

Studying the Impact of COVID-19 Pandemic on Orthodontic Patients in Jordan

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Abstract: *This study investigates the impact of the COVID-19 pandemic on orthodontic patients in Jordan, focusing on the challenges faced during lockdowns, such as reduced treatments, delayed appointments, and psychological concerns. Data were retrospectively analyzed from February to August 2020 at Queen Alia Dentistry Department. Results reveal a significant decline in patient visits and treatments, emphasizing the need for improved patient communication, remote treatment options, and enhanced clinic preventive measures to ensure healthcare continuity during crises.*

Keywords: COVID-19 Pandemic, Orthodontic, Healthcare Sectors, Jordan

1. Introduction

Unprecedented levels of international health crises have been brought forth by COVID-19. The result of this has been the formation of multinational partnerships for the purpose of locating new strains of the virus, manufacturing and disseminating vaccinations, and gaining an understanding of how to learn to live with COVID-19 [1, 2]. COVID-19 is a human transmitted disease. It had outspread globally with high morbidity and mortality rates. The pandemic had aggressively spread and affected millions of people's lives. The health and economic consequences of the pandemic and the lockdown have been severe, widespread, and devastating. The disease can be identified with a range of symptoms, some of which are similar to the characteristic symptoms of influenza, which include fever, headaches, dry cough, sore throat, asthenia, myalgia, and advanced-stage dyspnea, anosmia, and dysgeusia [1.2.3]. Despite the fact that the virus is mostly transmitted by droplets and direct contact with infected individuals, health care systems have been able to continue to maintain their provision of medical services. Because of this, those who work in the health care professionals are at the forefront of the public's exposure to the virus, with dental care professionals being especially vulnerable [1, 3]. Amman, the capital of Jordan, is home to approximately 4.5 million of the country's estimated population of over 10.3 million people. Jordan's health care services are widely recognized for their exceptional quality and was named as the leading provider of healthcare services in the whole of the Middle East and North Africa by the World Bank in the year 2008 [2, 4]. Undoubtedly, some oral manifestations were reported such as aphthous-like lesions, oral dryness, and vesiculobullous lesions [3]. The disease transmission is rapid; it can be through direct contact, aerosol, and droplets [4]. Hence, dentists are considered to be at high risk because of the exposure to aerosols. This study aims to explore the effects of the COVID-19 pandemic on orthodontic services and patient experiences in Jordan to guide improvements in healthcare during future emergencies. This study aims to explore the effects of the COVID-19 pandemic on orthodontic services and patient experiences in Jordan to guide improvements in healthcare during future emergencies.

Within the realm of postgraduate education, the United Kingdom and Jordan have been urged to work together on an international level [5]. The Jordanian health care system is divided into two primary areas: the public and semi-public

sectors, as well as the private sector. With a ratio of 0.7 dentists per 100, 000 people, Jordan has a higher level of dental provision than the United Kingdom has. In comparison, the United Kingdom has a ratio of 0.5 dentists per 100, 000 people [6]. The Ministry of Health, the Royal Medical Services, and University Hospitals are the primary organizations that offer orthodontic services. These organizations fall under the category of the "public sector." Privately held orthodontic practices cater to patients who are able to pay for their own orthodontic treatment. In Jordan and the United Kingdom, the need for orthodontic treatment is comparable. With the help of the Index of Orthodontic Treatment Need (IOTN), it was determined that 28 percent of the school-aged children in Amman had a "definite need" for treatment [6, 7]. Approximately one third (34%) of North Jordanian schoolchildren between the ages of 12 and 14 exhibited a clear requirement for orthodontic treatment, and fifty percent of the youngsters expressed a desire to have orthodontic treatment [6, 8]. In the United Kingdom, 37 percent of children aged 12 and 20 percent of children aged 15 have requirements that are not being met [6, 9].

In Jordan, the COVID-19 pandemic has made orthodontic treatment difficult [10, 11, 12]. This study addresses these issues created during lockdown [13]. Lockdown and curfew have delayed health services and postponed treatment appointments, worsening patients' emotional and physical health and treatment issues [14, 15, 16]. Unfortunately, few local research have examined the pandemic's effects on this industry. The study seeks to illuminate these issues and understand their effects to help establish successful plans to improve medical services during future emergencies. The study highlights the importance of adapting healthcare systems during crises to ensure patient care continuity and mitigate psychological and logistical challenges.

