

THE EFFECT OF THE URGENT CARE CENTRE ON PATIENTS FLOW AT AL-NOOR SPECIALIST HOSPITAL EMERGENCY DEPARTMENT

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ABSTRACT

Background: Urgent care clinic is one of the 2030 initiatives that contribute to reducing ED congestion. This study will evaluate the effectiveness of the first site of UCC in Makkah by comparing patients' volume in Hospital ED. The comparison will take place before and after the implementation and the rate of non-urgent cases.

Materials and Methods: The observational study evaluates the urgent care clinic & ED utilization of services using Canadian Triage and Acuity Scale (CTAS), select CTAS 4,5 as non-urgent visits. Data extracted and collected from Al-Noor automated system and manually from the UCC clerk due to lack of automated system at the UCC. The project data collected from August 2018 to December 2019 for UCC, and from 2016 - 2019 for ED to study the differences before and after the UCC activation. The study will be using SPSS statistic program for analyzing and interpreting.

Result: Study result shows about 50% reduction in non-urgent visits post-intervention. T.test result (11.227) was highly significant $p < 0.00 < 0.05$ the study proves that the UCC improve ED congestion. Odds ratio reports the relation between the non-urgent visits and age group and result show that UCC services are overutilized by middle age group. Most visits were made to the UCC during off duty hours on weekdays.

Conclusion: The 50% reduction in ED congestion was a result of UCC activation, further investigations are needed to report the effectiveness of UCC to improve the waiting time.

Keywords: Urgent Care Clinic, ED Congestion, Non-Urgent Cases, Canadian Triage and Acuity Scale, Primary Health Care, Iskan.

1.0 Introduction

Urgent Care Centre (UCC) is one of the National Transformation Initiatives that is linked to one of the strategic objectives in the Ministry of Health (MOH) in Saudi Arabia (Arabia, 2016). These objectives will improve healthcare services before hospitalization under the relevant 2030 Vision goals. The strategic objective aims at enhancing the quality of healthcare services, preventive or therapeutic. The number of non-urgent cases visiting hospitals' Emergency Department (ED) has been increasing during the last decade (Morley et al., 2018). One of the initiatives under Vision 2030 is to reduce congestions among hospitals' EDs by diverting non-urgent cases to primary health care centers (PHCs). The Canadian Triage and Acuity Scale (CATS), considered one of the approaches to improve patients flow by categorizing patients based on their level of illness, consists of five levels and triage out less urgent cases CTAS 4 and 5 (Bullard et al., 2017).

The MOH classifies different health organizations according to their geographical area in the kingdom of Saudi Arabia and according to the level of provided services. These services include primary, secondary, and tertiary to develop the cluster group to implement the 42 initiatives under the model of care module. MOH divided the kingdom into three main categories: Western clusters (W1, W2, W3, W4, W5, W6), Central clusters (C1, C2), and Eastern clusters (E1, E2, and E3). The W1 Cluster in Makkah was the first cluster to implement the Urgent Care Clinic (UCC) initiative that includes two PHCs. The initial implementation was through creating the action plan and training key staff to develop policies and procedures. The project will also apply CTAS in hospitals' EDs and triage out non-urgent cases to PHCs.

2.0 Materials and Methods

The experimental research design uses mixed quantitative and qualitative data to assess the improvement by examine the situation pre- and post-intervention, then verify UCC results. The observational descriptive cohort study tries to prove if there is a relation between UCC activation and reduction in Non-urgent cases volume by using one of T.test family.

The Canadian Triage and Acuity Scale is used to classify the visit's triage level in both sites. Access spreadsheet designed by project quality team was used to aggregate the data weekly from UCC clerks and evaluate the strategic initiative effectiveness. The project team used ED automated system at Al-Noor specialist hospital to retrieve ED data and Excel sheet to extract it monthly.

