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Characteristics and Outcomes of Conditions Encountered in Primary Care During FIFA World Cup 2022 in Qatar - A Cross-Sectional Study

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ABSTRACT

The FIFA World Cup, a massive football event, presents significant challenges to healthcare systems. Primary healthcare plays a crucial role in patient-provider interactions and serves as a cornerstone of the system. This study aimed to assess the frequency, characteristics, and outcomes of conditions treated in primary care facilities during the FIFA World Cup Qatar 2022. A cross-sectional study was conducted from November 15 to December 20, 2022. All patients visiting the 29 governmental primary healthcare facilities in Qatar were included. Anonymous patient data, including age, sex, nationality, diagnosis, treatments, visit date, consultation type, and outcomes, were extracted from electronic medical records. A total of 401,962 patients were seen in primary care, with an average age of 34.50 ± 19.3 years. Less than 1% held Hayya Visa ($n=3120$, 0.8%), and roughly 2% were referred to secondary care (8494, 2.1%). The most prevalent diagnoses were Type 2 diabetes mellitus ($n=59670$, 7.7%) and upper respiratory tract infection ($n=47364$, 6.2%). Paracetamol was the most frequently prescribed medication ($n=69,960$, 11.9%). Elderly patients ($OR=1.23$), non-Qatari patients ($OR=1.25$), and male patients ($OR=1.17$) were more likely to be referred to secondary care. Hayya cardholders were about twice as likely to be transferred ($OR=2.40$). Primary healthcare services operated efficiently during the FIFA World Cup 2022 in Qatar. The majority of cases involved managing chronic diseases and minor respiratory infections. Football enthusiasts and non-Qatari individuals were more often referred to secondary healthcare. These findings can guide policymakers in enhancing primary healthcare services for future mass gatherings.

INTRODUCTION

The FIFA World Cup is a major global football event that presents substantial challenges to the healthcare system (Karami, 2018). According to the World Health Organization, mass gatherings refer to planned occasions where a large number of individuals convene, potentially straining the resources, planning, and response capabilities of the host community's health system. Therefore, a well-prepared plan is necessary to address these challenges (Wilder-Smith & Steffen, 2019).

In 2022, Qatar, a member of the Gulf Cooperation Council in the Middle East, hosted the FIFA World Cup, attracting around 1.5 million visitors. Qatar undertook significant investments and endeavours to enhance its infrastructure and healthcare system in preparation for this international event. These efforts encompassed augmenting the capacity of the healthcare system by expanding emergency and ambulance services, as well as constructing new hospitals and primary healthcare centers (Organization, 2023).

Primary healthcare constitutes the initial point of contact between patients and healthcare providers, serving as a fundamental pillar of the healthcare system (Shi, 2012). It delivers comprehensive preventive, diagnostic, and therapeutic services that are readily accessible, aiming to enhance health outcomes, reduce costs, and optimise the utilisation of secondary care services. Due to its broad scope, primary healthcare encounters the majority of patients and various medical conditions (Starfield *et al.*, 2005).

Numerous studies have examined the most prevalent medical presentations encountered in primary care. For example, a systematic review conducted by Finley *et al.* encompassed eighteen studies from twelve countries across five continents. It revealed that upper respiratory tract infections, hypertension, routine health check-ups, diabetes, depression, anxiety, pneumonia, acute otitis media, back pain, and dermatitis were among the most frequently diagnosed conditions. Simultaneously, patients most commonly reported visiting for symptomatic issues, including cough, back pain, abdominal discomfort, pharyngitis, dermatological concerns, fever, headache, leg symptoms, respiratory concerns, and fatigue (Finley *et al.*, 2018).

Similarly, a cross-sectional study was conducted to evaluate prevalent conditions in general practice settings. It found that pulmonary, gastrointestinal, orthopaedic, and cardiac issues constituted 67.71% of the total health problems encountered in general practice. Furthermore, the study identified acute upper respiratory tract infections as the most prevalent health issue seen in primary care facilities (6.67%), followed by chronic conditions like hypertension and diabetes mellitus (Chen *et al.*, 2022). Similar findings were reported by other studies as well (Adib *et al.*, 1995; Gong *et al.*, 2020).

