Department of Reproductive Health, Hanoi University of Public Health, Hanoi, Vietnam

The paper is short and concise but the statistical test is too simple. The authors should use some bivariate analysis.

The discussion about "Moreover, the government has planned to move toward universal health insurance, where 80% of the total population are covered by health insurance and reduce out-of-pocket health expenses to under 40% by 2020. Since this strategy may be hampered by health insurance-related procedures, stakeholders should pay attention on simplifying administrative procedures for insured patients." could be not appropriate because this study has been conducted in a national-level hospital and it could not be refer to universal health coverage which should be provided at grassroot level (commune health station or district hospital).

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

No

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 11 May 2017

Vuong Nong Minh, Duy Tan University, Da Nang, Vietnam

Dear Mr Duc,

Thank you very much for your comments. We would very carefully consider your feedback and revise our manuscript. We hope that our newest version makes you satisfy.

Sincerely,

Authors

Competing Interests: No competing interests were disclosed.

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