All visits occurred during the study period at Al-Noor ED and Iskan UCC have been included except the incomplete and piloting data. This data will be removed due to UCC policies updated after the trial period. Iskan UCC data will be analyzed because it's corresponded to Al-Noor Hospital ED, the first site in Makkah implement the urgent care initiative.

Total Number of visits at Al-Noor specialist hospital ED was 643,460 in four years from 2016, until 2019. 574,777 of the visits received care in the triaging area and 68683 have no triage classification on the system. The data was extracted from Al-Noor automated system monthly. UCC has 42,061 visits during the study period and 18,757 of visits occurred in the Iskan UCC.

The UCC data obtained manually from UCC clerk on a weekly basis by using Access spreadsheet. Iskan UCC has 18,757 visits after the triage out process started some of them were in piloting period, it was about 5,487 visits and 13,270 visits were in full implementation phase from August 2018 to December 2019.

Ethical approval number (H-02-K-076-0620-317) obtained on 23 August 2020 issued by Regional Health Directorate in Makkah (Institutional Review Board at Al-Noor Specialist Hospital). The IRB provided approval in terms of adherence to research guidelines, such as keeping the patient's confidentiality and using data for research purposes only.

3.0 Result

The analysis part will identify and clarify the pattern of non-urgent visits, through the descriptive and inferential statistic to determine the majority of sample size distribution. By comparing the means of the period pre and post the implementation phase, the study reveals and shows-up the percentage of reduction in non-urgent visits after the activation of UCC.

3.1 Table-1: Descriptive statistics for Total number of visits at ED and UCC.

Table-1 exhibits that many patients who receive UCC and ED services are Saudi patients according to the descriptive statistic result. Most of the visits are for Male patients in both sites. The 70% of visits classify as CTAS-5 in UCC and 58.5% of ED visits classify as CTAS-4, both are under the non-urgent visits as the Triage Scale definition. The majority is for patients between 21- and 40-years old utilizing ED and UCC services. UCC has little high volume of visits on Monday, but the ED high volume of visits was on Saturday, and less than 8% use the UCC services during the weekend. Total number of triage-out for 2018 and 2019 after the UCC activated is 27084 visits. Less than 5.8% out of triage-out is returned back to ED as a result of wrong triage decision. The number of UCC patient transfer to ED is less than 1% that indicates the non-urgent patient rarely needs ED services. Total number of visits is 574777 for patients who received the triage services, mean 3.67, mode 4.00, median 4.00, SD 0.719 that reveal the data was normally distributed around the mean.

Attributes	UCC = 13,270		ED = 643,460	
	UCC Visits	%	ED Visits	%
Nationality				
Non-Saudi	2,383	17.96%	234,978	36.52%
Saudi	10,887	82.04%	408,482	63.48%
Gender				
Female	6,066	45.71%	261,647	40.66%

Male	7,204	54.29%	381,813	59.34%
Triage level	UCC Visits	%	ED Visits	%
CATS - 1	NA	0.00%	10,470	1.63%
CTAS - 2	9	0.07%	17,335	2.69%
CTAS - 3	4	0.03%	136,159	21.16%
CTAS - 4	3,885	29.28%	376,754	58.55%
CTAS - 5	9,372	70.63%	34,059	5.29%
Missing	0	0%	68,683	10.67%
Age	UCC Visits	%	ED Visits	%
Month - 20 years	3,968	29.90%	115,791	18.00%
21 - 40 years	4,793	36.12%	242,239	37.65%
41 - 60 years	3,657	27.56%	164,295	25.53%
above 60	829	6.25%	121,052	18.81%
Missing	23	0.17%	83	0.01%
Weekend Vs. Weekdays	UCC Visits	%	ED Visits	%
Sunday	2,506	18.88%	96,054	14.93%
Monday	2,577	19.42%	91,813	14.27%
Tuesday	2,465	18.58%	91,970	14.29%
Wednesday	2,354	17.74%	91,403	14.20%
Thursday	2,331	17.57%	89,117	13.85%
Friday	519	3.91%	86,318	13.41%
Saturday	518	3.90%	96,785	15.04%

