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Changes in healthcare seeking behaviors among caretakers of children in the previously occupied ISIS territory: Hadeetha, Anbar, Iraq: a cross-sectional survey of 415 households

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Abstract

Background The western province of Anbar, and the district of Hadeetha, have suffered direct impacts from the second United States led invasion (2003) through the ISIS invasion (2014–2017). With the primary health care centers being closed or inaccessible, the remaining population experienced changes in health seeking. The area of Anbar, Iraq remains largely remote from the discourse of health system recovery post-conflict. The objective of this study was to describe changes in health seeking behaviors of caregivers of children ages 12–72 months of age in Hadeetha, Anbar, Iraq from the conflict period of ISIS (Islamic State of Syria and Iraq), 2014–2017, to the post-conflict period, 2021.

Methods This was a mixed-methods study composed of a cross-sectional 415 household survey and focus groups in Hadeetha, Anbar, Iraq. Caretakers of children were interviewed from February to April 2021. Children were sampled from a list of children who missed at least one vaccination appointment without a return for follow-up from the birth cohorts of 2014 to 2020. Healthcare workers focus groups and key informant interviews occurred from 2019 to 2021 centered around experiences from the 2014 to 2021 period.

Results In the post-conflict period, there were no differences in health seeking based upon provider type between respondents. Physicians were primary healthcare providers in the post-conflict period for 79% of respondents versus only 47% in the conflict period. Healthcare workers described major barriers to delivering services in Hadeetha during the ISIS occupation due to infrastructure damage, threats of violence, decreased medical personnel, lack of compensation and disruptions in medical supplies from 2014 to 2017.

Conclusion This study provides insight into health seeking challenges among the many individuals who remained in Hadeetha during the ISIS occupation. Health use patterns by provider type mirror the concerns the healthcare providers shared: limited availability, efflux of professional workers, limited resources and security challenges to providing care. Positive trends toward increased access to physicians during periods of peace are an encouraging marker for continued population resilience during the post-conflict period. Recovery efforts continue to be hampered by internal sectarian discord within Iraq as well as insufficient resources to maintain health services as well as provide catch-up health services, such as immunizations.

Keywords Conflict, Health seeking, Iraq, ISIS (Islamic State of Iraq and Syria), Child health, Maternal health

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Background

Iraq continues to adjust to displacement and return of families and children to the formerly ISIS occupied territories. As of 2022, migration reports suggest that nearly 4.1 million of Iraq's original 6.7 million displaced returned to their original districts, but they are returning to largely unrecovered areas within the country [1]. Half of the total 4.1 smillion who require humanitarian aid lived in two governorates: Ninewa and Anbar [2]. Healthcare systems continue to adapt to providing for the remaining citizens as well as the influx of the returnees, while ongoing instability continues in the Anbar region.

Iraq's healthcare system and its attempts to rebound from four decades of war and ongoing stressors have been well documented since the First Gulf War [3, 4]. Parallel to government funded primary healthcare clinics, the private fee-for-service system expanded throughout Iraq [5, 6]. Preferential shifts of primary care providers to the private clinics created long lists of back-logged patients in the public sector, especially in areas that were inadequately staffed [6].

Though primary healthcare systems were prioritized for recovery after the second United States-led invasion, citizens still associated better services with the private sector [7, 8]. The 2014–2017 ISIS (Islamic State of Iraq and Syria) invasion and occupation of Anbar, Ninewa, Salahideen and Kirkuk tested Iraq's healthcare system even further. During the recovery period, Iraq's Ministry of Health continued to suffer inequities in resource distribution in terms of trained human capital and equipment necessary for disease detection and treatment [9]. A strained healthcare system was coupled with a three-decade exodus of healthcare providers outside of Iraq [2, 5]. Capacity building remains a significant challenge in Iraq, particularly in the primary health care arena [10, 11].

Healthcare delivery is particularly interrupted in the immediate conflict period but the disruption continues for years post-conflict. Pre-conflict capacity of the health systems is one predictor of sustainability during the conflict if the system has the necessary absorptive capacity to continue under a violence stressor. Vaccination services are often disrupted or halted [12–14]. During periods of conflict, international organizations prioritize the needs of refugees and IDPs, with "remainees," often inaccessible and remaining among the most vulnerable [15]. As of 2022, the United Nations identified one-hundred fifty-eight (158) activities in Anbar to reach the SDGs (Sustainable Development Goals), with only one focusing on reinforcing the primary healthcare system [16]. Even private–public partnerships that develop during the conflict period can hamper the redevelopment of the national healthcare system as humanitarian actors continue to express vested interest in the region, competing with needs identified by the native population [11, 17].