2. Methodology

The study conducted in a retrospective manner, utilizing information provided for about running patients during COVID 19 from February to August in Queen Alia Dentistry Department. The Focus was on understanding the impact seen as a result to the closures, curfews and limitation of visits for the Dentistry Department witnessed in 2020-2021. Hence, this retrospective study was adopted. Data pertaining to patients requiring dental treatments during the lockdown due to the COVID-19 pandemic were obtained from the records

of Queen Alia Dentistry Department in Jordan. This lockdown period extended from March 17, 2020, to April 29, 2020

3. Results

Table 1: Distribution of patients visiting the Queen Alia Dentistry Department

Cases	February, 2020	March, 2020	April, 2020	May, 2020	June, 2020	July, 2020	August, 2020
	Working days: 20	Working days: 13	Working days: 0	Working days: 15	Working days: 22	Working days: 21	Working days: 21
Consultation	270	120	0	6	56	161	181
X-ray (Panorama)	219	124	0	6	154	166	179
X-ray (Functional)	153	85	0	3	122	127	115
Measurements	509	306	0	23	430	422	355
Treatment Plan	244	160	0	0	73	198	158
Tearing	209	140	0	63	331	187	182
Face mask	2	0	0	0	0	2	2
Functional Device	20	11	0	0	9	17	17
Hawley Retainer	110	140	0	0	120	118	98
Head Helmet	1	1	0	0	0	2	2
Rings Fixing	479	351	0	29	468	413	382
Fixed Bracelet	20	10	0	0	8	7	7
Wideners	29	16	0	0	28	25	29
Installing a mobile device	90	23	0	0	36	22	26
Fixed device to prevent oral habits	15	5	0	0	7	9	11
Fixed distance keeper	52	37	0	0	25	16	22
Fixed top device	94	49	0	0	53	85	68
Bottom fixed device	94	49	0	0	53	85	68
Reconstruction of the lost mobile device	25	15	0	0	9	12	23
Re-glue broken clips to each clip + spacers	685	432	0	63	883	640	637
Missing braces re-installation	432	265	0	46	653	539	480
Wire change	780	527	0	178	642	808	757
Braces removal	53	67	0	3	53	43	37
Regular radiological examination/ Occlusal radiographic examination/ Examination committees/ Movable device to prevent oral habits/ Mobile distance keeper/ Partial fixed appliance for one jaw/ Reprocessing a calendar case with fixed devices/ Reprocessing of a mobile orthodontic case	0	0	0	0	0	0	0
Follow-ups	1578	1031	0	349	1497	1702	1731
Number of Cases	5794	3779	0	716	5383	7154	5515
Number of Patients	2048	964	0	261	1817	2268	2175

The following table provides information regarding the number of orthodontic procedures and patient cases that were registered in the Dental Department at Queen Alia Clinic between the starting date of February 2020 and the end date of August 2020. The analysis that follows focuses on the changes that have occurred in activities as a result of the presence of the pandemic:

Days of work and operational tasks:

The full lockdown and curfew measures had a noticeable impact, as evidenced by the fact that all activity came to a halt in April 2020 (the number of working days was equal to zero), when compared to February, the number of procedures and cases in March 2020 was significantly lower than it was in February. This was due to the fact that there were only thirteen working days (a major fall from February). Then, work began to partially restart in May of 2020, with a drop in the majority of procedures compared to the months prior to the pandemic. This occurred fifteen working days after the crisis began. From June to August of 2020, during this time period, there was a gradual increase, and work continued to resume virtually entirely (21-22 days).

Additionally, it is necessary to compare the differences between the months. With regard to the diagnostic procedures, the consultations case, it has been observed that in February of 2020, there were 270 consultations, but by March of that same year, the number had reduced to only 120 patients. The beginning of a gradual recovery was reflected in the fact that only six consultations were recorded during the month of May. Between the months of June and August, on the other hand, the numbers gradually grew until they reached 181 in August.

As far as panoramic X-rays are concerned, it has been seen that the number of them has decreased from 219 in February to 124 in March, and that they have completely disappeared in April. In the subsequent months, there was a gradual increase, which culminated in August at 179. It was discovered that there was a significant decrease in the degree of services that were offered during the lockdown period. One example of this is the functional X-ray. During the month of February, there were 153 cases, but by the month of March, that number had dropped to 85. In April, there were no cases recorded, but they started to progressively reappear during the subsequent months, reaching 115 cases in late August.