In Qatar, primary healthcare services are administered through a network of healthcare centres. Aligned with health demands, a strategic plan for primary healthcare was devised, with health centres strategically distributed

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across three regions: central, northern, and western areas (Al-Kuwari *et al.*, 2020; Ali Abdulmalik *et al.*, 2022). A total of 29 government-run health centres provide both preventative and therapeutic medical services to the entirety of Qatar's population (Al-Kuwari *et al.*, 2021). The present study aimed to determine the most common conditions encountered in primary care facilities during the FIFA World Cup 2022 in Qatar. It aims to offer clinical insights that can be applied in subsequent mass gatherings, contributing to a better understanding of prevalent conditions in primary care centres during such events and enhancing the preparedness of the healthcare system, particularly primary healthcare, for future large-scale occasions.

MATERIALS AND METHODS

Between November 15 and December 20, 2022, a cross-sectional study was carried out to identify the most commonly encountered conditions in primary care facilities during the World Cup. Qatar's primary health services are provided through 29 governmental primary health centres that are dispersed throughout the country. These centres operate on weekdays, with 18 of them also remaining open on public holidays and weekends and 10 operating around the clock. The analysis included all patients who visited these governmental primary healthcare centres during the specified period. The study included all patients accessing primary healthcare centres in Qatar, irrespective of age, gender, nationality, or condition. No exclusion criteria were applied. Given that all patients attending the healthcare centres were encompassed in the study, a sample size calculation was optional.

Study Instrument and Variables

A data collection tool was devised to gather baseline information on patients, encompassing age, gender,

nationality, diagnosis, treatments, and date of visit. Additionally, the type of consultation (in-person or virtual) and the visit's outcomes (discharge or transfer) were recorded. Diagnoses and related data were extracted from electronic records, all of which were de-identified to safeguard patient privacy and confidentiality.

Statistical Analysis

Data analysis was conducted using the Statistical Package for the Social Sciences program for Windows (V.25.0; IBM Corp, Armonk, New York, USA). Quantitative variables were presented using means and standard deviations, while qualitative variables were expressed as frequencies and percentages. A bar chart was employed for data visualisation. The chi-square test and T-test were applied as appropriate to ascertain the statistical significance between baseline characteristics of patients and visit outcomes (transfer or discharge). A p-value less than 0.05 was considered statistically significant.

RESULTS

A total of 401,962 patients were encompassed in the study. Their ages spanned from 0 to 109 years, with an average age of 34.50 ± 19.3 . Notably, about two-thirds of these patients were of non-Qatari nationality ($n=261,598$, 65.1%), and the majority were females ($n=236,160$, 58.8%). It was observed that one in every four consultations took place virtually ($n=99,821$, 24.8%). A small proportion of participants, less than 1%, possessed a Hayya Visa ($n=3,120$, 0.8%), and approximately 2% were transferred to secondary care facilities (8,494, 2.1%). The detailed baseline characteristics of the patients can be found in Table 1.

The frequency of visits to primary healthcare facilities fluctuated throughout the course of the event. Illustrated in Figure 1, the daily visits ranged from 2,335 to 17,261 visits per day.

Table 1: Baseline Characteristics of the Patients

Baseline Characteristics of the Patients		n (%)
Age, mean, SD		34.50 \pm 19.3
Age in years	0-17	80118 (11.1)
	18-45	205604 (19.9)
	46-59	71788 (51.2)
	≥ 60	44452 (17.9)
Nationality	Non-Qatari	261598 (65.1)
	Qatari	140364 (34.9)
Sex	Male	165802 (41.2)
	Female	236160 (58.8)
Consultation type	In-person	302141 (75.2)
	Virtual Consultation	99821 (24.8)
Hayaa-Visa holder	No	398842 (99.2)
	Yes	3120 (0.8)
Discharge status	Discharged	393468 (97.9)
	Transferred	8494 (2.1)