Health-seeking behaviors of Iraqis under the ISIS occupation have been characterized for Mosul, in Northern Iraq. During ISIS control, a private fee-for-service system was continued, with referral to approved affiliate governorates for specialty care. Healthcare services decreased and alternate health seeking among traditional providers filled gaps in the vacuum left by healthcare workers who left Iraq [2, 5, 18, 19]. Healthcare workers who remained faced months, even years, of uncompensated labor [20]. Efforts to deliver care in the conflict and post-conflict period were fraught with violence, regional instability and lack of central government dedication to recovery. Infrastructure repair of hospitals took precedence over primary healthcare centers [20].

Whereas most of the studies that have emerged from Iraq have focused on urban centers that have been highlighted for their extent of infrastructure damage, no studies have emerged from the Anbar region [12]. Anbar is unique in that prior to the ISIS invasion, Anbar experienced years of sectarian violence under AlQaeda. United Nation data sets such as UNICEF MICS (Multiple Indicator Cluster Survey) survey has limited ability to report on households in isolated, rural areas of former ISIS occupation [21–24]. The purpose of this study is to characterize health seeking behaviors of caretakers of children less than six years of age from the conflict to the post-conflict period in Hadeetha, Anbar, Iraq. It also provides narratives from the healthcare workers who attempted to provide care during the ISIS occupation of 2014–2017.

Methods

This study is comprised of two components: (a) a home-based, cross-sectional survey of children and their caretakers who had been lost to clinical follow-up for immunization completion in Hadeetha, Iraq and (b) a qualitative component of focus groups and key informant interviews of health managers in the Anbar region. A home-based survey as well as a review of immunization records retrieved from the child's immunization card was collected from household respondents between February and April 2021. The qualitative component included focus groups and key informant interviews of health care managers and professionals from Anbar, Iraq as part of a UNICEF sponsored Primary Health Care (PHC) and Expanded Program on Immunizations (EPI) nationwide conference in Erbil, Iraq in November 2019. Additional follow-up interviews were conducted among medical

professionals and the director of pediatric services of the Hadeetha district in December 2021.

Household surveys

Study setting

Anbar is one of Iraq's governorates which represents a large province bordering both of Iraq's western neighbors: Syria and Jordan as well as Saudi Arabia to the south. The Hadeetha district is strategically located at the south of the Hadeetha dam, and straddles the Euphrates River. As of 2020, Hadeetha's total population was estimated at 122,978, of which 15.75% are estimated to be younger than five years of age [25]. Unlike the rest of Anbar, central Hadeetha was surrounded, not occupied, by ISIS. This led to unique challenges within Hadeetha for the provision of health services.

Study population and sampling procedures

Random sampling occurred from a list of 3,953 children between 12 and 72 months of age who had been lost to clinical follow-up for immunization completion, with a greater than 95% response rate to the survey. Sampling occurred from birth cohorts of children 2014 to 2020 registered in the three primary health centers and four subcenters representing seven health facilities in the district. This sampling mechanism captured 92% of registered children in the district.

As there are currently no published studies on lack of immunization completion in the district, a conservative estimate for full immunization using UNICEF criteria (Polio×3, DTP×3, BCG and Measles) was set at 40%. Assuming a 15% impact on immunization completion based upon being in the conflict cohort, a total of 350 children were needed to provide 80% power at a two-sided alpha of 0.05 assuming 25% of children would be during the ISIS occupation (2014–2017), and 75% would be from the post-conflict period (2018–2020). The caregiver was contacted by the designated Hadeetha district EPI (Expanded Program on Immunization) clinician. In order to be included in this analysis, the caregiver had to report that the Anbar province was a continuous place of residence from 2014 to 2021. A total of 415 households with one child in the designated birth cohorts were randomly sampled and met criteria for inclusion in this analysis. The final sample represented 2489 household members and 1384 children under six years of age with a total of 415 children chosen, representing one child per household.

