



(REVIEW ARTICLE)



A SYSTEMATIC REVIEW OF THE ADEQUACY OF HYPERTENSION TREATMENT IN WOMEN ATTENDING AZADI TEACHING HOSPITAL DURING CRISES IN KIRKUK, IRAQ

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ABSTRACT

Background: Elevated intraocular pressure is a major, dangerous and modifiable risk factor, as the resulting deaths are primarily due to cardiovascular and cerebrovascular diseases worldwide. Control of this condition is particularly important in the context of the disruptions caused by humanitarian crises; it has been found that in the city of Kirkuk in Iraq, there have been prolonged periods of instability, and among the causes of this during the period from 2014 to 2017, during the time of ISIS's control and the widespread displacement that occurred repeatedly. This has been a major cause of sustained pressure on Azadi Teaching Hospital, which is considered a key referral centre in that governorate. Women attending outpatient clinics for this condition have faced overlapping problems that have prevented them from receiving treatment. Ultimately, the evidence regarding the appropriateness of treatment for these women remains extremely limited, fragmented and incomplete.

Objective: To systematically review the available evidence on the adequacy of hypertension treatment among women attending Azadi Teaching Hospital, Kirkuk, during periods of crisis, and to synthesize contextual, regional, and global data to inform recommendations.

Methods: A systematic search of PubMed/MEDLINE, Google Scholar, regional journals (Kirkuk Journal of Medical Sciences, Eastern Mediterranean Health Journal), and grey literature was conducted (search period: inception to September 2026). Studies were eligible if they reported on hypertension prevalence, treatment, adherence, or control among adults attending Azadi Teaching Hospital, or among Iraqi/crisis-affected populations where data were relevant to that setting. The exposure of interest was treatment adequacy, defined by four domains: (1) proportion receiving antihypertensive treatment, (2) guideline-concordance of prescribed regimens, (3) medication adherence, and (4) achieved blood pressure control (<140/90 mmHg). Risk of bias was assessed narratively given the predominance of cross-sectional designs.

Results: Seven studies met inclusion criteria. Only two studies were conducted directly at Azadi Teaching Hospital; the remainder provided Iraqi, Kurdistan-region, or crisis-setting contextual evidence. The prevalence and incidence of high

blood pressure amongst patients attending Azadi Teaching Hospital reached a very high rate of 41 per cent, whilst treatment coverage was very low and control of the condition, where possible, was very poor. A 2018 Azadi study found 93% of hypertensive patients uncontrolled. Evidence from Baghdad and Erbil showed control rates of 38.7% and 22% (rising to 47% with intensive follow-up), respectively. Female sex appeared protective for control in Erbil but not in Baghdad. Crisis-related barriers medication supply disruption, cost, out-of-pocket purchase, and interrupted follow-up were consistent across settings. Evidence specific to women at Azadi during crises remains sparse, and no study disaggregated treatment adequacy fully by sex and crisis phase.

Conclusions: Hypertension treatment adequacy among women attending Azadi Teaching Hospital during crises is likely inadequate across all measured domains, consistent with national Iraqi and crisis-affected regional data. Priority actions include sex-disaggregated prospective monitoring, medication supply-chain strengthening, adherence support, task-sharing with clinical pharmacists, and integration of hypertension into crisis-preparedness planning.

Keywords: Hypertension; Treatment adequacy; Women; Azadi Teaching Hospital; Kirkuk; Iraq; Humanitarian crisis; Conflict

1 INTRODUCTION

The prevalence of high blood pressure has reached approximately 29 to 32 per cent of the adult population in Iraq, whilst the World Health Organisation estimates that it accounts for 12 per cent. It is a leading cause of death worldwide, and the healthcare system in Iraq operates under prolonged constraints arising from pressures, conflicts, political instability and economic pressures[5-7]. These are considered key factors in the shortage of medicines, the disruption of services and the inadequacy of follow-up care. The province of Kirkuk, in particular, faces a unique and unstable situation, as it is a multi-ethnic city within Iraq that is the subject of dispute. It was attacked by ISIS in June 2014, leading to mass displacement[6]. The city experienced conditions akin to a siege and recurring security crises over the following decade, with Azadi Hospital bearing the brunt of this pressure whilst continuing to provide outpatient services. The Kirkuk Hospital Centre is considered to be the referral centre and main hospital in the city of Kirkuk, whilst the hospital attached to the University of Kirkuk is also considered part of the system. The concept of 'disease management' is a broader term that can be used to manage blood pressure, as it encompasses four consecutive check-ups during the course of a patient's treatment for high blood pressure whilst receiving any antihypertensive medication. It is essential to prescribe that are in line with clinical guidelines. It is important for the patient to adhere to the treatment and for the condition to be effectively controlled. Women constitute a particularly significant group among outpatients with hypertension, as this condition generally affects approximately 61 to 67 per cent of women. However, it is rare for specific checks relevant to women—which affect the effectiveness of treatment, such as the burden of caring for family members, which limits follow-up, family disputes, and health awareness—to be carried out[1,6-8].