Number of Visits To Primary Healthcare Centers During World Cup 2022 in Qatar

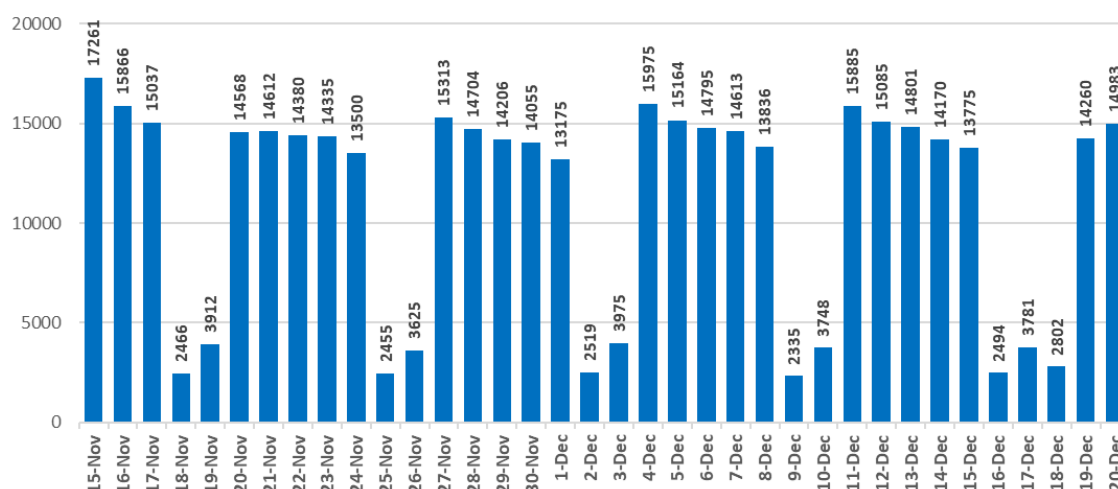


Figure 1: Number of Visits to Primary Healthcare Centers During World Cup 2022 in Qatar

Most Common Diagnosis

Physicians recorded a total of 769,945 diagnoses. Type 2 diabetes mellitus without complications (n=59,670, 7.7%) was the most frequently registered diagnosis, followed

closely by upper respiratory tract infections (n=47,364, 6.2%). Patients holding the Hayya card exhibited similar diagnoses to those without it as shown in Table 2.

Table 2: Most common registered diagnoses

The most common diagnosis among Hayya card holders, TN=4656		The most common diagnosis among other patients, TN=765289	
Diagnosis	n (%)	Diagnosis	n (%)
Viral upper respiratory tract infection	637 (13.7)	Type 2 diabetes mellitus without complication	59504 (7.8)
Type 2 diabetes mellitus without complication	166 (3.6)	Viral upper respiratory tract infection	46727 (6.1)
Essential (primary) hypertension	119 (2.6)	Essential (primary) hypertension	27216 (3.6)
Unspecified place of occurrence	96 (2.1)	Issue of repeat prescription	16223 (2.1)
Unspecified activity	95 (2.0)	Vitamin D deficiency	13843 (1.8)
Well baby	73 (1.6)	Telephone consultation	13007 (1.7)
Abdominal pain	58 (1.2)	Well baby	11079 (1.4)

The Most Commonly Prescribed Medications

Over the evaluated period, primary care physicians issued a total of 589,155 prescriptions. The most frequently prescribed medication was Paracetamol (n=69,960,

11.9%). Following closely, Cholecalciferol tablets (n=40,931, 6.9%) and Ibuprofen tablets (n=20,901, 3.5%) were among the commonly recommended medications by physicians as shown in Table 3.