Questionnaire

The survey design was based upon previously validated survey questions drawn from the Multiple Indicator Cluster Survey conducted in Iraq from 2000 to 2018 [19]. The caregiver survey included the following domains: (a) demographic information on the head of household, caretaker and child, (b) household information, (c) health history of the child, (d) immunization record captured from vaccination records, and (e) maternal demographic variables. An additional section was developed to assess the impact of conflict on healthcare access and attitudes. The conflict period was defined as the period of ISIS occupation until final liberation by Iraq: January 2014 to December 2017 [26]. Health seeking variables included treatment seeking, medication seeking and health care information seeking for the mother (caregiver) and the child. All data elements were designed and validated by the research teams in the United States and Iraq.

Statistical analysis

All baseline variables were analyzed using descriptive statistics, with number and percent as well as mean and standard deviation for continuous variables as needed. A total of 350 children were needed to reach 80% power at a 95% confidence level and 5% margin of error to detect differences in vaccine completion between to the two periods assuming a 95% response rate. Difference in health seeking by the mother versus the child (by the caretaker) are expressed as proportions and were analyzed with a Chi-square analysis (X^2). Caretaking for the child may be sought by the mother or by another member of the family. Changes in health seeking from the conflict to the post-conflict period and differences in health seeking between the mother versus child are expressed as absolute changes by the respondents per type of health care provider (doctor, nurse or pharmacist) as well as non-health care professionals (religious leaders, family members, internet). Relative changes in health seeking from the conflict to the post-conflict period, such as shifts from healthcare provider type, were assessed using changes based on individual responses. Bivariate data analysis was conducted using a series of contingency tables between care seeking based on health care provider type to produce a cross tabulation and Chi-square analysis (X^2). All analysis was conducted in STATA 17© [27].

Focus groups and key informant interviews

Healthcare professional participants

Health district managers from across Iraq were invited for a two-day conference in Erbil, Iraq as part of a PHC (primary healthcare center) health strengthening and EPI informational session in November 2019. Special break-out sessions to analyze health system's resilience among the former ISIS occupied governorates of Anbar, Kirkuk, Ninewa and Salahiddeen occurred in parallel to the main sessions. Structured focus groups

involved governorate-specific collaborative responses, a needs assessment and presentation of results. Focus group themes included adaptive strategies for provision of health services during the ISIS occupation and reconstruction and recovery efforts in the governorates. As severity of the conflict experience varied across governorates, structured questions permitted a formatted response in addition to open-ended opportunities to elaborate on the PHC and EPI specific failures within a governorate. Additional input was collected from the Hadeetha district Pediatric Health services manager in December 2021 as written key informant interviews. Data on reports of infrastructure damage, such as hospital and primary health care facilities, was cross-validated with a Ministry of Health/UNICEF health facilities national dataset.

Analysis

Focus groups were conducted in Arabic and English. Themes were prioritized around three trends during the conflict and post-conflict period: emergent absorption during the immediate insurgency period, adaptation during the ongoing occupation and finally, reconstruction and recovery efforts. Coded terms using a discourse analysis approach was applied to the focus groups and key informant interviews This analysis focuses on the responses of the Anbar and Hadeetha participants.

Results

Baseline results of household participants are presented in Table 1. Though all respondents reported that the mother was still alive at the time of the survey, not all households had the mother provide survey responses. It is also customary in rural, conservative areas of the Middle East that patriarchal structures preclude women from representing the family to outside representatives. Only 77.1% of respondents were mothers of children that were selected from the sample. Differences between respondent type (mother, father, grandparents) were conducted to determine if a stratified analysis was necessary. There were no differences across the strata so pooled results are presented.

The sampling mechanism sought to capture children who had been lost to clinical follow-up from the immunization schedule. Several of the households were drawn from areas that had not been accessed by a healthcare professional for a prolonged time. Of the respondents, both the head-of-household and maternal education levels were lower than observed for Iraq as a whole, with nearly 29.6% of heads-of household and 39% of mothers reporting only completing primary education or less. Though the sample captured children up to 72 months of age, all the households included at least one child less than five years of age. The average maternal age was 30 years old (SD 4). The average household had six members (SD 2).

Childhood variables, including health status of the child, are presented in Tables 2 and 3. Nearly 83.9% of childrene xperiences atleast one illness in the previous six months with the majority, 68.7%, being a febrile illness.