3.2 Table-2: The total number of urgent and non-urgent visits at ED over the four years.

Urgent Vs. Non-Urgent	2016 Visits	2017 Visits	2018 Visits	2019 Visits	%
Urgent	2,583	17,648	46,298	97,435	25%
Non-Urgent	64,898	137,148	123,743	85,024	64%
Missing	1,480	30,099	15,695	21,409	11%

Table-2 exhibits that the 64% of ED visits are non-urgent while 25% of visits are urgent so, that proves the ED is busy delivering services for non-urgent patients and consume the resources out of ED scope of services. This will affect the quality of services for the ED targeted group. Moreover, the number of urgent visits in 2019 was bigger than non-urgent visits unlike the previous three years. The number of urgent visits in 2019 comparing to the number of non-urgent visits at the same year indicated that the ED utilization of services has improved.

3.2.1 Table-3: The difference in non-urgent visits pre and post UCC intervention.

2016	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
%Non-Urgent	99%	100%	98%	83%	93%	98%	99%	99%	89%	99%	99%	96%
2017	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
%Non-Urgent	95%	96%	96%	92%	95%	97%	60%	95%	97%	84%	82%	82%
2018	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
%Non-Urgent	85%	82%	61%	75%	65%	70%	80%	36%	62%	70%	72%	65%
2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
%Non-Urgent	58%	63%	49%	43%	30%	47%	47%	41%	44%	41%	39%	43%
Confidence 95%												
Paired Samples Test		N	Mean	SD	upper	Lower	t	df	Sig. (2-tailed)			
Pre-intervention		24	.9263	.09030	.42189	.29061	11.227	23	.000			
Post-intervention		24	.5700	.15965								

Table-3 exhibits the percentage of non-urgent visits in ED over four years. The table expresses the highest percentage of non-urgent visits; it was in 2016 and 2017 pre-intervention. It was also around 93% of visits in average, but this percentage is going down

over the years. The average of non-urgent visits is 96% in 2016 and 89% in 2017 but it gradually decreased to 69% in 2018 and 45% in 2019 because of UCC activation. The data is normally distributed under confidence interval CI= 95% (lower limit .29 – upper limit .42) T. test value (11.227) and p value (0.05 > .000). The result indicates that there is a high statistically significant difference in the number of non-urgent visits after the UCC activation so; the study rejects the null hypothesis related to non-urgent visits.

