



## The Impact of the COVID-19 Pandemic on Maternal Healthcare Services: The Experience of Hospitals in the Arab World

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### Abstract

The COVID-19 pandemic has profoundly affected healthcare systems globally, with maternal healthcare services experiencing significant disruptions across the Arab world. This descriptive study examines the multifaceted impact of the pandemic on maternal healthcare delivery in Arab hospitals, exploring changes in service accessibility, quality of care, healthcare provider challenges, and maternal health outcomes. The pandemic necessitated rapid adaptations in healthcare delivery models, including the implementation of telehealth services, modified antenatal care protocols, and restructured labor and delivery practices. Arab world hospitals faced unique challenges related to resource constraints, cultural considerations, and varying levels of healthcare infrastructure development. This research synthesizes experiences from multiple Arab countries to provide a comprehensive understanding of how the pandemic transformed maternal healthcare services. Findings indicate substantial reductions in antenatal care visits, increased maternal anxiety and stress, disrupted continuity of care, and heightened concerns regarding infection transmission in healthcare settings. Healthcare workers experienced elevated stress levels, resource shortages, and challenges in maintaining standard care protocols while implementing infection prevention measures. Despite these challenges, the pandemic catalyzed innovations in healthcare delivery, including expanded telemedicine adoption and strengthened community health initiatives. Understanding these impacts is essential for developing resilient maternal healthcare systems capable of maintaining quality services during future health crises. The experiences documented across Arab hospitals provide valuable insights for policy makers and healthcare administrators seeking to enhance maternal healthcare preparedness and ensure continued access to essential services during emergencies.

**Keywords:** COVID-19, maternal healthcare, Arab world, pandemic impact, antenatal care, hospital services, healthcare delivery, maternal outcomes

### Introduction

The emergence of the COVID-19 pandemic in early 2020 precipitated an unprecedented global health crisis that fundamentally altered healthcare delivery systems worldwide. The Arab world, encompassing twenty-two countries across the Middle East and North Africa, faced distinctive challenges in maintaining essential healthcare services while combating the rapidly spreading virus. Maternal healthcare services, recognized as a critical component of public



health infrastructure, experienced substantial disruptions that threatened to reverse decades of progress in maternal and neonatal health outcomes.

The Arab region had made considerable strides in improving maternal healthcare prior to the pandemic, with many countries achieving significant reductions in maternal mortality rates and expanding access to skilled birth attendance. However, the COVID-19 pandemic exposed vulnerabilities in healthcare systems and created barriers to accessing routine maternal healthcare services. Pregnant women, already considered a vulnerable population requiring specialized care, faced compounded challenges during the pandemic as healthcare resources were diverted to manage COVID-19 patients, movement restrictions limited access to facilities, and fear of infection deterred many from seeking timely care.

The impact of the pandemic on maternal healthcare in the Arab world was shaped by diverse factors including varying healthcare infrastructure capacity, economic resources, political stability, and cultural practices surrounding childbirth and maternal care. Countries with more developed healthcare systems demonstrated greater resilience in maintaining maternal services, while those experiencing conflict or economic challenges faced more severe disruptions. The pandemic necessitated rapid adaptations in care delivery models, forcing healthcare systems to balance infection prevention measures with the imperative to maintain access to time-sensitive maternal healthcare services.

Understanding the pandemic's impact on maternal healthcare services in Arab hospitals is crucial for multiple reasons. First, it provides insights into system vulnerabilities that must be addressed to enhance resilience against future health crises. Second, it documents innovative adaptations and best practices that emerged during the crisis, offering valuable lessons for healthcare planning. Third, it highlights the specific needs and challenges of maternal healthcare in the Arab context, where cultural, social, and economic factors significantly influence healthcare-seeking behaviors and service delivery models. This research aims to comprehensively examine how the COVID-19 pandemic affected maternal healthcare services across Arab hospitals, exploring both the challenges encountered and the adaptive strategies implemented to maintain essential care for pregnant women during this unprecedented crisis.

### **Literature Review**

The intersection of pandemic response and maternal healthcare has garnered increasing scholarly attention as researchers seek to understand the pandemic's far-reaching consequences on maternal health outcomes and service delivery. The existing literature reveals a complex picture of disrupted services, compromised care quality, and innovative adaptations across different healthcare contexts.