Table 1 Baseline characteristics of survey respondents (n = 415)

Question	n (%)
Respondent to the survey	
Mother	320 (77.1%)
Father	88 (21.2%)
Grandparent	6 (1.5%)
Area	
Rural	123 (29.6%)
Head of household education	
Primary or less	123 (29.6%)
Some or all secondary	191 (46.0%)
Beyond secondary	101 (24.3%)
Number of household members	
< = 5	169 (40.7%)
More than 5	245 (59.3%)
Number of children less than 5 years of age in household	
2 or fewer	145 (35%)
More than 2	269 (65%)
What type of home do you live in?	
Apartment	22 (5.3%)
Multi family home	77 (18.6%)
Single family home	316 (76.1%)
Have internet in the home	267 (64.3%)
Household income source	
Laborer	35 (8.4%)
Farmer	75 (18.1%)
Business owner	87 (21%)
Education	33 (8%)
Healthcare	23 (5%)
Engineer	28 (6%)
Administrative	36 (8%)
Relatives inside Iraq	17 (4%)
Maternal education	
Primary or less	162 (39%)
Some or all secondary	212 (51.1%)
Beyond secondary	41 (9.9%)
Maternal marital status	
Married	379 (91.3%)
Divorced or widowed	36 (8.7%)
Children under five years of age in the household	
2 or fewer	367 (88.4%)
More than 2	48 (11.6%)

Table 2 Description of children in sample per household participants responses (n = 415)

	Mean (SD)	Range
Age in months	33 (15)	(11, 72)
Months breastfed	11.4 (4.2)	(2, 24)
Developmental variables (Months)		
Age first sit up	8 (1)	(5, 19)
Age first steps	14 (2)	(10, 19)
Age spoke first word	13 (3)	(7, 25)
Number of illnesses in past six months		
Diarrheal episodes	0.3 (0.99)	(0,14)
Respiratory illnesses	0.45 (0.72)	(0, 8)
Fever illnesses	0.83 (0.71)	(0, 4)
Other illnesses	1.1 (0.51)	(1, 6)

Additional illnesses including diarrheal disease (21%) and respiratory illness (38.1%). A total of 56% of children had two or more illnesses in the previous six-months. Only 21.4% (95% CI 17.3%, 25.1%) of children (87) were fully immunuzed by 12-months of age.

Treatment seeking behaviors for the mother and child (by the caretaker) are presented in Fig. 1. There was a strong association between seeking treatment from a physician for the mother and for the child. Eighty-nine percent (291 of 327) of mothers who sought medical treatment from a physician for themselves also sought treatment from a physician for their child [OR 22, 95% CI (12, 38.6)]. A similar association was observed for seeking medical treatment from a nurse. Sixty-seven percent of mothers who seek treatment from a nurse (70 of 104) for themselves also seek treatment from a nurse for their child [OR 20, 95% (11.4, 35)]. Similarly, positive associations were seen for care seeking from a pharmacist,

Table 3 Conflict related experiences of respondents (n = 415)

	n (%)	95% CI
Home was damaged	67 (16.1%)	(12.8%, 20%)
Living in same home as 2014–2017	277 (66.7%)	(62.1%, 71.2%)
Displaced from your home	125 (30.1%)	(25.9%, 34.7%)
Lost income 2014–2017	185 (44.6%)	(39.8%, 49.4%)
Answered Difficult or Very Difficult in Accessing the following during the 2014–2017 period		
	n (%)	**95% CI**
Healthcare for yourself	356 (85.5%)	(82.2%, 88.9%)
Healthcare for your child	333 (80.2%)	(76.2%, 83.9%)
Medication for yourself	367 (88.4%)	(85.1%, 91.2%)
Medication for your child	343 (82.7%)	(78.8%, 86.1%)
Vaccines for your child	339 (81.7%)	(77.8%, 85.2%)
Food	373 (89.9%)	(86.7%, 92.5%)