3.2.2 Figure-1: The progress of non-urgent visits during the four years.

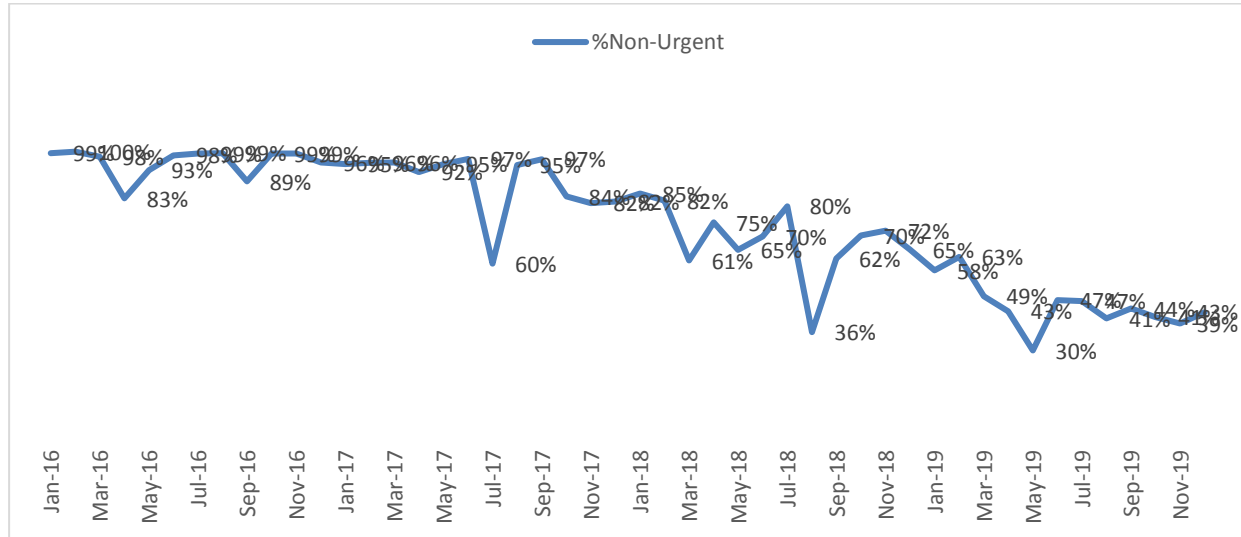


Figure-1 illustrates the percentage of non-urgent visits in the ED. The slop downwards throughout the years as a result of UCC post-intervention aligned with the study hypothesis. Results report about 50% reduction in non-urgent percentage after two years of UCC activation.

3.3 Table-4 The total number of ED visits grouped by the day of the week.

Weekend Vs. Weekdays	Non-Urgent	%	Urgent	%	Missing	%	Total
Sunday	61,148	64%	23,920	25%	10,986	11%	96,054
Monday	58,067	63%	23,617	26%	10,129	11%	91,813
Tuesday	58,705	64%	23,227	25%	10,038	11%	91,970
Wednesday	56,997	62%	24,438	27%	9,968	11%	91,403
Thursday	55,797	63%	23,657	27%	9,663	11%	89,117
Friday	55,753	65%	22,566	26%	7,999	9%	86,318

Saturday	64,346	66%	22,539	23%	9,900	10%	96,785
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Table-4 exhibits the ED volume of visits per day; the large proportion of non-urgent visits at ED is on Saturday. It was about 66% out of total number of ED visits. Odds ratio 0.990 CI: (0.971 to 1.009) p value 0.293 insignificant, the study result accepts the null hypothesis and indicates that the nonurgent visits use the ED services on weekdays more than weekends.

3.4 Table-5 The total number of ED visits grouped by the shift.

Shift	Non-Urgent	%	Urgent	%	Missing	%	Total
Afternoon shift	152,583	66%	54,628	24%	24,060	10%	231,27 1
Morning shift	152,841	61%	70,384	28%	28,582	11%	251,80 7
Night shift	105,389	66%	38,952	24%	16,041	10%	160,38 2

Table-5 exhibits the volume of visits divided by duty hours. The biggest non-urgent proportion was for Afternoon and early morning shifts versus urgent visits. The odds ratio 1.207 CI: (1.191 to 1.224) p value 0.000 is highly significant statistic result reject the null hypothesis and the study proves that the non-urgent visits are using ED services out of duty hours.

3.5 Table-6 The total number of ED visits grouped by the patient age at arrive.

Age	Non-Urgent	%	Urgent	%	Missing	%	Total
Month - 20 years	67,588	58.37%	37,052	32%	11,151	10%	115,791
21 - 40 years	164,900	68.07%	53,555	22%	23,784	10%	242,239
41 - 60 years	107,033	65.15%	39,601	24%	17,661	11%	164,295
above 60	71,272	58.88%	33,755	28%	16,025	13%	121,052
Missing	20	24.10%	1	1%	62	75%	83

Table-6 exhibits the volume of visits divided by age group; the greatest proportion of non-urgent visits is 68% linked to the middle age group of people between 21 and 40 years old. The result indicated that the young people commonly tend to overuse ED services. The significant odds ratio is 1.263 CI: (1.241 to 1.284) p value 0.000 so, the study result accepts the null hypothesis for old people using ED services and rejects the null for young people that tend to abuse the ED services as they fall under the non-urgent visits.