Early studies from various global regions documented immediate disruptions to maternal healthcare services following pandemic onset. Healthcare facilities rapidly reorganized to accommodate COVID-19 patients, often reallocating obstetric wards and redeploying maternal healthcare staff to pandemic response efforts. This reorganization frequently resulted in reduced capacity for routine maternal services, including antenatal care visits, postpartum follow-up, and family planning services. Research has consistently shown that pregnant women experienced difficulties accessing timely care due to factors including transportation limitations during lockdowns, fear of viral exposure in healthcare settings, and reduced availability of healthcare providers.

The literature examining maternal healthcare in the Arab world during the pandemic reveals regional variations in impact severity and response strategies. Studies from Gulf Cooperation Council countries indicate that relatively well-resourced healthcare systems were better positioned to implement protective measures while maintaining service continuity. These countries rapidly adopted telemedicine platforms for antenatal consultations, established dedicated COVID-19-free maternity pathways, and implemented universal screening protocols for pregnant women. Conversely, research from conflict-affected Arab countries demonstrates more severe disruptions, with some facilities temporarily suspending non-emergency obstetric services and pregnant women facing significant barriers to accessing any form of maternal healthcare.

Several studies have examined the psychological impact of the pandemic on pregnant women in Arab societies. Research indicates elevated levels of anxiety, depression, and stress among expectant mothers concerned about viral infection, potential pregnancy complications, and uncertainty regarding care availability. Cultural factors unique to Arab societies, including the importance of family presence during childbirth and postpartum support from extended family networks, were disrupted by visitation restrictions and social distancing measures. This disruption of traditional support systems compounded the psychological burden experienced by pregnant women.

The literature also addresses modifications to clinical practice guidelines and care protocols implemented during the pandemic. Healthcare facilities worldwide, including those in Arab countries, developed new protocols for managing pregnant women with suspected or confirmed COVID-19 infection. These protocols addressed questions regarding delivery timing, mode of delivery, breastfeeding recommendations, and mother-infant separation policies. Initial guidance was often contradictory and rapidly evolving, creating uncertainty among healthcare providers and patients. Research examining these protocol modifications reveals substantial variation in approaches across different Arab countries, reflecting differences in pandemic severity, resource availability, and interpretation of emerging evidence.



Healthcare workforce challenges during the pandemic represent another significant theme in the literature. Studies document that maternal healthcare providers experienced elevated stress levels, fear of occupational infection exposure, and moral distress when forced to make difficult decisions regarding resource allocation and care modifications. Staff shortages due to infection, quarantine requirements, or redeployment created additional burdens on remaining personnel. In Arab healthcare contexts, these challenges were sometimes exacerbated by reliance on expatriate healthcare workers who faced travel restrictions and repatriation concerns.

Research examining innovations in maternal healthcare delivery during the pandemic highlights the rapid expansion of telemedicine and remote monitoring technologies. Studies indicate that virtual antenatal visits became widely adopted across many Arab countries, particularly for low-risk pregnancies and routine follow-up appointments. While telemedicine offered solutions for maintaining care continuity, research also identifies limitations including technology access barriers, reduced ability to perform physical examinations, and challenges in building patient-provider relationships through virtual platforms.

The literature reveals concerning evidence regarding maternal health outcomes during the pandemic period. Some studies document increases in late presentation for care, missed antenatal visits, and delayed recognition of pregnancy complications. Research from several Arab countries indicates potential increases in home births without skilled attendance and women presenting to facilities only during advanced labor or with complications. However, the literature also reveals methodological challenges in definitively establishing causality between pandemic-related disruptions and specific adverse maternal outcomes, as comprehensive data collection was often compromised during the crisis period.

Despite growing research attention, significant gaps remain in understanding the pandemic's full impact on maternal healthcare in the Arab world. Much of the existing literature consists of single-center studies or short-term observations that may not capture longer-term consequences or regional variations. There is limited research examining differences in pandemic impact across diverse socioeconomic groups, refugee populations, and rural versus urban settings within Arab countries. Additionally, few studies have systematically evaluated the sustainability and effectiveness of adaptations implemented during the crisis or their potential integration into post-pandemic maternal healthcare models.

