

Research Article

Impact of Conflict on Healthcare Education: A Survey of Healthcare Students in Gaza

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Citation: Mostafa NZA, Heen LA, Al-Saadi M, Al-Saadi N, Alganabi Z, et al. (2025) Impact of Conflict on Healthcare Education: A Survey of Healthcare Students in Gaza. J Surg 10: 11428 DOI: 10.29011/2575-9760.011428

Received Date: 21 August 2025; **Accepted Date:** 27 August 2025; **Published Date:** 29 August 2025

Abstract

Introduction: The conflict in Gaza has had a devastating effect on the healthcare and education sector. This study aims to assess the impact of the conflict on students enrolled in healthcare courses in Gaza.

Methods: A cross-sectional survey was conducted from 28 October to 1 December 2024, using a validated structured questionnaire in Arabic and English. The survey evaluated demographics, educational background, conflict-related disruption, alternative learning methods used, mental health, and future outlooks. Data was analysed using descriptive statistics for closed questions and thematic analysis for free-text responses.

Results: 135 students aged 18–30 years old participated in the survey. The majority (91%) reported that their universities were within active conflict zones, with 86% stating that their university buildings were no longer intact. Key barriers to education included displacement (33%), lack of internet and electricity (53%), and psychological distress (22%). Clinical training was disrupted for 55% of students. 97% had lost a teacher(s) or colleague(s) during the conflict and 73% had lost a family member. 97% had been displaced; 18% more than 10 times. Nearly all students (98%) reported psychological distress, but only 5% received psychological support. Despite these challenges, 62% utilised online lectures. Financial strain was prevalent, with 65% continuing to pay tuition fees despite limited educational resources.

Conclusion: Students enrolled in healthcare courses in Gaza have faced immense challenges since 7 October 2023. This could have long-term implications for their professional development and the healthcare system's recovery. Restoration of educational infrastructure, mental health and financial support is urgently required.

Keywords: Conflict; Healthcare; Medical Education; Students

Introduction

The armed conflict in Gaza has severely impacted both the education and healthcare sectors [1-3]. The United Nations previously described the attacks as scholastocide due to the widespread destruction of academic infrastructure and resources. [2] The healthcare sector in Gaza has also been targeted, with attacks reported on hospitals, clinics, and ambulances, as well as healthcare workers and patients. [4,5] Despite some students enrolled in healthcare courses having the opportunity to evacuate to continue their studies abroad [6], the reality for most students is that their education and practise have been greatly impacted. Reports highlight that some students have been volunteering in hospitals since the 8 October 2023, facing demanding frontline responsibilities and subject to evacuation orders and displacement, whilst continuing their studies. This dual burden has posed significant challenges to their academic progression, clinical skills development, and overall well-being. [7] Students enrolled in healthcare-related courses are crucial to sustaining the future healthcare workforce of a nation and supporting the current workforce. It is known that prolonged conflict can exacerbate both academic and emotional challenges, often affecting not only the long-term career aspirations of students, but also the retention of staff and trainers. [8] Therefore, as a healthcare community, it is critical for us to understand the challenges being faced by these students, so that initiatives can be undertaken to support them both during this conflict and in the post-conflict era. This survey seeks to evaluate the impact of the war on students enrolled in healthcare courses in Gaza. Conducted during the conflict, it aims to provide valuable insights into the challenges these students face and to identify the support necessary to help them continue their education, complete their training, and ultimately fulfil their vital role as frontline healthcare professionals in the future.

Methods

This study is reported in accordance with the Checklist for Reporting of Survey Studies (CROSS) [9].

Survey Design

The study management group comprised of healthcare students and professionals based in Gaza and in the UK, with a shared interest in medical education and the well-being of healthcare students. Two members of the group led the design of the survey, which was then internally piloted by group members working in Gaza. Feedback from the pilot led to minor revisions to the survey, including improvements to the wording, formatting, and overall conciseness of the questions to enhance readability. Once finalised, the survey was translated into Arabic to ensure ease of completion

for participants. The final versions in both Arabic and English, are available in Appendix 1. The survey consisted of 26 questions divided into seven sections: 1. personal demographic information; 2. educational background (including university, program of study, and year of study); 3. impact of the conflict on education and clinical studies placements; 4. financial impact and logistical support (including access to resources such as study materials, electricity); 5. psychological support and well-being; 6. impact of the conflict on life and well-being (including displacement, living conditions, safety and number of family members killed or injured during the conflict); and the general impact of the conflict and future outlooks. The final section explored students' confidence in completing their studies, the required resources, career implications, and messages for the international medical community. This structured approach was modelled on prior studies that evaluated the effects of conflict on healthcare students in Ukraine and Iraq. [8,10] It was designed to deliver a comprehensive analysis of the challenges confronting healthcare students in Gaza, alongside critical questions surrounding their circumstances, resilience, and systemic support gaps. The survey followed a collaborative authorship model. All respondents provided their contact details if they wanted to be involved in the writing and review of the manuscript.

Data Collection and Analysis

The survey was conducted using Google Forms online tool (Google LLC, California, US) and distributed through social media channels and word of mouth. The survey was open between the 28 October and the 1 of December 2024. Data collation was performed in Excel (Microsoft, Washington, US). Duplicate entries were identified by checking the names and email addresses of the respondents. If duplicates were identified, the most up-to-date response was included. Responses were only included if all the mandatory questions in the survey had been completed. Translation of the survey from Arabic to English was undertaken independently by two members of the study group, and a third member checked the responses for discrepancies. Descriptive statistics, including counts and percentages were used in the analysis of the closed questions. Free-text responses were coded to identify themes where appropriate.

Ethical Consideration

Participation in the survey was voluntary, and completing the survey was taken as consent. Data access was limited to the study management team. The survey was undertaken in collaboration with the Medical Dean of Al-Azhar University, Gaza. The Gazan health research authority was consulted regarding ethical approval for this study and as the survey involved healthcare students and did not include patient data, this was not deemed necessary.

