Effects of October 2023 war on health care costs in Gaza

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Abstract

Background: The October 2023 war in Gaza has impacted the health system and increased the economic burden in Gaza.

Aim: To assess the effects of the war in Gaza on health care costs and access to services.

Methods: Between February and May 2024, this cross-sectional survey collected data from 658 individuals in Gaza on health care costs, obstacles to access and the effectiveness of health care services. Data analysis was conducted using SPSS version 25 and the relationships between the variables were determined using the chi-square test. Associations were considered statistically significant at $P < 0.05$.

Results: Seventy percent of the study participants reported increased health care costs because of the war; 40% relied on personal savings and 25% on aid to cover their medical expenses. The main barriers to accessing medications were shortages (70%), high prices (60%) and poor distribution (50%). Higher income levels were correlated with reduced barriers to access ($P < 0.01$) and higher education levels were associated with greater satisfaction with services ($P = 0.02$).

Conclusion: The war has disrupted the healthcare system in Gaza, seriously affecting the cost, access and quality of services. In addition to a permanent ceasefire, targeted actions are needed to lessen the economic burden on the population and improve service delivery.

Keywords: health care cost, health system, access to medicine, health economics, conflict, war, health emergency, Gaza

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Introduction

Wars and conflicts have detrimental effects on health and the cost of medical care. Estimating the cost is crucial to understand the impact and plan appropriate interventions *(1)*.

Healthcare infrastructure in Gaza was already on the verge of collapse before the October 2023 Israel-Hamas war, making the already dire situation worse. The war has resulted in hospital closures, limited access to supplies, physical damage to hospital infrastructure and transport networks, and evacuation of multiple medical facilities *(2)*.

Many years of persistent conflict in Gaza, a territory characterized by high population density and limited resources, has caused disruptions to medical supply chains, an escalation of health care costs and compromised the capability of health facilities, as in other conflict zones *(4–8)*. Import restrictions and blockades have disrupted the supply chain for essential medications and medical equipment, resulting in shortages and inflated prices in the black market.

Conflicts intensify financial pressures at the community level, resulting in increased economic hardships for families and reduced availability of vital services *(9)*. Despite efforts by the humanitarian community to seek an end to the war and tackle the associated challenges, the war has intensified and made health care provision very difficult *(10,11)*. The increasing number of casualties is overwhelming the health system. Chronic disease cases are increasing and they are becoming increasingly difficult to manage due to interrupted access to medication and care. Children, who are especially vulnerable in conflict zones, are experiencing disruptions to vaccination programmes and nutritional support, adversely affecting their health and development.

While diplomatic efforts continue to secure an enduring peace in the territory and restore stability to Gaza's health system *(3)*, it is essential to understand the effects of the conflict on health expenditures and access to medications to be able to design effective and sustainable interventions that will enhance resilience in Gaza. This research assessed the effects of the war on health care expenditure and availability of medications, to increase understanding of the difficulties faced by the affected population, and their coping mechanisms. It offers some recommendations to improve health care access and lessen the financial burdens.

Methods

This cross-sectional survey used a questionnaire to gather data on health care costs, medication access and health care service efficiency from 658 individuals in Rafah. Data was collected through online and in-person interviews between February and May 2024. The questionnaire contained 43 questions and collected data

on demography, health care expenditure, medication availability, ease of access to medical facilities, and opinions regarding the efficacy of government and non-government interventions.

Data was collected from Rafah residents and refugees before the Israeli occupation of Rafah. To ensure an unbiased representation, the study included a diverse sample of individuals across different age groups, gender, occupation, education level, and income group. The conflict-specific data collection focused on Rafah residents and refugees, capturing real-time challenges before Israeli occupation altered the conditions.

The survey was validated by 6 specialists in conflict studies, pharmaceutical access and health economics to ensure ethical and scientific rigour. It received approval from relevant authorities in the Gaza Strip and ethics clearance was obtained from the Institutional Review Board (IRB) of the Faculty of Pharmacy, Arab American University, Jenin. Due to the sensitive nature of the study, responses were anonymized to protect participants from potential risks and the data was stored securely to prevent unauthorized access. The study adhered to strict ethics standards to ensure participant safety, data integrity and compliance with research guidelines. All participants provided informed consent to participate voluntarily in the study.