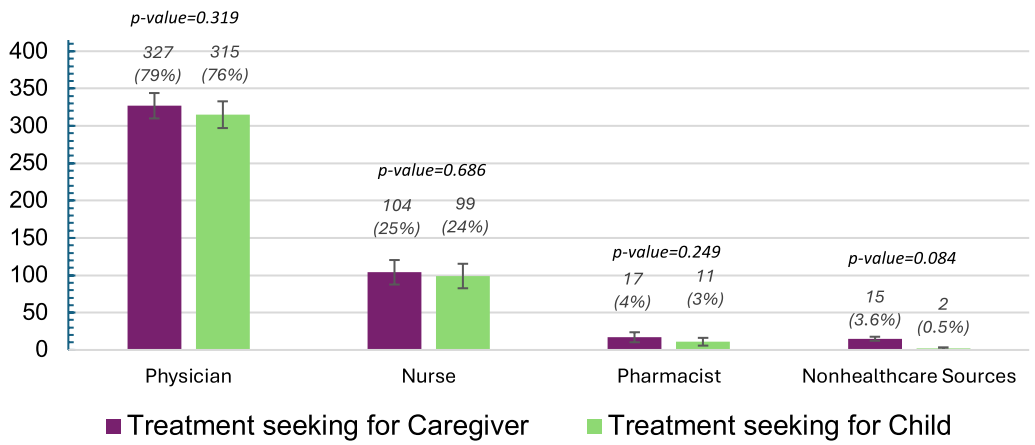

Fig. 1 Difference in treatment seeking behaviors between mother and child (by Caregiver) during the post-conflict period (n = 415)

though not as strong as other provider categories [OR 5.76, 95% CI (1.14, 29)]. Across paired comparisons of treatment seeking behaviors, there was no differences in health seeking behaviors between the caregiver for the mother versus care seeking for the child.

In order to understand obstacles to care during the ISIS occupation period, several questions focused on difficulty associated with healthcare access across provider type. The overall impact of conflict on the respondents was assessed across the domains of economic impact, damage to home and displacement. The majority of respondents indicated that seeking care for themselves, or their child, was difficult or very difficult during this period (Table 3). Sixteen percent of participants indicated their home was damaged during the conflict period, with 30% being displaced, all of whom moved to other areas in Anbar, mostly within Hadeetha.

Conflict experiences provide a framework to understand health seeking behaviors during the conflict period and changes in the post-conflict period. Figure 2 describes absolute changes in treatment and medication seeking between the two time periods among the 415 total respondents. From the conflict to post-conflict period, positive trends toward a reliance on physicians, and a decreased reliance on other healthcare professionals, was noted across categories. Identifying physicians as a source of treatment and medication increased the most compared to all provider types. Conversely, nurses as a source of treatment decreased by 23% and pharmacists as a source of medication decreased by 16%. An additional positive increase was noticed for technology to supplement treatment options, with 11% of respondents using the internet for treatment, medication, or medication information (Table 4).

Table 4 Sources of healthcare Information for survey respondents as of 2021 (n = 415)

Seek healthcare information		
Physician	288 (69.9%)	(65.3%, 74.2%)
Nurse	109 (26.5%)	(22.4%, 30.9%)
Pharmacist	13 (3.2%)	(1.8%, 5.2%)
Family Members	89 (21.6%)	(17.8%, 25.8%)
Internet	54 (13.1%)	(10.1%, 16.6%)
Traditional Healers	20 (4.9%)	(3.1%, 7.3%)

Additional analysis was performed to detect changes in care seeking at the individual level. Shifts in care seeking were from 2014 to 2017 and the follow-up period of 2021. Primarily, respondents indicated an increased reliance on physicians in the 2021 period. Forty-three percent of mothers who sought treatment from a nurse (85 of 200) during the conflict period continued to seek treatment from nurses during the post-conflict. Sixty-two percent of mothers (138 of 222) who did not utilize a physician during the conflict period began using a physician in the post-conflict period. Similar shifts were seen for medication seeking. Treatment and medication seeking shifted from nurses to physicians as well as pharmacists to physicians in the post-conflict period. Significant shifts were not seen from pharmacists to nurses or vice versa nor shifts away from using physicians.

Trusted sources of healthcare information saw similar trends as health seeking by provider type. Physicians were identified with the greatest frequency as trusted sources of information. Only a small portion of respondents indicated they used the internet to seek health information (13.1%) though 64% of respondents indicated they have internet in the home.