Results

Survey respondents

135 healthcare students in Gaza across a range of disciplines completed the survey. Participants were at all stages of higher education, from first-year undergraduate to postgraduate. Figure 1 illustrates the universities attended by respondents and their year of study. Respondents were aged between 18 and 30 years, with a mean age of 21.2 years. The largest group was aged 21 years (50/135; 37%).

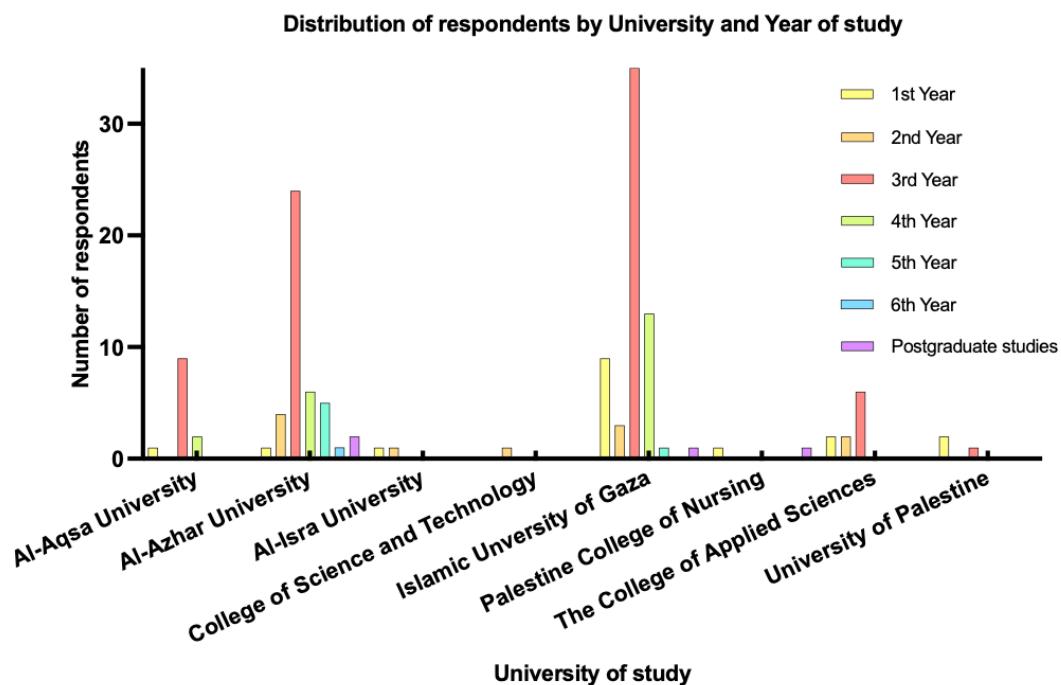


Figure 1: The distribution of students who completed the survey based on the university they are enrolled in and their year of study.

Educational Background

Seventy-four nursing students (55%), 37 medical students (27%), 15 dental students (11%), and 9 students (7%) of pharmacy, physiotherapy, or other medical sciences, completed the survey. At the time of completion, 91% (123/135) reported that their university was located within an active conflict zone. 86% (116/135) stated that their university buildings were no longer intact, while 14% (19/135) were unsure of their status. Nearly all respondents (99%; 133/135) were unable to access their university's facilities for over nine months.

Barriers to Education

Ninety-one per cent (123/135) of respondents reported encountering new barriers to their education since the beginning of the conflict. Common challenges are described in the free text responses shown in [Table 1].

Displacement and Living Conditions
No house, no internet, and no resources for studying; books, the laptop, and everything else were lost.
Insufficient internet for exams, repeated displacement, fear of shelling, lack of comfort for studying due to the war's chaos, and unavailability of books and notebooks.
The destruction of the house by the occupation, continuous displacement, lack of internet access—or when available, it is difficult to access and expensive given the current circumstances we are in. Insufficient food to sustain daily living, constant fatigue due to contaminated water, complete loss of motivation for studying due to the dire situation, frequent loss of family members as martyrs, breathing problems caused by smoke and firewood used for cooking, and the inability to sleep because of the sou...
Continuous displacement, relentless shelling, ongoing genocide in Gaza, destruction of our home, the university, and the erasure of our entire life. Nothing exists without restrictions; our whole life is constrained.
Displacement, lack of internet access in an online education setting
Displacement, lack of internet, lack of electricity, and absence of psychological comfort.
Frequent power outages, lack of internet, ongoing displacement, and the high cost of laptops and smartphones
There is no internet, no suitable environment for studying, and no sufficient time to study due to being preoccupied with securing water and food. There is no stable home, and I am unable to afford study supplies.
Difficulty leaving daily for hospitals due to the situation and danger, difficulty charging devices since it's paid and outside the displacement area, and difficulty concentrating on studying due to the overcrowding of families in the displacement area.
The internet, displacement, and most importantly, the high cost of printing books and documents.
Lack of internet, lack of electricity, lack of devices
Yes, the war has greatly affected my studies. First, the lack of a suitable environment for studying amidst the noise, constant displacement, and artillery shelling. Second, the unavailability of internet access for studying has been a major issue, as I struggle to download lectures and often have to travel long distances, putting myself at risk during wartime. Third, charging my phone is a significant challenge due to the lack of electricity, requiring me to travel long distances just to charge it. Four...
Continuous displacement and internet outages in some areas, this has affected my studies
Internal displacement, disrupted access to universities and hospitals, and a year-long study interruption for medical students outside Gaza.
The war, all forms of psychological pressure, displacement in all its forms, and fear.
Evacuation of the home due to being in a conflict zone, followed by its destruction.