Data analysis was conducted using SPSS version 25. The relationships between categorical variables were determined using the chi-square test. Associations were considered statistically significant at $P < 0.05$. The comparative analysis and statistical adjustments, including chi-square test, improved the accuracy of the statistical tests and helped differentiate the effects of the war from other underlying factors, ensuring that the findings accurately reflected the impact of the conflict on healthcare.

Results

Of the participants, 52% were male and 48% female, the largest age group was 25–34 years (28%). Most participants had secondary (34%) or higher education (30%), and 35% were employed full-time, while 20% were unemployed. Household sizes varied, 36% had 3–4 members, and income levels were predominantly middle (45%) and low (40%) (Table 1).

Of the households, 76% required medical treatment, of which 40% needed emergency care and 25% needed medication. The main barriers to accessing medicines were shortages (70%), high prices (60%), and distribution issues (50%). Most respondents relied on alternative medicine (40%) or delayed their treatment (25%), only 30% were satisfied with medicine distribution, and 72% felt unprepared for future conflicts (Table 2).

Of the respondents, 65% experienced delays in medical treatment and 55% frequently faced medicine shortages. The quality of medical services varied (15–30%). Only 40% had health insurance and half relied on alternative sources like black markets for medicines.

Table 1. Demographic characteristics of participants

	%	No.
Age group (years)		
18–24	15	99
25–34	28	184
35–44	24	158
45–54	17	112
55–64	10	66
≥ 65	6	39
Gender		
Male	52	343
Female	48	315
Occupation		
Employed full-time	35	229
Employed part-time	22	146
Unemployed	20	131
Student	10	66
Retired	7	47
Other (please specify)	6	39
Education level		
No formal education	5	33
Primary education	18	117
Secondary education	34	225
Higher education (e.g. university)	30	198
Postgraduate education	13	85
Household size		
1–2 members	10	66
3–4 members	36	236
5–6 members	32	211
≥ 7	22	145
Income level		
Low	40	263
Middle	45	296
High	15	99

Half of them perceived international aid organizations positively, 45% frequently experienced disruptions to health care services and 60% reported health issues due to the conflict.

Of the households, 70% experienced increased health care costs, 40% relied on personal savings and 25% on humanitarian aid to cover their medical expenses. Only 35% rated emergency health care services as good or excellent, and 30% found primary health care less accessible than before the conflict. The main barriers to medical treatment were medicine shortages (35%), lack of medical personnel (25%), damage to health care facilities (20%), and fair or poor (30–20%) patient-provider communication (Table 3).

Income level was significantly associated with barriers to accessing medicines ($P = 0.002$) and increased health care costs ($P < 0.01$), while education level impacted

satisfaction with health care services (P = 0.002). Poor emergency health care quality was linked to higher barriers to medicine access (P = 0.01), and medicine shortages led to increased reliance on alternative treatments (P = 0.02). High health care costs were associated with financial burden, with many relying on personal savings or loans (P = 0.01) to pay for services (Table 4).

Discussion

Armed conflicts severely disrupt healthcare systems, affecting availability and quality and imposing financial burdens on communities. The Gaza war has caused disruptions to health care and increased constraints among households. The economic impact of the war on health care costs and medication access compares to other conflict

Table 2. Healthcare costs and barriers to accessing medicines

	%	No.
Have you or any member of your household required medical treatment during the Gaza war?		
Yes	76	500
No	24	158
If yes, please specify the type of treatment required:		
Emergency care	40	200
Routine medical care	30	150
Specialized care (e.g. surgery, oncology)	20	100
Medication	25	125
Other (please specify)	5	25
What are the major barriers to accessing medicines?		
Shortages	70	460
High prices	60	395
Distribution issues	50	330
Other (please specify)	10	66
How effective are the following healthcare programs during the Gaza war?		
Non-government organizations programmes	65	428
Government programs	35	230
Do you feel prepared for future conflicts?		
Yes	28	184
No	72	474
How frequently do you experience medicine shortages?		
Daily	20	131
Weekly	30	197
Monthly	25	164
Rarely	15	99
Never	10	66
How do you cope with medicine shortages?		
Substituting with alternative medicines	40	263
Delaying treatment	25	164
Seeking help from non-government organizations	20	131
Purchasing from the black market	10	66
Other (please specify)	5	33
How satisfied are you with the current system of medicine distribution?		
Very satisfied	10	66
Satisfied	20	131
Neutral	30	198
Dissatisfied	25	164
Very dissatisfied	15	99