3.6 Table-7 The total number of visits grouped by the chief complaints “Diagnosis” at UCC arrive.

Chief Complaints (Diagnosis)	Visits	%
Minor respiratory illness (Bronchial asthma)	17	0.13%
Muscle skeletal pain, Simple infection (UTI, URTI)	17	0.13%
Strains and Sprains	17	0.13%
Acute vomiting and diarrhea	26	0.20%
Non complicated skin infections	58	0.44%
Minor Ear and Eye infection and injury, Muscle skeletal pain	60	0.45%
Migraine headache	126	0.95%
Mild dehydration	156	1.18%
Childhood Illness	273	2.06%
Acute Febrile viral illness in stable patients	586	4.42%
Other	696	5.24%
Minor Ear and Eye infection and injury	697	5.25%
Muscle skeletal pain	928	6.99%
Simple infection (UTI, URTI)	9,613	72.44%

Table-7 exhibits the UCC total number of visits divided by diagnosis; the higher percentage is more than 72% for visits diagnose as simple truck infection. The result rejects the null

hypothesis for the chief complain about non-urgent patients using the UCC services. The result reflects that most of the non-urgent visits diagnose as UTI, URTI based on ICD-10 coding.

3.7 Table-8 The total number of ED visits grouped by the patient's type.

Patients Type	Missing	Non-Urgent	Urgent	Total
Citizen	19,595	135,943	91,110	246,648
GCC Citizen	104	394	253	751
Hospital staff and their families	639	3,286	2,559	6,484
Royal order	160	1,176	737	2,073
Hajj& Umrah Visitors	10,524	42,192	26,207	78,923
Resident	25	72	61	158
Resident not eligible	3,824	9,949	12,471	26,244
Other	2,233	15,755	10,335	28,323

Table-8 exhibits the type of patients received the ED services. Result shows that the second type in volume of non-urgent visits after the citizens were Hajj& Umrah visitors. The result proves that the ED is overutilized by Hajj and Umrah visitors as governmental policy allows Hajj people to use the services and Hajj people would like to use free services provided by Saudi MOH.