Displacement to a densely populated area with an unsuitable environment for studying.
Weak and intermittent internet connectivity in the displacement area due to the current situation.
Firstly, displacement from one place to another due to the war and lack of independence affected my studies. Secondly, internet outages.
There are no physical health restrictions, but the lack of proper study conditions, such as the challenges of online education amidst displacement and psychological distress, is a major issue
The house was destroyed, the university was bombed, and there is no source of income for studying
Lack of internet most of the time due to displacement, and no place to study because of the house being bombed
My university was destroyed due to the war. Now, we are trying to study online, but this is not a solution. There is no internet or even electricity to charge devices, and we don't have a proper study environment. We are a whole family in a small tent. Most importantly, my field of study, dentistry, requires practical practice and university clinics equipped for student training
Firstly, I am displaced in a tent with no internet, and when available, it is very weak and not consistently accessible. Additionally, there are no reference books for studying, so we have to study using our phones, but we face the problem of charging, as there is no electricity available, making it difficult to charge the phone
Continuous fear and anxiety due to bombing and the repeated forced displacement
The war and living conditions
Displacement is the biggest
No revision books available and no suitable place for studying due to repeated displacement
Repeated displacement, and leaving my residential community, direct and indirect attacks, difficult living conditions, lack of strong internet and its permanent availability, difficulty in charging phones and laptops, among many others.
Lack of security, difficult living conditions, bombing and starvation, high prices of study supplies, and difficulty accessing internet for lectures and studying.
Power and internet outages, difficulty in transportation, far hospital locations and difficulty studying in a tent.
The studying environment is unsuitable
No availability of teaching/ educational supplies, no wifi availability and continuous displacement
Getting to the place of practice is very difficult
House and residential buildings destroyed

Destruction of home and no access to internet
Displacement over and over again constantly
Lack of shelter or a suitable place for studying.
The chaos of life in tents, and the high cost of printing and purchasing university supplies.
No place to study anymore
No house or place to stay, no place to study.
Lack of Internet and Electricity
No house, no internet, and no resources for studying; books, the laptop, and everything else were lost.
The lack of internet access, along with the unavailability of stationery and university textbooks for studying.
The lack of internet and limited time due to balancing livelihood and studies
Insufficient internet for exams, repeated displacement, fear of shelling, lack of comfort for studying due to the war's chaos, and unavailability of books and notebooks.
The destruction of the house by the occupation, continuous displacement, lack of internet access—or when available, it is difficult to access and expensive given the current circumstances we are in. Insufficient food to sustain daily living, constant fatigue due to contaminated water, complete loss of motivation for studying due to the dire situation, frequent loss of family members as martyrs, breathing problems caused by smoke and firewood used for cooking, and the inability to sleep because of the sou...
There is no suitable place and no internet.
The internet, printing, and mobile phone issues
Displacement, lack of internet access in an online education setting, the chaos of life in tents, and the high cost of printing and purchasing university supplies.
Displacement, lack of internet, lack of electricity, and absence of psychological comfort.
In these difficult circumstances, with the destruction of university buildings and being deprived of practical training due to the challenging conditions in hospitals, along with widespread internet issues and difficulties in communicating with university lecturers.
There is no internet or communication where I study, and with the ongoing war, we lost all study tools, stationery, and books. Psychological well-being is also compromised.
I couldn't continue my education due to the lack of internet in the area where I have been displaced, which caused me to fall behind my peers.

Frequent power outages, lack of internet, ongoing displacement, and the high cost of laptops and smartphones
There is no place or suitable conditions for studying where I currently live, and the internet is not strong enough to download the resources I need, but I am trying to overcome this by finding alternatives.
There is no internet, no suitable environment for studying, and no sufficient time to study due to being preoccupied with securing water and food. There is no stable home, and I am unable to afford study supplies.
Difficulty leaving daily for hospitals due to the situation and danger, difficulty charging devices since it's paid and outside the displacement area, and difficulty concentrating on studying due to the overcrowding of families in the displacement area.
The internet, displacement, and most importantly, the high cost of printing books and documents.
Lack of internet, lack of electricity, lack of devices, and lack of shelter or a suitable place for studying.
Difficulty in finding consistent internet access throughout the day.
Yes, the war has greatly affected my studies. First, the lack of a suitable environment for studying amidst the noise, constant displacement, and artillery shelling. Second, the unavailability of internet access for studying has been a major issue, as I struggle to download lectures and often have to travel long distances, putting myself at risk during wartime. Third, charging my phone is a significant challenge due to the lack of electricity, requiring me to travel long distances just to charge it. Four...
Internet access
Unavailability of books, a mobile device, and internet access
Continuous displacement and internet outages in some areas, this has affected my studies
4- Weak and intermittent internet connectivity in the displacement area due to the current situation.
Internet outages, the cost of printing books, and power outages
Firstly, displacement from one place to another due to the war and lack of independence affected my studies. Secondly, internet outages.
Being preoccupied with helping family members meet basic household needs such as food, drink, and water, amid shortages of food, drinking water, and cooking gas, takes up nearly two-thirds of my day. Internet outages in the area where I live, especially during the first months of the war. The lack of electricity to charge electronic devices, which I rely heavily on for my studies.
The high cost of paper, difficulty printing, the expensive prices of stationery, and internet costs
We were cut off from studying for over a year. We have to travel long distances to find an internet connection for studying and taking exams. Reaching the internet is another issue, as there is no transportation to access these points. Printing the necessary study materials costs a fortune compared to the current situation. Mental distraction and fear of airstrikes cause tension. There is no private space for studying, and the chaos around me affects my focus. The weather negatively impacts my situation.
Internet, money.
Internet

Internet outages, and when it's available, I have to travel a long distance to access it, along with the lack of necessary electronic devices.
Absence of internet, lack of resources for studying, and the surrounding circumstances
Continuous internet outages and random Israeli airstrikes.
Such as internet outages, the destruction of the university, and the inability to access and study there
Lack of internet, distance to the location, difficulty with transportation, and financial situation
Lack of internet most of the time due to displacement, and no place to study because of the house being bombed
Lack of electronic devices for studying, inability to bring my notes and books to the south despite many attempts, poor internet, stress and anxiety from any nearby security incidents, noise from neighbors, and difficulties in obtaining water, among other issues
My university was destroyed due to the war. Now, we are trying to study online, but this is not a solution. There is no internet or even electricity to charge devices, and we don't have a proper study environment. We are a whole family in a small tent. Most importantly, my field of study, dentistry, requires practical practice and university clinics equipped for student training
Firstly, I am displaced in a tent with no internet, and when available, it is very weak and not consistently accessible. Additionally, there are no reference books for studying, so we have to study using our phones, but we face the problem of charging, as there is no electricity available, making it difficult to charge the phone
Lack of sufficient internet access, despite the high costs of printing books
No internet and resources
No place to study as the university has been bombed and the internet in the area is bad
Yes, a lot of barriers such as no books, no internet and not even a phone or laptop to study on
Not going to university, remote learning with difficulty accessing internet (wifi)
Repeated displacement, and leaving my residential community, direct and indirect attacks, difficult living conditions, lack of strong internet and its permanent availability, difficulty in charging phones and laptops, among many others.
No wifi Availability
No wifi Availability
Financially due to the current circumstances and the extreme high prices, that has affected my inability to pay tuition fees and lack of internet access.
Wifi, Sun energy, lighting etc ...