This systematic review therefore asks: among women attending Azadi Teaching Hospital during crisis periods in Kirkuk, how adequate is hypertension treatment, and what crisis-related factors modify it?

2 METHODS

2.1 Protocol and registration

The review was conducted following PRISMA 2020 reporting guidance. Given the anticipated scarcity of primary studies specific to the population, the protocol allowed inclusion of contextual evidence (Iraqi national, Kurdistan-region, and crisis-setting studies) with clearly labelled indirectness, in line with narrative synthesis guidance for sparse evidence fields. The review was not prospectively registered; this is acknowledged as a limitation.

2.2 Search strategy

Searches were run (September 2026) in PubMed/MEDLINE, Google Scholar, the Kirkuk Journal of Medical Sciences archive, the Eastern Mediterranean Health Journal, and grey literature. Combinations of terms were used: (hypertension OR 'blood pressure') AND (Kirkuk OR Azadi OR Iraq) AND (women OR female) AND (treatment OR control OR adherence) AND (crisis OR conflict OR war). Reference lists of included studies and the BMJ Global Health systematic review of hypertension in humanitarian crises [3] were hand-searched.

2.3 Eligibility criteria

Population: adult women (or mixed-sex adult samples with extractable female data) attending Azadi Teaching Hospital or, for indirect evidence, Iraqi or crisis-affected adult populations. Exposure/condition: hypertension (clinic BP $\geq 140/90$ mmHg on repeated measurement or on antihypertensive therapy). Outcomes: at least one treatment-adequacy domain treatment coverage, regimen adequacy, adherence, or BP control. Study designs: all quantitative designs.

Excluded: studies of gestational hypertension only, hypertension in pregnancy without non-pregnant data, children, military-only samples, opinion pieces, and studies pre-dating 1999.

2.4 Data extraction and quality assessment

Data were extracted on setting, crisis period, sample size, sex distribution, and all four adequacy domains. Quality was assessed narratively, noting the dominant cross-sectional designs, single-BP-measurement ascertainment, convenience sampling, and absence of adherence measurement in several primary studies.

3 RESULTS

3.1 Study selection

Seven studies met inclusion criteria: two conducted at Azadi Teaching Hospital, three from elsewhere in Iraq (Baghdad, Erbil, Babylon-derived national adherence data), one Kurdistan-region community study, and one global systematic review of hypertension in humanitarian crises providing Iraq-specific data. No study exclusively sampled women, and none prospectively disaggregated outcomes by crisis phase; indirectness is therefore substantial for the precise review question.

3.2 Studies at Azadi Teaching Hospital

Al-Jubouri and colleagues studied 2,351 unselected medical clinic attendees at Azadi Teaching Hospital (2013-2015), a period spanning the ISIS crisis onset in Kirkuk [4]. Hypertension prevalence was 41%; although awareness and treatment rates rose significantly across the study window, the proportion receiving medication remained low and blood pressure control was poor, with the authors concluding that 'increase in improvement of management and controlling of HTN among our population seriously needed.' A second Azadi study (March-September 2018; n=200 hypertensive patients) examined hypertension and smoking [7]. Uncontrolled blood pressure was found in 93% of participants a figure reflecting a hospital under crisis conditions with complications (cardiac and cerebrovascular) markedly higher among smokers. Although not sex-restricted, the study's setting and timing place it squarely within Kirkuk's prolonged crisis period. Complementary Kirkuk evidence comes from a study of 150 hypertensive patients and 100 controls recruited from Azadi Teaching Hospital, demonstrating a high burden of hyperlipidaemia among hypertensive attendees relevant because untreated comorbidity indicates incomplete cardiovascular risk management in the same patient stream [5].

3.3 Iraqi and regional contextual evidence

At Al-Yarmouk Hospital, Baghdad (2018; 67.3% female), only 38.7% of hypertensive patients achieved controlled BP; monotherapy was the dominant strategy despite guideline preference for combination therapy [1]. A recent national-pattern study of 585 Iraqi hypertensive patients (61.5% female) found that only 10% achieved BP control, with non-adherence, inappropriate drug selection, and incorrect regimens as leading treatment-related problems; gender was significantly associated with BP status ($p=0.037$) [2]. In Erbil, baseline control was 22%, rising to 47% under intensive structured follow-up; women were significantly more likely to achieve control [8].

3.4 Crisis-setting evidence

The BMJ Global Health systematic review (61 studies) reported that nine studies covered the Iraq wars, that >80% of hypertensive patients in Syria and Iraq sought care, treatment rates ranged from 53.4% to 98.1%, and adherence proxy rates in Iraq reached 68.5% [3]. Barriers to adequate treatment in crises were consistent: medication cost and availability, severity of local crisis, and disrupted follow-up. The review explicitly identified women and crisis-phase analyses as critical gaps a gap this review confirms persists for Kirkuk.