3.8 Figure-2: Number of elderly's people using ISKAN UCC services.

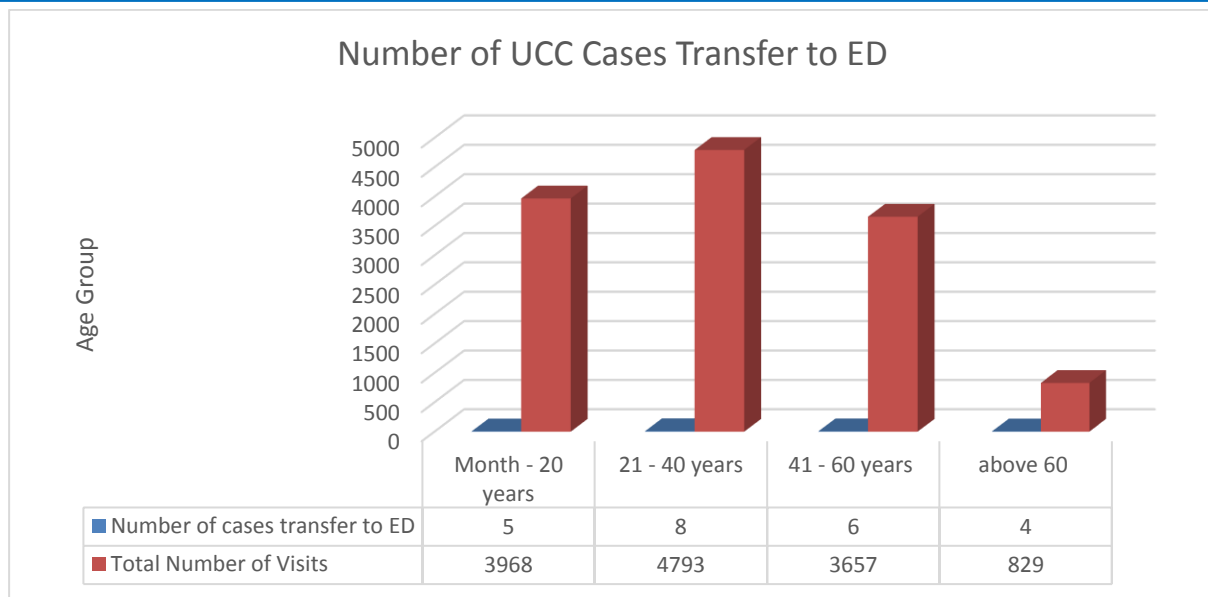


Figure-2 illustrates the total number of visits grouped by age using UCC services and the number of cases transfer from UCC to ED. Around 23 of patients use ambulance to transfer to ED, 4 of them were above 60 years old. Figure 2 accepts the null hypothesis related to aging people overuse ED services.

4.0 Discussion

Previous studies report massive consequences with congestion in ED. This study documents the pattern of non-urgent visits in the ED as a factor leading to overuse of ED services. UCC activation plays a major role in improving the quality of ED services. About 50% of reduction reported in this study for non-urgent visits, help the ED to deliver the emergency services for the target group of patients and save the ED resources that reflected on the total number of urgent visits in 2019 versus non-urgent visits in the last three years regardless the effect of annual growth rate. The reduction in non-urgent visits at ED reflected on UCC number of visits as mentioned in the previous study (*CASE STUDY*, 2009). Less than 1% of urgent visits attend UCC comparing to the total number of visits, in case of UCC receive the urgent visit it can transfer the patient to the nearest ED. The percentage of utilization of urgent visits for UCC indicates that there is no need to equip these clinics with heavy equipment, as UCC receive non-urgent visits that do not require resources as classified in previous studies (By & Outcomes, 2016).

The study result shows that the pattern of non-urgent visits consumes the ED services were out off duty hours for the middle age group, unlike what was mentioned in previous studies. Previous results indicate that the percentage of elderly people attending the emergency

departments was the most prominent percentage abuses the ED services. This study reveals that the elderly people above 60 years old and youth under the 20 years old were the most of urgent visits proportion. The large proportion of ED visits urgent and non-urgent were on the weekday in contrast with other studies result. The result accepts the null hypothesis related to the weekend visits because the people tend to attend the emergency department on the weekday.

The findings emphasized and confirmed the decrease in the percentage of non-urgent visits in ED after the activation of UCC. The pattern of non-urgent visits was out off duty hours so, policy makers should raise a decision to open UCC after duty hours on weekdays upon the patient need and open special clinic for Hajj& Umrah visitors near to their accommodations to relief the pressure of non-urgent visits for Hajj& Umrah visitors on ED total number of visits. Virtual clinic can also serve all Hajj& Umrah visitors and citizen patients as it covers all geographic location and provide patients with appropriate consultation to improve the situation especially at quarantine time as healthcare institutions were forced to provide some OPD services through virtual clinic aligned with quarantine policy to avoid spreading the virus.

Upon the diagnosis list recorded in UCC by clerks, that shows us the large percentage of visits classified as simple infection. This diagnosis needs less resources as mention in previous study (By & Outcomes, 2016) because the patients classify as non-urgent visits at level-5 in the triage scale need little attention and property to serve this group of people.

The policy makers work to expand the UCC services all over the kingdom of Saudi Arabia according to increasing demand of non-urgent visitors across the world. The expansion will depend on patients need according to their place of residence and time that they receive the services. The study showed us that there is a low need for urgent care clinics at weekends, contrary to what has been mentioned in studies conducted in other countries (Kiran et al., 2018), (Stoimenoff et al., 2018), (Krause, Cazaban, 2018) patients tend to visit UCC and ED on weekdays unlike what has been expected in study hypothesis.