The war in Gaza affected my ability to study in several ways. There were times when electricity and internet were cut off, making it difficult to follow online classes or access study materials. In addition, there was a psychological impact due to the constant anxiety and fear.
Lack of security, difficult living conditions, bombing and starvation, high prices of study supplies, and difficulty accessing internet for lectures and studying.
Power and internet outages, difficulty in transportation, far hospital locations and difficulty studying in a tent.
We need strong internet that is not available and is of poor quality, as well as lack of suitable devices for studying. All devices were either damaged, stolen or taken by soldiers, so this causes an obstacle to continuing our education.
Cutting off of electricity and wifi, no availability of a studying environment, being busy with providing living supplies.
Presence of wifi and fear
Restrictions of unavailable electricity and internet, in addition to the lack of availability of a good environment and space for study conditions.
The environment is not suitable for studying, no wifi and electricity.
No availability of teaching/ educational supplies, no wifi availability and continuous displacement
No wifi availability, continuous displacement and unsettled state
Continuous bombing, the surrounding danger, lack of availability of complete internet access.
No internet and resources
No availability of internet even with esim sometimes
Cutting off electricity and internet
No wifi availability, no stable connection, difficulty focussing and continuing
Lack of Study Resources
No house, no internet, and no resources for studying; books, the laptop, and everything else were lost.
The lack of internet access, along with the unavailability of stationery and university textbooks for studying.
Insufficient internet for exams, repeated displacement, fear of shelling, lack of comfort for studying due to the war's chaos, and unavailability of books and notebooks.
The internet, printing, and mobile phone issues

Displacement, lack of internet access in an online education setting, the chaos of life in tents, and the high cost of printing and purchasing university supplies.
There is no internet or communication where I study, and with the ongoing war, we lost all study tools, stationery, and books. Psychological well-being is also compromised.
There is no place or suitable conditions for studying where I currently live, and the internet is not strong enough to download the resources I need, but I am trying to overcome this by finding alternatives.
There is no internet, no suitable environment for studying, and no sufficient time to study due to being preoccupied with securing water and food. There is no stable home, and I am unable to afford study supplies.
Difficulty leaving daily for hospitals due to the situation and danger, difficulty charging devices since it's paid and outside the displacement area, and difficulty concentrating on studying due to the overcrowding of families in the displacement area.
The internet, displacement, and most importantly, the high cost of printing books and documents.
Lack of internet, lack of electricity, lack of devices, and lack of shelter or a suitable place for studying.
Unavailability of books, a mobile device, and internet access
Internet outages, the cost of printing books, and power outages
Being preoccupied with helping family members meet basic household needs such as food, drink, and water, amid shortages of food, drinking water, and cooking gas, takes up nearly two-thirds of my day. Internet outages in the area where I live, especially during the first months of the war. The lack of electricity to charge electronic devices, which I rely heavily on for my studies.
The high cost of paper, difficulty printing, the expensive prices of stationery, and internet costs
We were cut off from studying for over a year. We have to travel long distances to find an internet connection for studying and taking exams. Reaching the internet is another issue, as there is no transportation to access these points. Printing the necessary study materials costs a fortune compared to the current situation. Mental distraction and fear of airstrikes cause tension. There is no private space for studying, and the chaos around me affects my focus. The weather negatively impacts my situation.
Internet outages, and when it's available, I have to travel a long distance to access it, along with the lack of necessary electronic devices.
Absence of internet, lack of resources for studying, and the surrounding circumstances
Moving from one place to another, lack of internet, and inability to print study books due to high prices
Lack of electronic devices for studying, inability to bring my notes and books to the south despite many attempts, poor internet, stress and anxiety from any nearby security incidents, noise from neighbors, and difficulties in obtaining water, among other issues
Regarding books, expenses, and focus, especially since the practical aspect is affected by the circumstances, it will result in a generation that is unable to fully understand all the information related to nursing, particularly the practical part
My university was destroyed due to the war. Now, we are trying to study online, but this is not a solution. There is no internet or even electricity to charge devices, and we don't have a proper study environment. We are a whole family in a small tent. Most importantly, my field of study, dentistry, requires practical practice and university clinics equipped for student training

Firstly, I am displaced in a tent with no internet, and when available, it is very weak and not consistently accessible. Additionally, there are no reference books for studying, so we have to study using our phones, but we face the problem of charging, as there is no electricity available, making it difficult to charge the phone
Lack of sufficient internet access, despite the high costs of printing books
No internet and resources
Yes, a lot of barriers such as no books, no internet and not even a phone or laptop to study on
No revision books available and no suitable place for studying due to repeated displacement
No good places to study, no textbooks and tutor and if there is they are expensive
Lack of security, difficult living conditions, bombing and starvation, high prices of study supplies, and difficulty accessing internet for lectures and studying.
We need strong internet that is not available and is of poor quality, as well as lack of suitable devices for studying. All devices were either damaged, stolen or taken by soldiers, so this causes an obstacle to continuing our education.
Cutting off of electricity and wifi, no availability of a studying environment, being busy with providing living supplies.
No availability of teaching/ educational supplies, no wifi availability and continuous displacement
Destruction of Facilities
The lack of internet access, along with the unavailability of stationery and university textbooks for studying.
The destruction of the house by the occupation, continuous displacement, lack of internet access—or when available, it is difficult to access and expensive given the current circumstances we are in. Insufficient food to sustain daily living, constant fatigue due to contaminated water, complete loss of motivation for studying due to the dire situation, frequent loss of family members as martyrs, breathing problems caused by smoke and firewood used for cooking, and the inability to sleep because of the sou...
Continuous displacement, relentless shelling, ongoing genocide in Gaza, destruction of our home, the university, and the erasure of our entire life. Nothing exists without restrictions; our whole life is constrained.
Displacement, lack of internet access in an online education setting, the chaos of life in tents, and the high cost of printing and purchasing university supplies.
In everything, I'm still don't believe the gloomy future that waiting for us.my nursing building damage in the first week of the war
Shelling and destruction. Additionally, the loss of some family members as martyrs and the injury of others.
In these difficult circumstances, with the destruction of university buildings and being deprived of practical training due to the challenging conditions in hospitals, along with widespread internet issues and difficulties in communicating with university lecturers.
Evacuation of the home due to being in a conflict zone, followed by its destruction.