## **Methodology**

This descriptive study employed a comprehensive analytical approach to examine the impact of the COVID-19 pandemic on maternal healthcare services across hospitals in the Arab world. The methodology was designed to capture the multifaceted nature of pandemic-related disruptions and adaptations while acknowledging the diverse contexts within the Arab region.



The study utilized a descriptive research design to systematically document and analyze changes in maternal healthcare service delivery during the pandemic period. This approach was selected as most appropriate for achieving the research objectives of describing patterns, trends, and characteristics of maternal healthcare disruptions and responses across Arab hospitals. The descriptive methodology enabled detailed examination of the phenomenon without requiring experimental manipulation or control conditions, which would have been neither feasible nor ethical during an ongoing health crisis.

Data sources for this study encompassed multiple channels to ensure comprehensive coverage of the pandemic's impact. Published literature from peer-reviewed journals, official reports from ministries of health in Arab countries, bulletins from regional health organizations, and documented case studies from individual hospitals provided primary information sources. These sources were systematically reviewed to identify relevant data regarding changes in maternal healthcare service utilization, modifications to care delivery protocols, challenges encountered by healthcare facilities and providers, and reported maternal health outcomes during the pandemic period.

The study focused on the timeframe from March 2020, when the World Health Organization declared COVID-19 a global pandemic and Arab countries began implementing public health measures, through December 2022, allowing examination of both acute crisis responses and evolving adaptations over an extended period. This timeframe captured the initial shock to healthcare systems, subsequent waves of infection, and gradual normalization or restructuring of maternal healthcare services.

Geographically, the study encompassed Arab countries across the Gulf region, the Levant, North Africa, and the Horn of Africa, recognizing the significant diversity within the Arab world in terms of healthcare infrastructure, economic development, political stability, and cultural practices. While comprehensive data from every Arab country was not available, the analysis included information from major healthcare facilities across multiple countries to ensure representative coverage of regional experiences.

Key variables examined included quantitative indicators of service utilization such as numbers of antenatal care visits, delivery rates at healthcare facilities, emergency obstetric interventions, and attendance at postpartum follow-up appointments. Qualitative dimensions explored included types of modifications made to care delivery protocols, barriers to accessing maternal healthcare reported by women and providers, innovations implemented to maintain service continuity, and psychological impacts on pregnant women and healthcare workers. Additionally, the study examined organizational and systemic factors including resource availability, policy responses, and coordination mechanisms between maternal healthcare services and pandemic response efforts.



Data analysis involved systematic categorization and synthesis of information across different sources and contexts. Thematic analysis techniques were applied to identify common patterns, divergent experiences, and notable innovations across Arab hospitals. Quantitative data, where available, was examined for trends over time and variations across different country contexts. The analysis sought to maintain sensitivity to contextual factors that shaped experiences in different Arab countries while identifying overarching themes applicable across the region.

Several methodological considerations and limitations warrant acknowledgment. The availability and quality of data varied considerably across countries and facilities, with more comprehensive information available from countries with stronger health information systems and research capacity. The ongoing nature of the pandemic during much of the study period meant that complete data on longer-term outcomes was not available for all locations. Additionally, the crisis conditions under which healthcare facilities operated sometimes compromised routine data collection efforts. The study relied primarily on aggregated and reported data rather than direct observation or primary data collection, introducing potential limitations in data completeness and accuracy. Despite these constraints, the descriptive methodology provided valuable insights into the pandemic's impact on maternal healthcare services across the Arab world and documented important lessons for health system preparedness and resilience.

## **Results**

The examination of maternal healthcare services across Arab hospitals during the COVID-19 pandemic revealed substantial and multifaceted impacts on service delivery, utilization patterns, and health outcomes. The findings demonstrated both common challenges experienced across the region and context-specific variations reflecting diverse healthcare system capacities and pandemic severity.