Table 3. Access to health care services and health care costs

Access to healthcare services	%	No.
How do you rate the quality of emergency healthcare services during the Gaza war?		
Excellent	10	66
Good	25	164
Fair	30	198
Poor	25	164
Very poor	10	66
How accessible are primary healthcare services compared to before the conflict?		
Much more accessible	10	66
Somewhat more accessible	20	131
Same	25	164
Somewhat less accessible	30	197
Much less accessible	15	99
What are the main reasons for delays in receiving medical treatment?		
Shortages of medicine	35	231
Lack of medical personnel	25	164
Damage to healthcare facilities	20	131
Financial constraints	15	99
Other (please specify)	5	33
How would you describe the communication between healthcare providers and patients during the Gaza war?		
Excellent	15	99
Good	25	164
Fair	30	198
Poor	20	131
Very poor	10	66
How do you perceive the level of support provided by local healthcare workers during the conflict?		
Very supportive	25	164
Supportive	35	231
Neutral	20	131
Unsupportive	15	99
Very unsupportive	5	33
Health care costs and financial impact		
Have healthcare costs increased for you or your household during the Gaza war?		
Yes	70	460
No	30	198
If yes, how much has your healthcare spending increased compared to before the conflict?		
< 10%	15	99
10–30%	35	231
31–50%	25	164
> 50%	25	164
How have you financed these increased health care costs?		
Personal savings	40	263
Loans	20	131
Assistance from non-government organizations	25	164
Government assistance	10	66
Other (please specify)	5	33
How do you rate the overall financial burden of healthcare costs during the Gaza war?		
Very high	30	198
High	40	263
Moderate	20	131
Low	10	66

Table 4. **Relationships between key variables**

Variables/relationships	Category/variables	*P* value.
Relationships between key variables		
Age group-increased health care costs	Age group	0.010
Income level-barriers to accessing medicines	Income level	0.002
Occupation-access to specialized care	Occupation	0.168
Education level-satisfaction with health care services	Educational Level	0.002
Household size-preparedness for future conflicts	Household Size	0.034
Gender-access to medicines	Gender	0.054
Health care costs and demographic variables		
Age-health care costs increased	18–24, 25–34, 35–44, 45–54, 55–64, ≥ 65 (years)	0.03
Income level-health care costs increased	Low, middle, high	< 0.01
Education level-health care costs increased	No formal, primary, secondary, higher, postgraduate	0.04
Barriers to accessing medicines and other variables		
Age-health care costs increased	18–24, 25–34, 35–44, 45–54, 55–64, ≥ 65 (years)	0.03
Income level-health care costs increased	Low, middle, high	< 0.01
Education level-health care costs increased	No formal, primary, secondary, higher, postgraduate	0.04
Barriers to accessing medicines and other variables		
Income level-high barrier to access	Low, middle, high	< 0.01
Gender-high barrier to access	Male, female	0.02
Education level-high barrier to access	No formal, primary, secondary, higher, postgraduate	0.03
Service effectiveness and satisfaction		
Service type-high satisfaction	Non-government, government	< 0.01
Insurance coverage-high satisfaction	Yes, No	0.03
Service quality issues and health complications		
Service quality issues-health complications experienced	Frequently, Occasionally, Rarely, Never	< 0.01
Effectiveness of health campaigns and accessibility		
Health campaign effectiveness-mental health services	Very effective, effective, neutral, ineffective, very ineffective	0.02
Changes in health and other variables		
Conflict-related health changes-increased costs	Yes, No	< 0.01
Conflict-related health changes-barriers to medicines	Yes, No	N/A
Conflict-related health changes-satisfaction	Yes, No	N/A
Emergency health care quality and medicine access		
Quality of emergency health care-high barrier to access	Excellent, good, fair, poor, very poor	0.01
Primary health care accessibility and costs		
Primary health care accessibility - increased costs	Much more, somewhat more, same, somewhat less, much less	0.03
Communication quality and satisfaction		
Communication quality-high satisfaction	Excellent, good, fair, poor, very poor	0.02
Increased health care costs and barriers to medicines		
Health care costs increase-high barrier to access	< 10%, 10–30%, 31–50%, > 50%	0.04
Financing methods and financial burden		
Financing method-high financial burden	Personal savings, loans, humanitarian assistance, government assistance, other	0.01
Medicine shortages and coping strategies		
Medicine shortages-substituting with alternatives	Daily, weekly, monthly, rarely, never	0.02

zones *(12–19)*. The Gaza war has severely damaged medical facilities, which will require millions to rehabilitate, including emergency supplies, equipment upkeep and security. The war has disrupted Gaza's economy, reduced incomes and limited health care affordability. Economic decline and unemployment affect health systems and the increased demand for mental health services places additional burdens on scarce resources.