Loss of many academic figures and university professors who were killed in this war.
Poor mental health due to the consequences of the war, including killing, destruction, restrictions, and deprivation of basic life necessities.
Physical destruction: Medical colleges and university facilities have been subjected to bombing. Psychological trauma: We suffer from negative psychological effects due to violence and the loss of friends and family. Restrictions on movement: Violence and military restrictions prevent students from participating in academic events.
The house was destroyed, the university was bombed, and there is no source of income for studying
Such as internet outages, the destruction of the university, and the inability to access and study there
Lack of internet most of the time due to displacement, and no place to study because of the house being bombed
My university was destroyed due to the war. Now, we are trying to study online, but this is not a solution. There is no internet or even electricity to charge devices, and we don't have a proper study environment. We are a whole family in a small tent. Most importantly, my field of study, dentistry, requires practical practice and university clinics equipped for student training
No place to study as the university has been bombed and the internet in the area is bad
Not going to university, remote learning with difficulty accessing internet (wifi)
Not going to hospital to practice
Power and internet outages, difficulty in transportation, far hospital locations and difficulty studying in a tent.
1. The studying environment is unsuitable 2. Getting to the place of practice is very difficult 3. House and residential buildings destroyed
Psychological Barriers
Insufficient internet for exams, repeated displacement, fear of shelling, lack of comfort for studying due to the war's chaos, and unavailability of books and notebooks.
The destruction of the house by the occupation, continuous displacement, lack of internet access—or when available, it is difficult to access and expensive given the current circumstances we are in. Insufficient food to sustain daily living, constant fatigue due to contaminated water, complete loss of motivation for studying due to the dire situation, frequent loss of family members as martyrs, breathing problems caused by smoke and firewood used for cooking, and the inability to sleep because of the sou...
Displacement, lack of internet, lack of electricity, and absence of psychological comfort.
There is no internet or communication where I study, and with the ongoing war, we lost all study tools, stationery, and books. Psychological well-being is also compromised.
The war, all forms of psychological pressure, displacement in all its forms, and fear.
Poor mental health due to the consequences of the war, including killing, destruction, restrictions, and deprivation of basic life necessities.

Physical destruction: Medical colleges and university facilities have been subjected to bombing. Psychological trauma: We suffer from negative psychological effects due to violence and the loss of friends and family. Restrictions on movement: Violence and military restrictions prevent students from participating in academic events.
We were cut off from studying for over a year. We have to travel long distances to find an internet connection for studying and taking exams. Reaching the internet is another issue, as there is no transportation to access these points. Printing the necessary study materials costs a fortune compared to the current situation. Mental distraction and fear of airstrikes cause tension. There is no private space for studying, and the chaos around me affects my focus. The weather negatively impacts my situation.
There are no physical health restrictions, but the lack of proper study conditions, such as the challenges of online education amidst displacement and psychological distress, is a major issue
Lack of electronic devices for studying, inability to bring my notes and books to the south despite many attempts, poor internet, stress and anxiety from any nearby security incidents, noise from neighbors, and difficulties in obtaining water, among other issues
Continuous fear and anxiety due to bombing and the repeated forced displacement
Inability to focus, thinking of the bombing, memories/flashbacks on the mind
Psychological state
The war in Gaza affected my ability to study in several ways. There were times when electricity and internet were cut off, making it difficult to follow online classes or access study materials. In addition, there was a psychological impact due to the constant anxiety and fear.
Presence of wifi and fear
Fear, insecurity, lack of life provisions, and there is no transportation. The financial situation is very difficult and I am tired mentally.
Inadequate Study Environment
Insufficient internet for exams, repeated displacement, fear of shelling, lack of comfort for studying due to the war's chaos, and unavailability of books and notebooks.
There is no suitable place and no internet.
Displacement, lack of internet, lack of electricity, and absence of psychological comfort.
In these difficult circumstances, with the destruction of university buildings and being deprived of practical training due to the challenging conditions in hospitals, along with widespread internet issues and difficulties in communicating with university lecturers.
Focus has diminished, and study productivity has decreased.
There is no place or suitable conditions for studying where I currently live, and the internet is not strong enough to download the resources I need, but I am trying to overcome this by finding alternatives.
Difficulty leaving daily for hospitals due to the situation and danger, difficulty charging devices since it's paid and outside the displacement area, and difficulty concentrating on studying due to the overcrowding of families in the displacement area.
Lack of internet, lack of electricity, lack of devices, and lack of shelter or a suitable place for studying.

Yes, the war has greatly affected my studies. First, the lack of a suitable environment for studying amidst the noise, constant displacement, and artillery shelling. Second, the unavailability of internet access for studying has been a major issue, as I struggle to download lectures and often have to travel long distances, putting myself at risk during wartime. Third, charging my phone is a significant challenge due to the lack of electricity, requiring me to travel long distances just to charge it. Four...
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Lack of electronic devices for studying, inability to bring my notes and books to the south despite many attempts, poor internet, stress and anxiety from any nearby security incidents, noise from neighbors, and difficulties in obtaining water, among other issues
Regarding books, expenses, and focus, especially since the practical aspect is affected by the circumstances, it will result in a generation that is unable to fully understand all the information related to nursing, particularly the practical part
My university was destroyed due to the war. Now, we are trying to study online, but this is not a solution. There is no internet or even electricity to charge devices, and we don't have a proper study environment. We are a whole family in a small tent. Most importantly, my field of study, dentistry, requires practical practice and university clinics equipped for student training
No place to study as the university has been bombed and the internet in the area is bad
The war and living conditions
Inability to focus, thinking of the bombing, memories/flashbacks on the mind
No revision books available and no suitable place for studying due to repeated displacement
Repeated displacement, and leaving my residential community, direct and indirect attacks, difficult living conditions, lack of strong internet and its permanent availability, difficulty in charging phones and laptops, among many others.
Lack of security, difficult living conditions, bombing and starvation, high prices of study supplies, and difficulty accessing internet for lectures and studying.
1. The studying environment is unsuitable 2. Getting to the place of practice is very difficult 3. House and residential buildings destroyed
Restrictions of unavailable electricity and internet, in addition to the lack of availability of a good environment and space for study conditions.