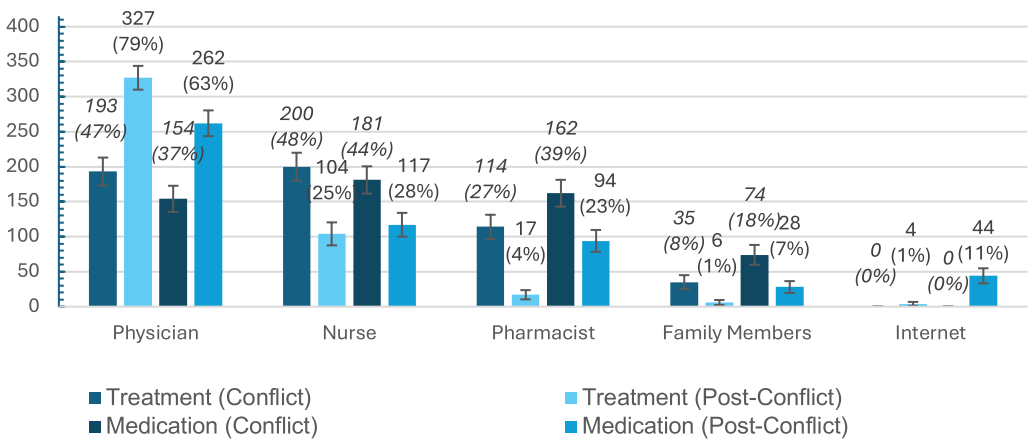

Fig. 2 Changes in healthseeking behaviors of caretakers from the conflict to the post-conflict period (n = 415)

Focus group and key informant interview results

The qualitative arm of this study provided an opportunity to provide context for the respondents' barriers to healthcare seeking during the period of conflict. The themes of the focus groups and key informant interviews are presented below around two themes: (1) Absorption and Adaption during the ISIS period and (2) Barriers to Recovery and Reconstruction in the post-conflict period.

Absorption and adaptation: provision of health services during periods of conflict

Differing from their counterparts in Ninewa, Salahuddin and Kirkuk, the Anbar healthcare managers expressed that the ISIS invasion and occupation was an extension of the previous two decades of conflict. The Anbar participants expressed exhausted adsorption capacity during ongoing aggression as the previous three decades did not provide an opportunity for rebound and recovery. Hadeetha was differentiated from other cities in Anbar as it was primarily surrounded, not occupied, by ISIS. The strangulation approach taken toward the city of Hadeetha, and surrounding tribes, left the area without electricity, food and medical services from 2014 to 2017. Furthermore, the isolation from ISIS control did not allow the formation of an alternate healthcare system under ISIS, which was largely a fee-for-service and referral system to other areas in Iraq, with ISIS permission. Instead, Hadeetha was reliant on continuation of services based upon what was available within the city itself. Medication and vaccine distribution was difficult, not only due to ISIS blockades, but lack of refrigeration systems, electricity and the sparsity of gasoline for vehicles.

Per the Pediatric District Health Manager, "the number of healthcare professionals and employees within Hadeetha dropped from sixty to only six." Physicians, with opportunities outside of the region, were among the very first to leave. Remaining staff were mostly untrained or unseasoned professionals. Though the population of Hadeetha did not experience the large exodus patterns of the rest of Anbar, the health demands of the remaining population increased with few opportunities for health maintenance or emergency interventions. Interviewees indicated an increased reliance on traditional medicine, shifting of medical treatment to the few remaining nurses, a reappearance of vaccine preventable diseases and prolonged malnutrition.

Lack of security within Hadeetha impeded the health services of the remaining physicians. Without electricity or gasoline, both private and public clinics were closed. The Hadeetha main hospital was under construction at the time of the insurgency and was inoperable throughout the time period. Several times, desperate patients would seek the physician at home (ie, visit the district manager's home) for emergent care. Physicians and other healthcare providers were execution targets by ISIS.

The central government attempted to mitigate disruptions in health services by delivering personnel, and supplies, by aircraft drops in a military airfield outside of Hadeetha. Healthcare workers reported, "We would be required to run with supplies on their backs between the ISIS territory and Hadeetha to enter the city." Due to the two decades of insurgency, only Iraqi personnel with historic roots in Hadeetha would be deployed for three-to-six-month stints in Anbar. These deliveries were intermittent and met with frequent disruption. Moments of lull would allow for continuation of mass vaccination campaigns. These services were often uncompensated. Vaccine delivery chains were disrupted as the EPI manager indicated, "… vaccination delivery was often redirected, requiring deliveries of vaccines from Baghdad's Ministry of Health to be routed through Kerbala in the South of Iraq. Roads within Anbar were wrought with explosives as well as three decades of damage." The participants shared that "steadfastness and patience," as well as an uncompromising commitment to their community, motivated their survival during this period. Another theme was a hopeful attitude that the next decade will bring a period of peace and opportunity for restoration and preparedness for the next crisis.

Recovery and reconstruction: 2018 to pre-pandemic Hadeetha health services

Recovery themes focused on optimizing periods between unrest for health system capacity building and creating cohesive community networks. Intensive efforts were made to recruit healthcare professionals back to Anbar and Hadeetha. The process of restaffing was described as "slow" for the Anbar region. Ongoing national level disruptions in the form of political protests, limited educational and economic opportunities for the youth and regional interference are ongoing are slowing Anbar's recovery.