Seventy percent of our participants reported higher health care costs due to the conflict, with many reporting

over 50% increases over pre-war levels. Shortages and high prices of medications have worsened the burden. These findings align with other research that have shown that conflicts disrupt drug supply chains and health care, severely impacting the wellbeing of affected populations *(20–22)*.

The link between the increasing health care costs and barriers to accessing medications is key to understanding the financial impact of the war on health systems. Previous studies have shown that conflicts drive health care expenses higher with greater challenges to accessing medication, worsening financial strain and health outcomes *(23)*. Our finding of increased reliance on loans and savings for medical costs align with these findings, underscoring the need for targeted interventions to mitigate the effects and agreeing with studies *(18)* that highlight the financial burden that households in conflict zones bear and the limited efficacy of external aid.

The supply chain disruptions and restrictions have caused frequent shortages of medications and supplies, leading to treatment delays and higher treatment expenses. These findings highlight the correlation between emergency health care quality and obstacles to medicine availability, whereby worse quality is associated with greater barriers. Fadlyana et al reported that insufficient healthcare infrastructure exacerbates challenges to medicine distribution during emergencies (20). Due to the shortages, a quarter of our participants postponed treatment and less than half replaced prescription drugs with alternatives. This is consistent with other finding reporting comparable coping strategies in conflict areas *(21)*.

A significant portion of the respondents ranked the quality of emergency medical services as fair or poor and this correlated with larger barriers to acquiring medicines. Moustafa et al have shown that access to critical services is severely impacted when health care quality deteriorates during wars (22). There was a correlation between decreased access to services and higher health care costs; those who found health care less accessible reported higher costs. This observation aligns with other research by Jaff et al *(23)*.

Most participants believed that patient-provider communication was either fair or poor, and this perception is associated with poorer levels of satisfaction with health care services, in line with other research that emphasizes the crucial role of effective communication in patient satisfaction *(24)*.

Individuals whose health had changed because of the conflict reported greater increases in medical expenses and more substantial obstacles to getting prescription drugs. A significant proportion of the participants rated the financial burden as extremely high, indicating the effects of conflict on health care affordability and economic stability, as earlier reported *(25)*. The negative effect of the war on access to health care will have long-term effects on managing chronic illnesses. When regular medicine and care stop, disorders, including diabetes, hypertension and cardiovascular diseases, may worsen, and children are particularly at risk in such areas of conflict.

Individuals with lower incomes faced greater obstacles than those with higher incomes, highlighting how financial constraints hamper access to essential medicines, which disproportionately affect lower-income individuals.

Limitations of the study

The investigation was constrained by incomplete data due to the unstable security situation, which limited access to health care institutions, patients and supply chain information. Sensitivity around the conflict may have caused respondents to withhold details, potentially introducing reporting biases. Findings from the Gaza Strip may not apply to other conflict zones with different socioeconomic and political contexts. The data collection tool was not pre-tested and validated and this may have affected the reliability of responses. Convenience sampling was used, which may have introduced selection bias, limiting the study's generalizability to the broader Gaza population. Self-reporting of data may have caused recall bias or social desirability bias, as participants may have underreported or overreported their health care challenges due to the sensitive nature of the conflict. The cross-sectional design prevented the establishment of causality between the war and health care costs, and the study was conducted before the Israeli occupation of Rafah, meaning conditions may have worsened after data collection.

Recommendations

To address the challenge of high health care costs and limited access to medication in conflict zones, there is a need to strengthen financial support by increasing government funding and international aid, expanding insurance coverage and establishing emergency funds in Gaza. Efforts should be made to improve medication supply chains to ensure a steady supply of essential medicines and to repair damaged health care infrastructure and increase staffing. Promoting community support for alternative sources and developing community-based health initiatives can help address the shortages.