Financial Constraints

The destruction of the house by the occupation, continuous displacement, lack of internet access—or when available, it is difficult to access and expensive given the current circumstances we are in. Insufficient food to sustain daily living, constant fatigue due to contaminated water, complete loss of motivation for studying due to the dire situation, frequent loss of family members as martyrs, breathing problems caused by smoke and firewood used for cooking, and the inability to sleep because of the sou...

Displacement, lack of internet access in an online education setting, the chaos of life in tents, and the high cost of printing and purchasing university supplies.

War, conflict, and financial difficulties.

Frequent power outages, lack of internet, ongoing displacement, and the high cost of laptops and smartphones

There is no internet, no suitable environment for studying, and no sufficient time to study due to being preoccupied with securing water and food. There is no stable home, and I am unable to afford study supplies.

The internet, displacement, and most importantly, the high cost of printing books and documents.

Internet outages, the cost of printing books, and power outages

The high cost of paper, difficulty printing, the expensive prices of stationery, and internet costs

Internet, money.

Moving from one place to another, lack of internet, and inability to print study books due to high prices

The house was destroyed, the university was bombed, and there is no source of income for studying

Lack of internet, distance to the location, difficulty with transportation, and financial situation

The current state of self, financial and spatial

No good places to study, no textbooks and tutor and if there is they are expensive

Financially due to the current circumstances and the extreme high prices, that has affected my inability to pay tuition fees and lack of internet access.

Lack of security, difficult living conditions, bombing and starvation, high prices of study supplies, and difficulty accessing internet for lectures and studying.

Fear, insecurity, lack of life provisions, and there is no transportation. The financial situation is very difficult and I am tired mentally.

Displacement and Unstable Living Conditions (mentions: 40)

Living in tents or unsuitable spaces for studying (10 mentions)
“Firstly, I am displaced in a tent with no internet.”
“There is no place or suitable conditions for studying where I currently live.”
Frequent forced displacement (12 mentions)
“Continuous displacement and internet outages in some areas.”
“Moving from one place to another, lack of internet, and inability to print study books due to high prices.”
Overcrowded shared spaces (8 mentions)
“The crowded family atmosphere, with multiple displaced families living in one house, makes it difficult to concentrate.”
“We are a whole family in a small tent.”
Evacuation of homes and destruction of residential buildings (10 mentions)
“Evacuation of the home due to being in a conflict zone, followed by its destruction.”
“The house was destroyed, the university was bombed, and there is no source of income for studying.”
Lack of Internet and Electricity (mentions: 65)
Weak, intermittent, or unavailable internet (38 mentions)
“No internet and resources.”
“Difficulty accessing the Internet, lack of electricity, as well as frequent displacements from one place to another.”
Lack of electricity for charging devices (20 mentions)
“Frequent power outages, lack of electricity, ongoing displacement, and the high cost of laptops and smartphones.”
“Charging my phone is a significant challenge due to the lack of electricity.”
Cost of internet access and printing study materials (7 mentions)

<p>“High cost of paper, difficulty printing, and expensive stationery.”</p>
<p>“The internet, printing, and mobile phone issues.”</p>
Financial Constraints (mentions: 17)
High cost of printing materials and stationery (10 mentions)
<p>“The high cost of printing books and documents.”</p>
<p>“Printing the necessary study materials costs a fortune compared to the current situation.”</p>
Lack of funds for internet, books, or tuition fees (4 mentions)
<p>“Financially, due to the current circumstances and the extreme high prices, that has affected my inability to pay tuition fees.”</p>
Struggles to balance education with securing life necessities (3 mentions)
<p>“Being preoccupied with helping family members meet basic household needs such as food, drink, and water.”</p>
Destruction of Educational Facilities (mentions: 20)
Destruction of university buildings and medical clinics (11 mentions)
<p>“The destruction of university buildings has deprived us of practical training.”</p>
<p>“My nursing building was damaged in the first week of the war.”</p>
Inability to access institutions due to safety concerns (5 mentions)
<p>“We couldn’t continue education due to the lack of internet in the area where I have been displaced, causing me to fall behind my peers.”</p>
Psychological and Emotional Barriers (mentions: 16)
Continuous fear, insecurity, and anxiety due to shelling and bombings (11 mentions)
<p>“Continuous fear and anxiety due to bombing and the repeated forced displacement.”</p>
<p>“Fear, insecurity, and lack of life provisions.”</p>

Lack of motivation to study due to trauma and loss (5 mentions)
“I have lost all motivation to study due to the lack of basic life necessities like safety, security, water, and food.”
Lack of Study Resources (mentions: 32)
Lack of textbooks, reference books, and revision materials (13 mentions)
“No revision books available and no suitable place for studying due to repeated displacement.”
“Unavailability of books, a mobile device, and internet access.”
Inability to replace lost study supplies due to destruction or theft (12 mentions)
“Books, the laptop, and everything else were lost.”
“All devices were either damaged, stolen, or taken by soldiers.”
Reliance on smartphones as the sole tool for studying (7 mentions)
“We have to study using our phones, but we face the problem of charging as there is no electricity available.”
Inadequate Study Environment (mentions: 26)
Noise from overcrowded spaces and neighbors (10 mentions)
“Noise from neighbors and difficulties in obtaining water, among other issues.”
“The noisy environment negatively impacts my studies.”
Lack of quiet and safe places for studying (16 mentions)
“There is no suitable place for studying where I currently live.”
“The environment is not suitable for studying, no WiFi and electricity.”
Loss of Time and Educational Progress (mentions: 15)
Delayed studies due to displacement or internet outages (8 mentions)

“My delay in studying and losing two years of my life.”
“We were cut off from studying for over a year.”
Missed opportunities for practical or clinical training (7 mentions)
“Not going to hospitals to practice.”
“My major, dentistry, relies heavily on practical work, but these are unavailable during the war.”