Antenatal care services experienced significant disruptions across Arab hospitals during the pandemic period. Facilities reported marked reductions in the number of routine antenatal visits, with decreases ranging from thirty to sixty percent during peak pandemic periods compared to pre-pandemic baselines. Many hospitals implemented modified antenatal care schedules with fewer but more comprehensive visits, attempting to balance infection risk reduction with maintenance of essential monitoring. First trimester visits showed the steepest declines, suggesting that women either delayed seeking initial prenatal care or obtained care through alternative channels. The reduction in facility-based antenatal visits was attributed to multiple factors including movement restrictions during lockdown periods, women's fear of viral exposure in healthcare settings, transportation challenges, and deliberate policy modifications to reduce non-essential facility visits.



The adoption of telemedicine for antenatal care emerged as a prominent adaptive strategy across Arab hospitals, though implementation varied considerably by country and facility. Healthcare institutions in Gulf countries with more developed digital infrastructure and higher rates of smartphone penetration achieved relatively rapid and extensive telemedicine adoption. Virtual consultations were utilized for routine follow-up appointments, medication management, and patient education, while in-person visits were reserved for ultrasound examinations, laboratory testing, and assessment of concerning symptoms. Hospitals in countries with less developed technological infrastructure or among populations with limited digital access faced greater challenges in implementing virtual care alternatives. Healthcare providers reported that while telemedicine offered valuable solutions for maintaining some continuity of care, it presented limitations including inability to perform physical examinations, challenges in assessing non-verbal cues, and difficulties in serving patients with limited technological literacy or access.

Labor and delivery services underwent substantial reorganization across Arab hospitals in response to the pandemic. Most facilities implemented screening protocols to identify pregnant women with suspected or confirmed COVID-19 infection, though screening approaches varied from symptom-based screening to universal testing policies. Hospitals established separate delivery pathways for COVID-19 positive or suspected cases, attempting to minimize transmission risk to other patients and healthcare workers. These dedicated pathways sometimes required repurposing existing obstetric facilities or establishing entirely new delivery spaces with enhanced ventilation and infection control measures.

Companion restrictions during labor and delivery represented one of the most emotionally challenging pandemic-related modifications in Arab hospitals, where cultural norms typically emphasize strong family involvement in childbirth. Most facilities implemented policies limiting or prohibiting companions in labor and delivery areas to reduce infection transmission risk and preserve personal protective equipment supplies. These restrictions encountered significant resistance from patients and families accustomed to having female relatives present for support during childbirth. Healthcare providers reported increased anxiety and distress among laboring women who were separated from traditional support systems, though some facilities eventually modified policies to permit single companions under specific conditions.

Cesarean delivery rates showed variable patterns across Arab hospitals during the pandemic. Some facilities reported increases in cesarean deliveries, potentially reflecting provider concerns about prolonged labor in suspected COVID-19 cases or patient preferences to schedule deliveries and minimize hospital exposure time. Other facilities reported stable or decreased cesarean rates, particularly during periods of reduced elective procedure scheduling. The inconsistency in cesarean delivery trends across different Arab hospitals suggests that local



factors including pandemic severity, resource constraints, and individual facility policies substantially influenced obstetric practice patterns.

Postpartum care and follow-up services experienced notable disruptions across the region. Many hospitals shortened postpartum hospital stays, discharging mothers and newborns earlier than standard pre-pandemic protocols to reduce infection exposure risk and free hospital capacity. This approach created challenges for mothers requiring extended recovery time, newborns with early feeding difficulties, and families lacking adequate home support systems. Routine postpartum follow-up visits declined sharply, with many facilities reporting attendance rates below fifty percent of pre-pandemic levels. Some hospitals attempted to compensate through telephone follow-up or virtual consultations, though these modalities proved less effective for identifying postpartum complications requiring physical examination.

Healthcare workforce challenges emerged as a critical theme across Arab hospitals. Maternal healthcare providers experienced elevated stress levels related to personal infection risk, concerns about transmitting infection to families, and uncertainty regarding optimal clinical management of pregnant patients with COVID-19. Staff shortages due to infection, quarantine requirements, or redeployment to pandemic response roles created increased workloads for remaining personnel. Several countries experienced additional workforce pressures related to movement restrictions affecting expatriate healthcare workers who comprise significant proportions of maternal healthcare staff in certain Gulf countries. Healthcare administrators reported difficulties in maintaining adequate staffing levels while implementing infection control protocols that sometimes required staff isolation in specific hospital zones.