Health problems within the districts persist, particularly malnutrition, violence related injuries, vaccine preventable diseases, cancer, and mental health problems. Recovery is ongoing. As of 2019, remote areas within the region were not under the control of the central government, making supervision of remote staff difficult and healthcare access focused on centralized locations in urban centers. The central government still struggled in compensating medical personnel who reported salary disruptions lasting a few months to an entire year in both 2019 and 2021.

Limited central government involvement and leadership had left Anbar and Hadeetha based recovery and resilience themes to focus on governorate and district efforts. A major theme was establishing community partnerships throughout Anbar to provide auxiliary support to healthcare personnel in times of conflict. An emphasis was placed on using traditional structures, not simply media platforms, to form community cohesion and response. Coordination across governorates for crisis training, occurring monthly, would provide specialized medical training of healthcare providers and community leaders. It was recommended to run simulation exercises during periods of political lull.

Recovery in the districts was prioritized around restoration of infrastructure. The Hadeetha hospital is now functional as are all of the primary healthcare centers. Sixty-percent of the subcenters (6 of 10) are fully functional as well. To mitigate the impact of healthcare sites as targets during insurgency and conflict, participants recommended identifying a series of alternate sites throughout the governorate for emergency stockpiles of supplies including vaccines, ambulances, and medications. The need for central government recovery and attention was discussed across all districts and governorates in the seminar.

Discussion

The impact of conflict on care seeking and child health

The immediate period post-ISIS occupation in Anbar witnessed a slow recovery process in which infrastructure repair was prioritized over re-establishing decentralized patient services for remote and isolated communities [28]. Attempts to meet the needs of the population were slowed with the continuing challenges of reincorporating into care the millions of returnees to the Anbar province [29–33]. Health disparities that existed before occupation based upon wealth quintile were exacerbated by health literacy and overall literacy, which has dropped in Iraq since the second Gulf War [34, 35]. Unlike comparable countries based on World Bank wealth indices, Iraq's gross domestic product (GDP) spending on health care is lower, with only 4.2% of GDP spent on healthcare. Efforts by the Ministry of Health toward health financing and social insurance policies continue to be derailed by intermittent and prolonged period of conflict [15].

The effects of armed conflict on children can be considered acute and post-acute though it is known that women and children bear the disproportionate burden by armed conflict, such metrics are poorly quantified due to limitations in data gathering ability. Gaps in data are even wider for internally displaced persons and "remainees," who are inaccessible during the conflict period or fall out of the reach of traditional aid and humanitarian agencies [35, 36]. A focus on vaccine preventable diseases led to decreased monitoring of other respiratory illness in the region [37–39]. Similar results regarding respiratory infections among children in Hadeetha are noted in Mosul in the one-year post-conflict period [37, 38]. Given these are children who have not been retained in care, these numbers may represent an underestimation.

Across developmental variables, the children achieved the developmental milestones of sitting up, speaking and walking within the normal range [40]. Overall reports of respiratory and diarrheal illnesses in the sample are consistent with UNICEF MICS Iraq reports and other studies across Iraq [12, 21, 37]. Reported childhood illnesses were consistent with Iraq national statistics, including respiratory illnesses [39] Children across birth cohorts had incomplete immunizations by 12-months of age, with several delays in vaccination.

The post-conflict usage patterns indicate a desire by caregivers to seek medical treatment for their children from physicians. Anbar witnessed an exodus of healthcare providers during the ISIS occupations [20]. The result was a reliance on alternate providers and paraprofessionals for treatment and medication during the conflict period and into the immediate post-conflict period. Similar trends were noted in Mosul, Iraq which investigated health utilization patterns in the recovery period in which pharmacists and alternative medicine were used by both residents who remained during ISIS and those who were returning [11, 12].

Unlike studies in other parts of Iraq, this study investigates longitudinal, self-reported changes in healthcare use. The increase reliance on physicians in the post-conflict period correlates with an increased return of physicians to the region after liberation. Decentralized approaches to healthcare, such as the use of nurses and pharmacists, particularly among the more rural residents, suggests that sub-centers and health houses more distant from Hadeetha central continue to depend on support staff such as nurses and pharmacists to work in the role of treatment and medication management. Shifts in care seeking to other healthcare professional can serve to provide continuity of services with a broader patient provider base in case of additional conflicts in the region.