Table 1: Summary of the free text responses regarding the challenges faced by healthcare students

and include: displacement and unstable living conditions (40/123; 33%); lack of internet and electricity (65/123; 53%); and psychological and emotional distress (16/123; 13%). Respondents also cited a lack of study resources (32/123; 26%), destruction of educational facilities (20/123; 16%), missed opportunities for clinical training (15/123; 12%), and financial constraints (17/123; 14%). Of the 109 students undertaking clinical training, 60/109 (55%) reported that their clinical training had been directly affected due to the conflict. Reasons for this disruption included: the destruction of hospitals and infrastructure (15/60; 25%); the shortage of training and medical supplies (40/60; 67%) and safety concerns in attending hospitals (10/60; 17%). Nine students (15%) reported limited access to mentors and educational resources. Overall, 99 students (73%) shared how the conflict impacted on their education, highlighting themes such as disruption to education (39/99; 39%), lack of resources (33/99; 33%), the psychological impact (18/99; 18%), and diminished aspirations (17/99; 17%).

Alternative Learning Methods

When asked about alternative learning methods adopted during the conflict, 121 students (90%) responded. Most (75/121; 62%) reported using online lectures. Other adaptations during the conflict included the use of study groups and electronic books (23/121; 19%) and travelling long distances to access reliable internet (25/121; 21%). Despite recognising the benefits of online learning, 40/121 (33%) of the respondents had challenges in accessing these due to a lack of electricity to charge devices and internet connectivity: ‘Firstly, I am displaced in a tent with no internet.’ Others expressed concerns about its limitations, including: ‘Online lectures alone are not enough for teaching; there must be eye contact between the student and the lecturer.’ and ‘lectures via the

internet cannot replace clinical (in-person) training.’

Financial Support

Most respondents (88/135; 65%) reported that they have had to continue paying university fees, with 64/88 (73%) of these students stating that these fees had not been reduced despite the conflict.

Psychological impact and displacement

Regarding the impact of the conflict on mental health, 132/135 (98%) of respondents reported that the conflict had affected them psychologically. However, only 7/132 (5%) reported that they had received any form of psychological support. 131/135 students (97%) stated that they had a teacher(s) or colleague(s) who had been killed during the conflict and 99/135 (73%) reported that a family member (1st or 2nd-degree relative) had been killed. Nearly all respondents (131/135; 97%) reported that they had been displaced during the conflict. Of these, 18% (24/131) had been displaced more than 10 times; 41% (53/131) had been displaced 5–10 times and 41% (54/131) had been displaced fewer than 5 times. Most respondents (60/132; 45%) indicated that they were currently living in tents. Additionally, 15/132 (11%) of respondents were living in orphanages or other shelters, and 3/132 (2%) reported living in Egypt.

Outlook for the future

A Likert scale was used to determine how confident the students felt about completing their education despite their current difficulties. More than half of the students felt confident or very confident that they would be able to complete their education, with only 15% feeling not confident; the responses are shown in (Figure 2).

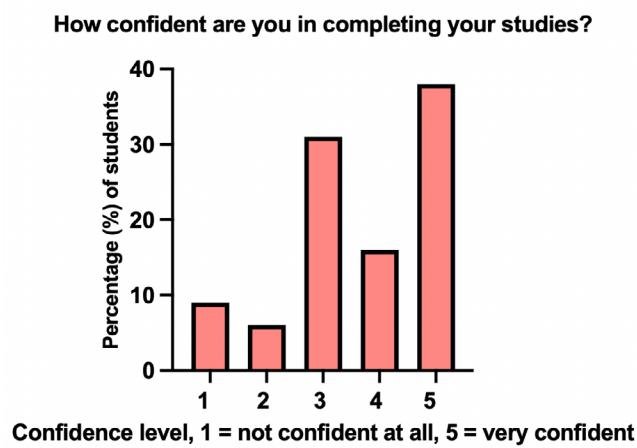


Figure 2: The confidence level of students in completing their healthcare studies

Regarding their expectations of how the conflict would affect their future studies or professional careers, 49% of students (66/135) felt there would be a direct impact on their education. This included delays in graduation (27%; 36/135), disruptions to practical training (16%; 21/135), and 7% (10/135) reported challenges stemming from prolonged online learning. Additionally, 33% (44/135) highlighted the psychological toll of the conflict on their ability to concentrate in the future, 15% (20/135) mentioned financial constraints, and 33% (45/135) expressed concerns over limited future job opportunities. Despite these challenges, 7% (10/135) of students expressed hope for the future. Most students selected an 'end to the conflict' (85/135; 63%) and a 'new university' (72/135; 53%) as requirements for them to complete their studies.

Discussion

This study examines the impact of the conflict in the Gaza Strip on the education and professional development of students enrolled in healthcare courses. To the author's knowledge, this is the first prospective cross-sectional survey to assess these effects during the current ongoing conflict. The right to education is universally recognised as a fundamental human right. [13] Education in the healthcare sector holds particular significance, as healthcare workers are an integral part of a society's ability to maintain health during conflict and they play a crucial role in rebuilding public health afterward. However, for healthcare education to continue, access to both universities and hospitals is critical for theoretical learning and practical experience. The findings of this study highlight severe and multifaceted disruptions to healthcare education in Gaza. Respondents reported widespread destruction of university buildings and hospital infrastructure, prolonged displacement, and a lack of access to essential resources such as the internet, books, and study space. These challenges echo some