Table 3: Most common prescribed medications

The most common medications are given to Hayya card holders, TN=5753		The common medications are given to other patients, TN=583402	
Diagnosis	n (%)	Diagnosis	n (%)
Paracetamol	975 (16.9)	Paracetamol	68985 (11.8)
Ibuprofen	288 (5.0)	Cholecalciferol	40931 (7.0)
Vitamin C	261 (4.5)	Ibuprofen	20613 (3.5)
Chlorhexidine	252 (4.4)	Chlorhexidine	17934 (3.1)
levocetirizine	248 (4.3)	Vitamin C	16556 (2.8)
Amoxicillin/clavulanate	223 (3.9)	Levocetirizine	14750 (2.5)
Dextromethorphan (Cough Suppressant)	189 (3.3)	Diclofenac topical	13399 (2.3)
Diclofenac topical	185 (3.2)	Cetirizine/pseudoephedrine	13131 (2.3)
Cetirizine/pseudoephedrine	179 (3.1)	Xylometazoline	12172 (2.1)
Diphenhydramine/ammonium chloride	155 (2.7)	Amoxicillin/clavulanate	12020 (2.1)

Association Between Visit Outcomes and Baseline Characteristics of the Patients

As indicated in Table 4, individuals aged 60 years and older exhibited elevated rates of referral in comparison to their younger counterparts ($P<0.001$). Non-Qatari patients ($P<0.001$), male patients ($P<0.001$), those opting for in-person consultations ($P<0.001$), and individuals holding the Hayya card ($P<0.001$) demonstrated higher instances of transfer to secondary care.

The outcomes of the logistic regression analysis are

detailed in Table 5. The findings indicate that patients of advanced age ($OR=1.23$), non-Qatari nationality ($OR=1.25$), and male gender ($OR=1.17$) exhibit a higher likelihood of being referred to secondary care facilities. Notably, individuals holding the Hayya card were approximately twice as likely to be transferred ($OR=2.40$). Moreover, patients who opted for in-person consultations were four times more inclined to be transferred to secondary care hospitals compared to those who chose virtual consultations ($OR=4.063$, 95% CI 3.732-4.423).

Table 4: Logistic Regression of the Association Between Visit Outcomes and Baseline Characteristics

Baseline Characteristics of the Patients		Visit outcome		P value
		Discharged	Transferred	
Age, years \pm SD		34.5 \pm 19.3	35.1 \pm 19.8	0.004
Age, group	0-18	78487 (98.0)	1631 (2.0)	<0.001
	18-45	201127 (97.8)	4477 (2.2)	
	45-60	70488 (98.2)	1300 (1.8)	
	≥ 60	43366 (97.6)	1086 (2.4)	
Nationality	Non-Qatari	255821 (97.8)	5777 (2.2)	<0.001
	Qatari	137647 (98.1)	2717 (1.9)	
Sex	Male	161821 (97.6)	3981 (2.4)	<0.001
	Female	231647 (98.1)	4513 (1.9)	
Consultation type	In-person	294241 (97.4)	7900 (2.6)	<0.001
	Virtual Consultation	99227 (99.4)	594 (0.6)	
Hayya card holder	No	390555 (97.9)	8287 (2.1)	<0.001
	Yes	2913 (93.4)	207 (6.6)	

Table 5: Logistic Regression of the Association Between Visit Outcomes and Baseline Characteristics

Variable	Odds ratio, 95% Confidence interval	P value
Age	1.004 (1.001-1.008)	0.013
Age*; 0 – 17 years	1.29 (1.19-1.41)	<0.001
Age: 18 – 45 years	1.01 (0.94-1.09)	0.747
Age; > 60 years	1.23 (1.15-1.30)	<0.001
Nationality**	1.25 (1.19-1.31)	<0.001
Sex***	1.17 (1.12-1.22)	<0.001
Consultation type *****	4.52 (4.15-4.91)	<0.001
Hayya card holder *****	2.40 (2.08-2.78)	<0.001

DISCUSSION

The primary objective of this study was to identify the most prevalent conditions encountered in primary care facilities during the World Cup 2022 while also examining their attributes and outcomes. The research findings highlighted that type 2 diabetes mellitus without complications and upper respiratory tract infections were the most frequently observed cases. Virtual consultations emerged as a widely adopted approach, with the majority of cases not necessitating a referral. It was noteworthy that a significant number of visits were dedicated to the ongoing management of diabetes mellitus, underscoring that routine care remained unaffected by the international sporting event. Additionally, chronic conditions like

hypertension and dyslipidemia constituted common reasons for seeking care at these centres, as discerned from the results. In consonance with established literature, our study corroborated the prevalence of acute upper respiratory infections as a frequent presentation in primary care. The prescription patterns further substantiated this observation. Notably, widely used medications included pain relievers such as Paracetamol and Ibuprofen, along with treatments for upper respiratory infections such as Vitamin C, Levocetirizine, and Dextromethorphan. Furthermore, our study findings were consistent with the annual statistical report from Qatar's primary healthcare corporation, which underscored that type 2 diabetes mellitus without complications and upper respiratory

tract infections rank as the most common conditions treated in primary care in the country (PHCC, 2023).