Resource constraints affected maternal healthcare delivery across Arab hospitals, though severity varied considerably by country wealth and healthcare system capacity. Shortages of personal protective equipment during initial pandemic waves created anxiety among obstetric care providers and sometimes necessitated rationing or reuse of protective equipment beyond standard guidelines. Some hospitals reported shortages of essential medications, medical gases, and equipment as supply chains were disrupted and resources were redirected toward pandemic response. Blood supply challenges emerged in several locations, raising concerns about availability of blood products for managing obstetric hemorrhage. Hospitals in countries experiencing economic crises or conflict situations faced particularly severe resource constraints that compromised their ability to maintain standard maternal healthcare services.

Mental health impacts on pregnant women represented a significant concern documented across Arab hospitals. Healthcare providers reported increased anxiety, depression, and stress among pregnant patients concerned about viral infection risks, potential effects of COVID-19 on pregnancy outcomes, and uncertainty regarding care availability. Social isolation resulting from movement restrictions, reduced family gatherings, and limited social support networks



compounded psychological distress. Traditional postpartum support systems involving extended family assistance were frequently disrupted, leaving new mothers more isolated during the postpartum period. Healthcare facilities reported limited capacity to address mental health needs due to time constraints, shortage of mental health professionals, and competing demands of pandemic response.

Maternal health outcomes during the pandemic period showed concerning trends in several indicators, though data completeness varied across Arab countries. Some hospitals reported increases in late presentation for antenatal care, potentially reflecting delayed care-seeking due to pandemic-related barriers. Emergency departments in several facilities documented increased presentations of pregnant women with advanced pregnancy complications that might have been identified earlier through routine antenatal surveillance. Home births without skilled attendance reportedly increased in some areas, particularly during strict lockdown periods, raising concerns about management of delivery complications in non-facility settings. However, definitive assessment of maternal mortality and severe morbidity trends was challenged by incomplete reporting systems and delays in data compilation during the crisis period.

Emergency obstetric care capacity was strained in many Arab hospitals during peak pandemic periods. Facilities managing high volumes of COVID-19 patients sometimes experienced reduced availability of intensive care unit beds, ventilators, and specialized personnel for managing obstetric emergencies. Several hospitals reported delays in accessing emergency interventions including cesarean deliveries and management of obstetric hemorrhage due to competing demands on operating rooms and anesthesia services. These capacity constraints created ethical dilemmas regarding resource allocation and prioritization of maternal emergencies versus COVID-19 critical care needs.

Infection prevention and control practices underwent substantial enhancement across Arab hospitals, with implications for maternal healthcare delivery. Universal masking policies, enhanced surface cleaning protocols, and physical distancing measures in waiting areas became standard practice. These measures provided some protection for pregnant women accessing facility-based care but also created practical challenges including reduced examination room availability due to enhanced cleaning requirements and longer waiting times. Healthcare providers reported that personal protective equipment and infection control protocols, while necessary for safety, sometimes impeded communication with patients and interfered with the therapeutic relationship, particularly when full facial covering prevented non-verbal communication.

Vaccination rollout for pregnant women represented a significant development during the later phases examined in this study. Arab countries varied in their timing and policies regarding



COVID-19 vaccination for pregnant women, with some initially excluding pregnancy as a precautionary measure while others included pregnant women as priority populations. As evidence accumulated regarding vaccine safety in pregnancy, most Arab hospitals began offering and encouraging vaccination for pregnant women, though uptake rates varied substantially. Healthcare providers reported spending considerable time counseling pregnant women regarding vaccination decisions and addressing concerns related to limited initial data on pregnancy-specific outcomes.

The pandemic catalyzed innovations in maternal healthcare delivery that may have lasting benefits beyond the crisis period. Enhanced telemedicine capabilities developed during the pandemic demonstrated potential for improving access to specialist consultations for women in remote areas and for routine follow-up care. Community health initiatives and home visiting programs expanded in some locations to compensate for reduced facility-based services, strengthening connections between health facilities and communities. Hospitals developed new protocols for risk stratification and differentiated care models, directing limited resources toward higher-risk pregnancies while maintaining basic services for low-risk women through alternative modalities.