In addition, the therapeutic techniques are detailed in this table. When it comes to the treatment plan, it is observed that there was a reduction from 244 cases in February to 160 cases in March, and then the reduction came to an end entirely in April and May. After that, it is gradually seen that there is an increase to 198 in July, although the rates have remained below what they were before the epidemic. Furthermore, the chart provides a selection of dental measurements. It has been observed that there was a significant drop from 509 in February to 306 in March, and then by August, there had returned to a level that was very close to normal (355).

During the month of February, there were a total of 209 occurrences of tearing services. However, the number of cases decreased in the subsequent months, reaching 182 in August. As a result of the low demand for face masks and head helmets in comparison to other services, the quantity of these items was extremely limited both before and during the epidemic. These services have experienced major fluctuations, particularly with regard to ring mending and the re-installation of missing braces procedures. Throughout the month of February, for instance, there were 479 incidents of ring fixing; but, throughout the months of March and April, the number of cases dropped dramatically, and then progressively increased again in the months that followed April.

It can be also shown the number of instances that were documented for Functional Device was twenty in February of 2020, but that number dropped to eleven in March. There were no cases recorded during the months of April and May. Beginning in June, the number of cases progressively increased until it reached seventeen in July and August. In terms of the Hawley Retainer, there was a minor increase in the number of instances reported in March, with 140 cases being recorded as opposed to 110 cases being documented in February. However, there were no cases recorded during the months of April and May. However, the numbers gradually rebounded to 120 in June, with a slight decline to 98 cases in August.

In terms of the Head Helmet, the numbers remained extremely low, with only one case being documented in the months of February and March. There were no cases recorded in the months that followed, and it wasn't until July and August that the number of cases grew to only two. In the case of fixed bracelets, the number of instances decreased from twenty in February to ten in March. There were no cases recorded in April or May. After that, the numbers remained stable at low levels during the subsequent months, with just seven cases recorded in July and August.

The number of instances of wideners dropped from 29 in February to 16 in March, with no cases being reported in April or May. After that, the number of cases progressively grew until it reached 29 in August, which was the same level as it was in February.

There was a significant drop in the number of cases of installing a mobile device, which went from 90 in February to 23 in March. There were no incidents recorded in April or May, and then the number of cases progressively grew to 26 in August.

In terms of Fixed Device to Prevent Oral Habits, the number of cases decreased from 15 in February to 5 in March, continued to decrease during the lockdown, and then gradually recovered to 11 cases in August for the month of August.

In February, there were 52 cases of Fixed Distance Keepers, but by March, there were only 37 cases. There were no cases documented in April or May, but the number of cases gradually grew until it reached 22 in August.

During the lockdown time, there was a considerable decline in the number of cases of Fixed Top Device and Bottom Fixed Device. The number of cases decreased from 94 in February to 49 in March, and there was no activity in April or May. However, the numbers increased to 68 in August. The number of instances reported for Reconstruction of the Lost Mobile Device decreased from 25 in February to 15 in March. There were no cases reported in April or May, but the number of cases gradually grew until it reached 23 in August. Cases of Missing Braces Re-installation decreased from 432 in February to 265 in March, with no cases reported in April. However, the numbers considerably rebounded to 480 in August, indicating that the situation has improved significantly.

Last but not least, the number of cases of braces removal decreased from 53 in February to 67 in March. The number of cases was extremely low during the months of April and May, with only three cases being recorded in May. In August, the number of cases returned to the former level of 37. The majority of orthodontic services were severely reduced during the lockdown period, and they gradually returned when limitations were removed. These data demonstrate the clear impact that the pandemic had on orthodontic services. All of these numbers are a reflection of the difficulties that patients and clinics have encountered in order to continue receiving medical care throughout the pandemic.

Additionally, it is demonstrated that the wire change, often known as rewiring, was also seen. With the resumption of work, the numbers gradually improved, going from 780 in February to 527 in March, and eventually reaching 757 in August. These operations saw a substantial amount of variation, with the number of damaged clips being re-glued to each clip with spacers (re-braces) reducing from 685 in February to 432 in March, but then significantly increasing to 883 in June. Some other cases were recorded to be zero in all months as shown in the above table. Regarding the follow-up, the month of March had the greatest decline in the number of cases (1, 031), while the month of April saw no cases at all. During the subsequent months, they experienced a dramatic increase, reaching a total of 1, 731 cases in August.