Concerns were initially raised regarding the potential risk of outbreaks of Middle East respiratory syndrome coronavirus (MERS-CoV) and COVID-19 during the FIFA World Cup 2022 in Qatar (Al-Tawfiq *et al.*, 2022; Llorente-Nieto *et al.*, 2023). However, the results of our report were against these concerns. Although upper respiratory tract infections were prevalent, chronic conditions such as diabetes and hypertension took precedence over respiratory infections as the primary reasons for seeking care in primary health settings.

The results of this study revealed notable variation in the volume of visits to primary healthcare facilities during the assessed period. This fluctuation could be attributed to the reduced availability of healthcare centres on weekends. Another contributing factor was that certain routine consultations and procedures, including child screenings, antenatal care, and routine immunisations, were exclusively conducted on weekdays.

Moreover, the majority of patients were discharged; our findings revealed that individuals of advanced age were more likely to be referred to secondary care hospitals. This could potentially be attributed to the higher likelihood of elderly patients presenting with multiple health issues and urgent conditions necessitating expedited referral to secondary care settings.

The findings that non-Qatari patients and Hayya card holders were more inclined to be referred could be explained by their tendency to present with acute conditions that may need to be fully addressed in the primary care setting. In contrast, Qatari and non-Hayya cardholders often sought care for chronic disease management alongside acute concerns. Another possibility could be a lower threshold for referral for patients holding Hayya cards.

Of particular interest, nearly one-quarter of all consultations were conducted virtually. This utilisation rate of telemedicine services aligned with previous reports from Qatar (PHCC, 2023). Hence, the expansion of telemedicine services was not impeded by the mass gathering at the World Cup 2022.

Parallel to the primary healthcare services, Qatar established over 110 clinics and 212 mobile units in the most frequented areas during the tournament, ensuring convenient and efficient access to medical services. This proactive approach resulted in effective case management and enhanced preparedness. ("Qatar's Healthcare Sector Treated 51,809 Patients During-FIFA World Cup Qatar-2022," 2022).

This study has several strengths. It is the first study to determine the characteristics and outcomes of the conditions encountered in primary care during a FIFA World Cup event. All encountered patients were included. Several measures were assessed, and a multivariate analysis was performed. However, this study has some limitations. Participants' comorbidities and the outcomes of referrals were not assessed.

CONCLUSIONS

In conclusion, the study revealed that primary healthcare services, including the successful integration of virtual consultations, throughout the FIFA World Cup 2022 in Qatar. Predominantly, routine cases involving the management of chronic illnesses and common upper respiratory conditions were the predominant encounters. Notably, visitors and non-Qatari patients exhibited higher referral rates compared to their counterparts. This underscores the pivotal role of primary healthcare in fortifying readiness for large-scale gatherings.

LIMITATIONS

The study has some limitations, such as its lack of assessment of participants' comorbidities, which could have provided valuable insights into the complexity of cases encountered in primary care during the FIFA World Cup. Additionally, outcomes of referrals were not investigated, leaving a gap in understanding the effectiveness and appropriateness of transfers to secondary care facilities.

Suggestion for Further Study

Future research endeavours could delve into a comprehensive evaluation of comorbidities among patients attending primary care facilities during mass gatherings, providing a more nuanced understanding of complex cases. Additionally, investigating the long-term outcomes and experiences of patients referred to secondary care following such events would contribute to a holistic assessment of healthcare delivery. Furthermore, comparative studies across various international sporting events could offer valuable insights into the generalizability of findings and the optimisation of healthcare preparedness strategies.