5.0 Conclusion and recommendation

The study proved that non-urgent visits decreased after the activation of urgent clinic, and it also proved that the percentage of non-urgent visits was for middle-aged group between 21-40 years old, and they utilize emergency services during the weekdays' off duty hours. The percentage of misclassified cases in the ED triage area was less than 1%, and this indicates that these cases do not need to come to the ED or receive emergency services and that proved the emergency staff have a high ability to classify these cases and transfer them in a safe way to UCC, and there is no need to open such clinics near to the emergency departments. Open the UCC off duty hour on the weekdays upon the statistical data calculated. Close the clinic on weekends due to underutilization of UCC services as reported and to keep the ED resources. It will be better if the research studies the waiting time for non-urgent visits at ED and UCC to decide how many clinics need to operate in each cluster. Also, further investigation is needed to report the common medication that the patients need because this will improve the UCC

implementation in future. Open Hajj and Umrah UCC will help the ED to relief the congestion consequence at the peak time of Hajj and Umrah.

The study indicates that the UCC was the best initiative to improve ED congestion because UCC decreased unnecessary visits and utilized ED resources. The study reports about 50% of decrees in non-urgent visits in short period of time and remaining need special solution to resolve it as well as Hajj and Umrah people.

Acknowledgement

First, thanks to Allah for helping me to complete this project. Second, I would like to acknowledge Layan Al.Qasemi for her advice on the proofreading. And special thanks to Dr. Waleed for his opinion. This project is dedicated to the vision realization office team. They have been a constant source of support and encouragement during the challenges of graduation. I am truly grateful to work with you all. It is also dedicated to my parents, who love me and inspire me limitlessly and help me to work hard to achieve my objectives.

Declaration

We hereby declare that the project entitled “The Effect of the Urgent Care Centre on Patients Flow at Al-Noor Specialist Hospital Emergency Department” submitted to the International Journal of Public Health and Clinical Sciences under the guidelines of postgraduate Research, at King Abdulaziz University, Jeddah. This work has not previously been submitted to any other journal for publication.

Authors contribution

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References

- Arabia, S. (2016). *National Transformation Program 2020*. Saudi Arabia.
https://vision2030.gov.sa/sites/default/files/NTP_En.pdf
- Bullard, M. J., Musgrave, E., Warren, D., Unger, B., Skeldon, T., Grierson, R., Van Der Linde, E., & Swain, J. (2017). Revisions to the Canadian Emergency Department Triage and Acuity Scale (CTAS) Guidelines 2016. *Canadian Journal of Emergency Medicine*.
<https://doi.org/10.1017/cem.2017.365>
- By, D., & Outcomes, C. (2016). *Computers in Emergency Medicine AN ELECTRONIC*

- EMERGENCY TRIAGE SYSTEM TO IMPROVE PATIENT.* 50(6), 910–918.
- CASE STUDY, healthcare financial management 9 (2009). hfma.org
- Kiran, T., Moineddin, R., Kopp, A., Frymire, E., & Glazier, R. H. (2018). Emergency department use and enrollment in a medical home providing after-hours care. *Annals of Family Medicine*, 16(September/October 2018), 419–427. <https://doi.org/10.1370/afm.2291>
- Krause, Cazaban, P. and V. (2018). Comparison of utilization of urgent care and primary care 2011-2015. *Family Medicine Annd Care*, 1(1), 6. <https://doi.org/10.15761/FMC.1000102>
- Morley, C., Unwin, M., Peterson, G. M., Stankovich, J., & Kinsman, L. (2018). Emergency department crowding: A systematic review of causes, consequences and solutions. *PLoS ONE*, 13(August 30, 2018), 1–42. <https://doi.org/10.1371/journal.pone.0203316>
- Stoimenoff, L., Newman, N., Committee, P. P., Dunn, T., & Noe, T. (2018). URGENT CARE INDUSTRY WHITE PAPER 2018 (Unabridged) The Essential Role of the Urgent Care Center in Population Health. *2018 Urgent Care Association*, 2018, 21.