When it comes to the number of patients and cases, it has been noticed that in the month of February, there were 2, 048 patients who registered 5, 794 cases (procedures). In the month of March, the number of patients reduced to 964, which resulted in only 3, 779 instances. In the month of April, all activities came to a total halt, including the registration of no cases. In the month of June, the number of patients and cases rebounded to 1, 817 and 5, 383, respectively. Finally, by the month of August, the number of cases had surpassed 5,

500, and the number of patients had reached 2, 175, which provided evidence of a considerable recovery in activity.

As a result, it is evident that the entire lockdown has an effect, as this is something that can be viewed explicitly. In April of 2020, all activities came to a complete and total halt, which had a significant impact on patients who were having treatment or who required continued follow-up. Furthermore, it can be observed from the table that there is a decline in the number of cases and procedures. This is due to the fact that there was a reduction in the number of working days between the months of March and May, which had a substantial impact on the number of cases and procedures. A modest increase in the number of cases was noted after the clinics reopened, which indicated that attempts were being made to compensate for the earlier shutdown. The gradual recovery was observed after the clinics reopened. On the other hand, the lockdown caused delays in treatment and increased demands on clinics after work began, which was another manifestation of the long-term impact.

4. Discussion

According to the study, the COVID-19 pandemic had a major effect on orthodontic patients in Jordan. Both the number of patients and the caliber of treatments given during lockdown times significantly decreased when compared to the pre-pandemic period. It is evident from comparing these effects to earlier research that they were not specific to Jordan but rather represented a worldwide trend in healthcare during the pandemic [17, 18,19]. The study found a significant drop in patient numbers during the lockdown times, which is consistent with findings from a study by [2] that found a 90% drop in patient visits during the lockdown in Jordan. Notwithstanding this decline, the study by [3] revealed that patients in different nations were prepared to stick with therapy if preventative measures were offered, suggesting that patient reactions varied among communities.

In terms of the caliber of care given, elective procedures like installing new appliances declined, but emergency procedures like fixing damaged cables and reattaching detachable gadgets were more prevalent. These findings align with a research by [10] that found that patients frequently delayed treatment until clinics reopened due to device issues. The study by [1] also revealed that the most frequent issues that patients encountered were cheek injuries brought on by broken wires and detached brackets. Despite this, patients did not exhibit a significant anxiety of seeing orthodontists; rather, the primary obstacle was closure and practical difficulties. At the same time, the study by [4] revealed that patients' levels of oral hygiene had declined, which was indicative of the effects of not receiving regular care.

Patients in the study by [3] demonstrated a strong willingness to follow preventive measures in order to secure their safety, which was consistent with the study's emphasis on the significance of sterilizing and wearing protective gear. In order to guarantee patient safety and service continuity, the study [6] endorsed immunizing medical personnel. Patients faced financial and psychological challenges. Patients' psychological states were negatively impacted by treatment delays. Our study's participants expressed significant anxiety

about treatment delays, which is consistent with a study by [1] that found patients to have depression. Nevertheless, patients shown a strong will to stick with their treatment as soon as the chance arose. [3] also highlighted the extra financial strain that families experienced due to treatment delays.

Last but not least, this conversation highlights the difficulties orthodontic patients encountered during the coronavirus outbreak, as limitations and preventative actions caused the focus of treatment to shift to emergency situations. The importance of improving remote contact with patients and offering clear instructions for handling critical issues during emergencies is demonstrated by their readiness to follow preventative actions. On the basis of the findings of the study, preventative actions will be suggested in order to enhance the way in which similar circumstances are handled in the future. Among these steps are the enhancement of sterilization and safety protocols in dental clinics, the provision of ongoing training for medical staff on how to respond to health crises, and the guaranteeing of the utilization of telemedicine technology for the purpose of communicating with patients and offering medical advice when it is required. Additionally, it is essential to build complete emergency plans that involve planning appointments in a manner that decreases congestion and promoting knowledge among patients on how to cope with minor concerns during lockdown periods. These preparations should be developed in order to accommodate patients.

5. Conclusion

This study concludes that the COVID-19 pandemic significantly disrupted orthodontic care in Jordan, causing reduced treatments and psychological challenges for patients. To address these issues, the study recommends enhancing clinic preventive measures, incorporating telemedicine, and developing crisis management strategies to ensure uninterrupted healthcare services during emergencies.

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