4 SYNTHESIS: ADEQUACY OF TREATMENT IN WOMEN AT AZADI

Domain 1 Treatment coverage: likely inadequate , Data from AZadi Teaching Hospital shows that, between 2013 and 2015, a minority of patients with high blood pressure were receiving treatment, despite increased awareness and understanding of the condition. Data collected from crisis settings indicates that difficulties in accessing care and disruption to service provision are considered major and decisive barriers. Second area: Conditions of the treatment system: These may be inadequate, as a descriptive approach is favoured in Iraq, with monotherapy accounting for approximately 53 per cent, rather than combined therapy based on evidence-based guidelines[1-4]. It appears that there are recurrent errors in the selection of medication and the determination of dosages, and no information is available at Zadi Hospital regarding these treatment regimens by gender. Area 3: Treatment adherence: very poor and below the required standard; this indicator is considered important in treatment in Iraq, with a rate of approximately 68.5 per cent This means that approximately one in three patients do not take their medication as prescribed. Young

women, female students and individuals with poor self-care practices are considered the groups most at risk of these diseases. Crisis situations, such as displacement, are a major cause of purchasing medicines directly without a prescription and of irregular follow-up, which exacerbates the problem [3-6]. Domain 4 Control: inadequate. The best available estimates for the Azadi patient stream are 93% uncontrolled (2018) and 'bad' control with low treatment proportions (2013-2015) [4,7]. Female sex may confer modest advantage (Erbil data), but the Baghdad data show no female benefit, so the balance of evidence for women specifically at Azadi is indeterminate and likely unfavourable during acute crisis phases [1,8]. Overall, the evidence supports a judgment of inadequate treatment adequacy across all four domains for women attending Azadi Teaching Hospital during crises, extrapolated from two site-specific studies, convergent Iraqi data, and crisis-setting barriers literature. The certainty is low due to indirectness, cross-sectional designs, and absent sex-disaggregation.

5 DISCUSSION

This is the first systematic review focused on treatment adequacy for women with hypertension at Azadi Teaching Hospital during crises. Three findings stand out. First, the hypertension care cascade at Azadi leaks at every stage: diagnosis (41% prevalence), treatment (low coverage), adherence (~1/3 non-adherent), and control (up to 93% uncontrolled). Second, crisis is not merely a backdrop but a causal modifier conflict-driven supply disruption, displacement of patients and staff, and reliance on out-of-pocket pharmacy purchases structurally undermine each adequacy domain [3,6].

Thirdly, women constitute the majority of those affected by this condition; at the same time, they represent the smallest subgroup in the study, as none of the included studies reported sufficient treatment outcomes categorised by gender at Azad Teaching Hospital. Nevertheless, women represent the largest group facing specific barriers related to crises and consultations, such as restrictions on mobility, low levels of health awareness and the burden of home care. This is one indicator from the city of Erbil, which shows that intensive follow-up with combination therapy at high doses achieves disease control rates of 22 to 47 per cent within a single year, with greater benefits observed among older women. It can be said that treatment provision is capable of improvement even in specific settings close to crisis zones. The scientific recommendations for Azad Hospital can be summarised as follows: Firstly, the inclusion of hypertension management within the hospital's crisis preparedness plans and the provision of a reserve stock of medicines that help control this condition. Secondly, the establishment of specialised clinics for follow-up, organised and led by pharmacists or nursing staff. Thirdly, the prescribing of a combination therapy in a single tablet to reduce the burden of polypharmacy on patients. Fourthly, rely on quality indicators categorised by gender. Fifthly, launch a community and home blood pressure monitoring programme to compensate for the difficulty in accessing clinics during periods of security unrest.

5.1 Limitations

The absence of any study that directly and exclusively measures the effectiveness of treatment in women at Azadi Teaching Hospital represents a major limitation of this review, particularly with regard to specific stages of the crisis. However, it is possible to draw indirect evidence from this specific group, which has been compared and analysed, given that the initial studies were sporadic and most were conducted at a single centre, relying on blood pressure measurements taken during a single visit, with no assessment of adherence to treatment or only limited evaluation thereof. Furthermore, as these studies were not published in local journals with archives and indexes, this necessitates a narrative synthesis and monitoring to serve as an alternative to post-hoc analysis, particularly given the inconsistencies in the definitions used and the inability to integrate the information, as it is noted that the review had not been previously recorded

6 CONCLUSIONS AND RECOMMENDATIONS

With regard to women who sought treatment for high blood pressure at Azadi Teaching Hospital during the crises that occurred in the city of Kirkuk, the care provided is considered inadequate in all respects, including treatment coverage, the suitability of the healthcare system and adherence to it, as well as disease management. The best local estimates indicate that the majority of women undergoing treatment did not achieve the target blood pressure level during the years of crisis. Consequently, several options are proposed to improve the implementation of treatment, which are tailored to the Iraqi context as follows:

- Ensuring the safety and continuity of medication supply
- Establishing a structured and organised follow-up system
- Strengthening and promoting adherence to treatment, with a particular focus on women
- Providing them with combination prescriptions in a single tablet

Previous and future research has involved conducting gender-specific clinical studies at Azad Teaching Hospital, covering both crisis and post-crisis periods. Standardised measures of treatment adherence were established, and specific research and studies were conducted on women's behaviour in seeking treatment and their patterns of healthcare-seeking behaviour during periods characterised by a lack of security and stability

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