REFERENCES

- Adib, S. M., Nuwayhid, I., & Hamadeh, G. N. (1995). Most common diseases treated in primary health care facilities in Lebanon. *Le Journal Medical libanais. The Lebanese Medical Journal*, 43(1), 17-22.
- Al-Kuwari, M., Abdulla, S., Abdulla, M., Bakri, A., Kandy, M., Mustafa, A., Swamy, S., Rahman, M., Shaikan, F., Patterson, A., Buhaddoud, H., & Rothlisberger, G. (2020). Qatar's Primary Health Care Health Needs Assessment 2019.
- Al-Kuwari, M. G., Al-Abdulla, S. A., Abdulla, M. Y., Haj Bakri, A., Mustafa Mohammed, A., Chettiam Kandy, M., Patterson, A., & Illiyaraja Krishnan, J. (2021). Epidemiological health assessment in primary healthcare in the State of Qatar-2019. *Qatar medical journal*, 2021(3), 57.
- Al-Tawfiq, J. A., Gautret, P., & Schlagenhauf, P. (2022). Infection risks associated with the 2022 FIFA World Cup in Qatar. *New Microbes and New Infections*, 49.
- Ali Abdulmalik, M., Al-Kuwari, M. G., Haj Bakri, A., Ahmad Al Abdulla, S., Chettiam Kandy, M., Yousef Abdulla, M., & Michael Gibb, J. (2022). Understanding the

- epidemiological characteristics of the primary healthcare corporation-based COVID-19 swabbed persons in Qatar, 2020. *Qatar medical journal*, 2022(3), 23.
- Chen, K., Li, Z., Liu, R., Zhu, Y., Yan, W., Pui, N. A. P., & Chen, Z. (2022). Distribution of health problems at the general outpatients' clinic of the University of Hong Kong-Shenzhen Hospital: A cross-sectional study. *Frontiers in Public Health*, 10, 889819.
- Finley, C. R., Chan, D. S., Garrison, S., Korownyk, C., Kolber, M. R., Campbell, S., Eurich, D. T., Lindblad, A. J., Vandermeer, B., & Allan, G. M. (2018). What are the most common conditions in primary care?: Systematic review. *Canadian Family Physician*, 64(11), 832-840.
- Gong, X., Wang, X., Shi, T., Shi, J., Yu, W., Zhou, L., Chen, N., Huang, J., & Wang, Z. (2020). Disease composition and epidemiological characteristics of primary care visits in Pudong New Area, Shanghai: a longitudinal study, 2016-2018. *BMJ open*, 10(11), e040878.
- Karami, M. (2018). Sporting mass gatherings: public health preparedness and responsibility of health authorities. *Journal of Research in Health Sciences*, 18(3), e00422.
- Llorente-Nieto, P., González-Alcaide, G., & Ramos-Rincón, J.-M. (2023). Mass gathering in Qatar 2022 World Cup. What should be especially monitored? *Journal of Infection and Public Health*.
- Organization, W. H. (2023). Ministry of Public Health, Qatar and who collaborating to implement public health security measures as FIFA World Cup approaches <https://www.who.int/news-room/feature-stories/detail/ministry-of-public-health-qatar-and-who-collaborating-to-implement-public-health-security-measures-as-fifa-world-cup-approaches>
- PHCC. (2023). Corporate Strategy <https://www.phcc.gov.qa/AboutUs/Corporate-Strategy>
- Qatar's Healthcare Sector Treated 51,809 Patients During-FIFA World Cup Qatar-2022. (2022). <https://www.qna.org.qa/en/News-Area/News/2023-02/11/0022-qatar's-healthcare-sector-treated-51,809-patients-during-fifa-world-cup-qatar-2022>
- Shi, L. (2012). The impact of primary care: a focused review. *Scientifica*, 2012.
- Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of primary care to health systems and health. *The milbank quarterly*, 83(3), 457-502.
- Wilder-Smith, A., & Steffen, R. (2019). Mass gatherings. In *Travel medicine* (383-386). Elsevier.