Conclusion

This study has highlighted significant increases in health care costs, decreased access to medications and lower quality services in Gaza due to the war. The findings underscore the need for comprehensive strategies to alleviate financial burdens and enhance access to health care in Gaza and similar conflict zones. By addressing these issues, policymakers and health care providers can help improve service delivery and ultimately enhance the wellbeing of affected populations.

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Effets de la guerre d'octobre 2023 sur les coûts des soins de santé à Gaza

Résumé

Contexte : La guerre déclenchée à Gaza en octobre 2023 a affecté le système de santé et accru la charge économique dans ce territoire.

Objectif : Évaluer les effets de la guerre à Gaza sur les coûts des soins de santé et l'accès aux services.

Méthodes : Entre février et mai 2024, la présente étude transversale a permis de recueillir des données auprès de 658 personnes à Gaza sur les coûts des soins de santé, les obstacles à l'accès et l'efficacité des services de soins de santé. Ces données ont été analysées à l'aide de la version 25 du logiciel SPSS et les relations entre les variables ont été déterminées grâce au test du khi-carré. Les associations ont été considérées comme statistiquement significatives pour une valeur de *p* inférieure à 0,05.

Résultats : Soixante-dix pour cent des participants à l'étude ont signalé une augmentation des coûts des soins de santé en raison de la guerre ; 40 % d'entre eux ont eu recours à leurs économies personnelles et 25 % à une aide pour couvrir leurs frais médicaux. Parmi les principaux freins à l'accès aux médicaments figuraient les pénuries (70 %), les prix élevés (60 %) et une mauvaise distribution (50 %). Des niveaux de revenu plus élevés étaient corrélés à une réduction des obstacles à l'accès ($p < 0,01$) et des niveaux d'éducation supérieurs étaient associés à une plus grande satisfaction vis-à-vis des services ($p = 0,02$).

Conclusion : La guerre a bouleversé le système de santé à Gaza, affectant gravement l'accès aux services ainsi que leur coût et leur qualité. Outre un cessez-le-feu permanent, des mesures ciblées sont nécessaires pour alléger la charge économique pesant sur la population et améliorer la prestation des services.

آثار حرب أكتوبر/ تشرين الأول 2023 على تكاليف الرعاية الصحية في غزة

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الخلاصة

الخلفية: أثرت حرب أكتوبر/ تشرين الأول 2023 في غزة سلبًا على النظام الصحي وزادت العبء الاقتصادي في غزة.

الأهداف: هدفت هذه الدراسة الى تقييم آثار الحرب الدائرة في غزة على كل من تكاليف الرعاية الصحية وإمكانية الحصول على الخدمات.

طرق البحث: وفي الفترة بين فبراير/ شباط ومايو/ أيار 2024، جمع هذا المسح المقطعي بيانات من 658 فردًا في غزة عن تكاليف الرعاية الصحية والعقبات التي تحول دون الحصول على خدمات الرعاية الصحية وفعاليتها. وحُللت البيانات بالإصدار 25 من برنامج SPSS، وحُدِّدت العلاقات بين المتغيرات باستخدام اختبار مربع كاي. واعتُبرت الارتباطات ذات دلالة إحصائية عندما تكون القيمة الاحتمالية < 0.05.

النتائج: أفاد 70% من المشاركين في الدراسة بزيادة تكاليف الرعاية الصحية بسبب الحرب؛ واعتمد 40% منهم على المدخرات الشخصية و25% منهم على المساعدات في تغطية نفقاتهم الطبية. وأما العقبات الرئيسية للحصول على الأدوية فكانت نقص الأدوية (70%)، وارتفاع أسعارها (60%)، وسوء توزيعها (50%). وارتبطت مستويات الدخل الأعلى بتقليل معوِّقات الحصول على الخدمات (القيمة الاحتمالية < 0.01)، وارتبطت مستويات التعليم العالي بمزيد من الرضا عن الخدمات (القيمة الاحتمالية = 0.02).

الاستنتاجات: تسببت الحربُ في تعطيل نظام الرعاية الصحية في غزة، وهو ما أثَّر على تكلفة الخدمات وإتاحتها وجودتها تأثيرًا خطيرًا. وبالإضافة إلى ضرورة الوقف الدائم لإطلاق النار، يلزم اتخاذ إجراءات ذات أهداف محددة بهدف تخفيف العبء الاقتصادي الواقع على سكان القطاع، وتحسين مستوى تقديم الخدمات بالقطاع.

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