Coordination between maternal healthcare services and COVID-19 response efforts varied across Arab hospitals. Facilities with effective coordination mechanisms were better able to maintain maternal healthcare capacity while managing pandemic response demands. Those lacking coordination frameworks experienced more severe disruptions as maternal services were deprioritized or disrupted by competing pandemic response needs. Regional health coordination mechanisms in some areas facilitated resource sharing, protocol standardization, and mutual support among facilities, while others operated more independently with less regional coordination.

## Discussion

The findings from this examination of maternal healthcare services across Arab hospitals during the COVID-19 pandemic illuminate critical vulnerabilities in healthcare systems while simultaneously revealing remarkable resilience and adaptability. The substantial disruptions documented across multiple dimensions of maternal healthcare underscore the challenges of maintaining essential services during health emergencies, while the innovative adaptations implemented offer valuable lessons for enhancing health system preparedness.

The marked reduction in antenatal care utilization observed across Arab hospitals reflects a complex interplay of supply-side service disruptions and demand-side barriers to care-seeking. From a supply perspective, healthcare facility reorganization to accommodate pandemic response, staff redeployment, and deliberate modifications to reduce facility visits all contributed to decreased service availability. Simultaneously, demand-side factors including



movement restrictions, fear of infection, and economic hardships reduced women's ability and willingness to seek facility-based care. This bidirectional disruption created a particularly severe impact on maternal healthcare access, as pregnancy requires time-sensitive interventions that cannot be indefinitely postponed without risking adverse outcomes. The finding that first trimester visits experienced steeper declines than later pregnancy visits suggests that women prioritized care seeking when pregnancy was more advanced, potentially missing opportunities for early risk identification and intervention.

The rapid adoption of telemedicine for antenatal care across Arab hospitals represents a significant paradigm shift accelerated by pandemic necessity. While telemedicine had existed prior to the pandemic, its integration into maternal healthcare was limited in many Arab countries due to regulatory barriers, reimbursement challenges, and cultural preferences for in-person care. The pandemic created imperatives that overcame these barriers, forcing rapid implementation of virtual care platforms. The experience demonstrated that telemedicine can effectively support certain aspects of antenatal care, particularly for low-risk pregnancies and routine follow-up. However, the findings also revealed important limitations and inequities in virtual care access. Women in rural areas with poor internet connectivity, those from lower socioeconomic backgrounds with limited smartphone access, and individuals with lower technological literacy faced barriers to accessing virtual care services. This digital divide risked exacerbating existing health inequities, with the most vulnerable populations potentially experiencing the greatest difficulty accessing modified care delivery models.

The reorganization of labor and delivery services with separate COVID pathways reflected efforts to balance infection control with maintenance of safe childbirth services. While epidemiologically sound, these modifications created new challenges related to resource duplication, as facilities essentially needed to maintain parallel service pathways. The restriction of companions during labor and delivery, while intended to minimize infection transmission, represented a significant disruption to culturally important practices in Arab societies. Birth is traditionally viewed as a family event in Arab cultures, with female relatives providing crucial emotional and practical support to laboring women. The isolation of women from this support system during childbirth created psychological distress that healthcare providers often felt inadequately prepared to address. The eventual modification of companion policies in some facilities reflected attempts to balance infection control objectives with recognition of the importance of psychosocial support during childbirth.

Healthcare workforce challenges documented across Arab hospitals highlight the critical importance of supporting healthcare workers during health crises. Maternal healthcare providers faced the dual burden of personal health concerns and professional obligations to continue providing care during uncertain and dangerous conditions. The moral distress reported by providers forced to make difficult decisions regarding modified care protocols or resource



allocation requires recognition and institutional support. The experience underscores the necessity of investing in healthcare workforce wellbeing, including mental health support, adequate protective equipment, and recognition of the extraordinary demands placed on healthcare workers during emergencies. The workforce disruptions related to expatriate healthcare workers in certain Gulf countries revealed vulnerabilities in healthcare labor models dependent on international recruitment, suggesting the value of developing more robust domestic healthcare workforces.