Conflict and health system strategies

In non-conflict settings, recommendations to maximize health care utilization by patients can employ multiple strategies. Community engagement campaigns that increase patient decision-making strategies and a participator care model can be used to overcome care seeking challenges and provide equity of services across communities [13]. In conflict settings, recommendations revolve around prioritizing rural residents and returnees

to conflict recovery zones. This recommendation does not address the continuing health gaps incurred by those who remained under occupation or during the conflict.

In Iraq, health seeking was dictated by access. A pay for service model continued under the ISIS occupation. Dependence on the private sector exacerbated out of pocket health expenditures, driving a reliance on self-care and traditional healers. The quality of public sector care still paled in comparison to what was perceived as superior care in the private sector [8]. Shifting individuals back to the government sector for care remains a challenge throughout the recovery areas.

A key strategy shared during the focus groups was a continuous preparation program for future health system's disruptions. Among the disaster-based strategies required would be crisis support for healthcare professionals, cooperation across sectors and a community embedded approach to conflict resistance, endurance and recovery [20]. Crisis support would include stockpiles of necessary medical supplies, communication lines that would be preserved during times of violence and collateral networks of healthcare providers to provide support during conflict. Infrastructure repair for the returnees goes hand-in-hand with shoring up the healthcare infrastructure. Even post-conflict distribution of infrastructure recovery funds was inconsistent across and within the affected governorates [41]. This impacted return patterns of physicians to the regions and had a subsequent impact on care seeking behaviors o patients.

Strengths and limitations

This study had several strengths. Using a sampling frame of all children in the birth cohort who were loss to follow-up for immunization services allowed the investigators to draw a representative population for the study. This study also focused on the unique impact of conflict on those individuals who were unable to leave under ISIS. This provided a unique insight into the experiences of "remainees," individuals who are unable to evacuate. This study also provided a look into the long-term impact of shifts in care seeking among families and their children, particularly as other healthcare workers filled physician voids. Including discussions driven by the healthcare workers provided to the barriers faced by the providers under ISIS occupation. This study also had limitations. Recall bias could impact the parent's ability to document provider preferences during the occupation. Given these were largely individuals isolated from routine care delivery, the data could not be cross validated with health records. The study also does not capture children who had delays in healthcare but were reintroduced into the care system prior to the study as they were excluded from the sampling frame.

Conclusion

The objective of this study was to investigate the impact of conflict on care seeking behaviors among parents and children in formerly occupied ISIS territory of Hadeetha, Anbar, Iraq. This study adds to the literature regarding individual and health system shifts during the conflict and post-conflict period. It also provides insight into how many years post-conflict are required to reintroduce children to routine care. Iraq has four decades of experience with conflict and shock to the healthcare infrastructure. Recovery strategies have placed a strong emphasis on the need of the central government to develop and implement disaster-based strategies before, during and after a crisis. A concerted effort to reintegrate individuals into primary healthcare services and remedy the gaps in health care for those that were isolated for nearly half a decade must occur hand-in-hand with other community, government, social, and security campaigns. Reintegration into care pathways is the first step to health equity in the region and to ensure the most vulnerable do not remain vulnerable to the residual impact of conflict.

Abbreviations

EPI	Expanded Program on Immunization
ISIS	Islamic State of Iraq and Syria
PHC	Primary healthcare center
UNICEF	United Nations Children's Fund
MICS	Multiple Indicator Cluser Survey
USA	United States of America

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Author contributions

SA participated in the conception, design of the work, analysis, interpretation of data, drafted and revision. TH and AK contributed to the design of the work, the acquisition, interpretation of data; revision. WM, KT and GB participated in the conception, design of the work, interpretation of data, revision. MK participated in the conception, design of the work, analysis, interpretation of data, revision of manuscript. All authors read and approved the final manuscript.

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Data availability

The data that support the findings of this study are available from the authors and the district of health but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the Hadeetha district of health.

Declarations

Ethics approval and consent to participate

Institutional Review Board approval was received from Johns Hopkins University Bloomberg School of Public Health and the Hadeetha, Anbar, Iraq Ministry of Health Ethics Approval Board.

Consent for Publication

No individually identifiable data is available.

Competing interests

The researchers have no competing interests to declare. SA reports receiving funding from Pfizer and Roche-Genentech, though not related to this project. KT reports funding from Pfizer, AstraZeneca and Moderna, though not related to this project.

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