The mental health impacts on pregnant women represent an underappreciated dimension of the pandemic's toll on maternal health. Beyond the direct effects of COVID-19 infection, the psychological burden of uncertainty, social isolation, and disrupted support systems created significant distress. The finding that healthcare facilities lacked adequate capacity to address mental health needs reflects long-standing gaps in integration of mental health services within maternal healthcare systems. The pandemic experience demonstrates the necessity of strengthening psychosocial support as a core component of maternal healthcare, recognizing that mental health and physical health are inextricably linked in determining pregnancy outcomes and maternal wellbeing.

The concerning trends in some maternal health outcome indicators, including late presentation for care and increased emergency complications, suggest that pandemic-related disruptions may have resulted in preventable adverse outcomes. While definitive causality is difficult to establish given data limitations, the logical pathway from reduced antenatal surveillance to delayed identification of complications is evident. These findings underscore the critical importance of maintaining access to essential maternal healthcare services even during health emergencies. The classification of maternal healthcare as essential should translate into concrete policy measures that protect service continuity, including resource protection, workforce maintenance, and active outreach to ensure continued access.

The variation in pandemic impact across different Arab countries reveals the importance of pre-existing healthcare system capacity and resources in determining resilience. Countries with well-developed healthcare infrastructure, adequate resources, and strong health information systems were better positioned to adapt to pandemic challenges while maintaining maternal healthcare quality. Conversely, countries experiencing conflict, economic crisis, or pre-existing healthcare system fragilities experienced more severe disruptions. This finding reinforces the importance of sustained investment in healthcare infrastructure and the recognition that health security requires robust health systems capable of managing both routine and emergency demands.

The innovations catalyzed by the pandemic, including expanded telemedicine, enhanced community health programs, and differentiated care models, offer potential for lasting



improvements in maternal healthcare delivery. Rather than viewing these adaptations purely as crisis responses to be discarded when the emergency subsides, health systems should critically evaluate which innovations offer value for ongoing integration into routine care. Telemedicine, for instance, may enhance access for women in remote areas or those with transportation challenges even in non-pandemic contexts. Differentiated care models that stratify pregnant women by risk level and provide care through appropriate channels could improve efficiency and patient experience while directing specialized resources toward those with greatest need.

The experience of Arab hospitals during the pandemic provides crucial lessons for health emergency preparedness. Maternal healthcare must be explicitly prioritized in emergency response plans, with clear guidance regarding service maintenance, resource protection, and adapted delivery models. Preparedness planning should include development of protocols for managing pregnant women during health emergencies, stockpiling of essential supplies, surge capacity plans that avoid diverting maternal healthcare resources, and mechanisms for maintaining workforce capacity. The importance of flexible and adaptive policies that can be rapidly modified based on evolving evidence and local conditions is evident from the varied and changing protocols implemented across different facilities and time periods.

The findings also highlight the necessity of robust health information systems capable of maintaining data collection and surveillance even during crises. The difficulty in definitively assessing pandemic impact on maternal outcomes was partly attributable to disrupted data collection systems. Investment in resilient health information infrastructure that can continue functioning during emergencies is essential for monitoring health outcomes and guiding response efforts. Additionally, research capacity should be maintained during emergencies to enable real-time evaluation of interventions and outcomes, informing evidence-based policy adjustments.

Cultural and social factors significantly shaped the pandemic's impact on maternal healthcare in Arab contexts. Understanding these factors is crucial for designing effective and acceptable adaptations to maternal healthcare delivery during emergencies. Policies and protocols developed in other global regions may require modification to align with Arab cultural values, family structures, and healthcare expectations. The involvement of community leaders, religious authorities, and women's groups in developing and communicating emergency health policies may enhance acceptability and adherence while ensuring cultural appropriateness.

Looking forward, the COVID-19 pandemic experience offers an opportunity to reimagine maternal healthcare delivery in ways that enhance both normal-time quality and emergency resilience. The demonstration that significant care delivery modifications are possible when necessity demands should inspire creativity in addressing long-standing challenges in maternal healthcare access and quality. The acceleration of digital health adoption, strengthening of



community health systems, and development of differentiated care models all represent potential pathways toward more accessible, efficient, and resilient maternal healthcare systems.

## Conclusion

The COVID-19 pandemic exerted profound and multifaceted impacts on maternal healthcare services across hospitals in the Arab world, disrupting established care delivery models while simultaneously catalyzing adaptations and innovations. This examination has revealed significant reductions in routine antenatal care utilization, reorganization of labor and delivery services with infection control modifications, substantial healthcare workforce challenges, and concerning trends in some maternal health indicators. The pandemic exposed critical vulnerabilities in maternal healthcare systems, including dependence on facility-based care models lacking alternative service delivery channels, insufficient integration of mental health support, and resource fragility under surge conditions.

The experiences documented across Arab hospitals demonstrate both the resilience of healthcare systems and personnel who continued providing maternal care under extraordinary circumstances, and the urgent need for enhanced health emergency preparedness specifically addressing maternal healthcare. The rapid adoption of telemedicine, implementation of differentiated care models, and strengthening of community health initiatives represent valuable innovations with potential for integration into post-pandemic maternal healthcare delivery. However, the inequities revealed by differential access to adapted care modalities demand attention to ensure that innovations do not exacerbate existing disparities.

Several key implications emerge from this research for policy makers, healthcare administrators, and maternal healthcare providers in the Arab world. First, maternal healthcare must be explicitly designated as essential within health emergency response frameworks, with concrete measures to protect service continuity including dedicated resource allocation, workforce protection, and maintenance of care access. Second, investment in alternative care delivery modalities, particularly telemedicine infrastructure and community health systems, can enhance both routine access and emergency resilience. Third, mental health integration within maternal healthcare services requires strengthening to address psychosocial dimensions of maternal wellbeing. Fourth, health information systems must be reinforced to maintain surveillance capacity during emergencies, enabling evidence-based policy adjustments and outcome monitoring.

The diversity of experiences across Arab countries underscores the importance of context-specific approaches that account for healthcare system capacity, resource availability, cultural factors, and population needs. While regional coordination and shared learning offer value, effective preparedness requires adaptation to local contexts rather than one-size-fits-all solutions. The involvement of diverse stakeholders including healthcare providers, patients,



community organizations, and policy makers in preparedness planning can ensure that emergency protocols are both effective and culturally appropriate.

The pandemic experience also highlights the interconnectedness of health system components and the necessity of comprehensive approaches to health system strengthening. Maternal healthcare cannot be isolated from broader health system capacity, workforce development, infrastructure investment, and health security preparedness. Sustained commitment to strengthening health systems in their entirety provides the foundation for resilient maternal healthcare capable of maintaining quality services under both routine and emergency conditions.

As the acute phase of the COVID-19 pandemic recedes, the maternal healthcare community in the Arab world faces the critical task of learning from this experience while addressing ongoing challenges and preparing for future emergencies. The substantial toll exacted by pandemic-related disruptions on maternal healthcare access and outcomes must be acknowledged, while the innovations and adaptations developed during the crisis should be critically evaluated for potential integration into improved maternal healthcare delivery models. The pandemic has demonstrated that significant change is possible when imperative, offering an opportunity to reimagine maternal healthcare systems that are more accessible, equitable, efficient, and resilient.

Future research should continue examining longer-term impacts of pandemic-related disruptions on maternal and child health outcomes, evaluate the effectiveness and sustainability of innovations implemented during the crisis, and investigate specific needs of vulnerable populations including refugees, women in conflict-affected areas, and those in rural or underserved communities. Comparative analyses across different Arab countries can identify factors associated with greater resilience and successful adaptation, informing evidence-based preparedness strategies. Additionally, research examining healthcare provider experiences and needs can guide supportive interventions to address workforce wellbeing and retention.

The COVID-19 pandemic represents an unprecedented challenge to maternal healthcare systems globally and in the Arab world specifically. While the disruptions and challenges have been substantial, the experience has also revealed opportunities for positive transformation. By learning from both the difficulties encountered and the successful adaptations implemented, the maternal healthcare community in the Arab world can build more resilient, accessible, and high-quality systems capable of protecting maternal health under all circumstances. The commitment to ensuring that every woman has access to safe, respectful, and effective maternal healthcare regardless of external circumstances must remain paramount as health systems evolve in the post-pandemic era.



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