of those reported in conflict settings previously. [8,10-12] Despite international protections under Articles 18 and 52 of the Geneva Conventions, which prohibit attacks on civilian hospitals and educational institutions, many university and hospital facilities in Gaza have been severely damaged or destroyed. [14-17] In this survey, all respondents stated that their university buildings were either completely destroyed or inaccessible, with nearly all reporting that they had been unable to attend university for at least nine months. More than half of the students reported that their clinical training had been severely affected, emphasising that the conflict had not only interrupted university-based learning but also essential hands-on training in hospitals. This was attributed to the destruction of healthcare infrastructure and limited access to hospitals and clinical educators which directly affects healthcare education. [18] Previous studies have noted the difficulty of maintaining practical training during prolonged crises and have proposed simulation as an alternative, though it remains a limited substitute, [19] even more so when access to electricity and the internet is limited as demonstrated to be the case in Gaza. Furthermore, it has been reported that more than 1500 healthcare workers have been killed in Gaza over the last 22 months. [20] Their deaths not only impact healthcare delivery and but also delay the recovery of medical services and impact on the education of healthcare students. Previous research has identified displacement, insecurity, violence, and the loss of educational capacity as common barriers to educational progress in conflict zones. [21] Our findings add to this body of evidence. The students in this study have experienced prolonged exposure to violence and instability, and this is a well-documented precursor to long-term mental health challenges. [22] This is concerning for healthcare students, who must not only manage their trauma but also be prepared to support and treat others. Nearly all respondents described significant psychological burdens, which, although unsurprising, highlight a critical unmet need. Notably, only a small proportion of students reported having access to psychological support. Addressing this gap and providing mental health support for students who have faced trauma is essential to enable students to resume their educational development and prepare for their roles as future healthcare professionals in a region facing immense challenges. The solidarity of medical and educational bodies internationally could help further support these students and help them feel less isolated whilst facing these challenges. This has been organised for students in conflict zones previously [23,24].

Financial strain emerged as another prominent theme, with 65% of respondents indicating that they continued to pay reduced university fees despite the inaccessibility of facilities and resources. This financial burden places an additional pressure on students. The ongoing financial obligations, despite the lack of access to adequate face to face educational resources, raise concerns about

the long-term affordability and accessibility of education in such settings. To ensure the continuity of healthcare education in Gaza measures should be taken to restore infrastructure, establish funding to financially support students, and secure funding for universities. Establishing temporary medical facilities and hospitals using rapid-construction models, like those employed during the COVID-19 pandemic, can serve as a short-term solution until permanent university buildings and teaching hospitals are fully restored. [25] Additionally, the receipt of financial assistance by all students and universities to cover fees and living expenses and retain faculty, sustain academic programs, and develop online learning platforms, would alleviate the disruption to medical training. Despite significant challenges, respondents demonstrated remarkable resilience and adaptability. When accessible, online lectures were used as an alternative to in-person learning, enabling students to remain academically engaged amidst the conflict. This mirrors findings in other conflict-affected regions where remote learning has been adopted to compensate for disrupted traditional education. [25] However, internet access is limited in Gaza, and many students were unable to rely consistently on this option, as a result, remote learning failed to fully mitigate the barriers to face-to-face teaching. Some students reported travelling long distances to access reliable internet connectivity, a resource that was neither universally available nor consistently stable. The limitations of remote learning were particularly pronounced in the context of clinical training. Healthcare education relies heavily on hands-on experience to develop practical skills, critical thinking, and patient care competencies. Respondents frequently cited the inadequacy of online learning for clinical education, emphasising that it could not replicate the experiential and interactive nature of in-person training. This finding aligns with broader evidence suggesting that while online learning is a valuable educational tool, it cannot fully replace the immersive and practical components of healthcare training. [26] Indeed, studies have also shown that students in healthcare disciplines often experience decreased confidence and competence in their skills when clinical training is disrupted or replaced by virtual methods [27].

This study has several limitations that should be considered when interpreting the findings. Firstly, the cross-sectional design provides a snapshot of the student's experiences and challenges at a single point in time, which limits the ability to assess how these experiences and barriers may have evolved or changed throughout this conflict. A longitudinal approach would provide more comprehensive insights into the long-term impact of these disruptions on education and mental health. Secondly, the survey did not explore all potential aspects that could have influenced the students' educational and psychological experiences. While this approach was necessary to keep the survey concise and improve the response rate, it may have omitted other relevant factors affecting

students' lives and learning during the conflict. It is also important to note that the response rate may have been limited due to limited availability and access to the internet. Additionally, while the study highlights the psychological burden faced by students, it did not employ specific psychological scoring tools to quantify levels of distress, anxiety, or depression. The use of validated psychological instruments could have provided more robust data on the mental health impact of the conflict. Also, the survey was completed by the participants in Arabic and the responses were translated, and therefore some of the meaning in the responses could have been lost in translation. The translation was checked by multiple bilingual healthcare workers to minimise this.

Conclusion

Healthcare students in Gaza face immense challenges due to the Israel-Gaza conflict that began in October 2023. These include displacement, loss of loved ones and teachers, and severe disruptions to their education. Despite these hardships, their resilience is evident. However, urgent action is needed to address the barriers to their education. Providing financial and psychological support, improving internet access, and implementing flexible curriculum adaptations are critical. International collaborations can also further support students through working with the universities to establish scholarships and hands-on training programs. These measures are essential to sustain healthcare education and ensure the future of healthcare delivery in Gaza. An end to the war is also desperately required.

Declarations

- **Ethics approval and consent to participate:** Not applicable.
- **Consent for publication:** Consent was obtained through the initial survey, where students who wished to be acknowledged as collaborators provided their names. The manuscript was also shared with all collaborating authors for their review and contributions.
- **Availability of data and materials:** Survey responses are available from the corresponding author upon reasonable request.
- **Competing interests:** The authors declare no competing interests.
- **Funding:** This research received no external funding.
- **Authors' contributions:** The study management group designed the study, developed and distributed the survey, and drafted the initial manuscript. Collaborators completed the survey, assisted with its dissemination, and contributed to the writing and review of the final manuscript.
- **Acknowledgements:** See below.

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Gaza Healthcare Students Survey

The ongoing war in Gaza has placed immense pressure on healthcare services, including medical education and training. We recognize that medical students are facing unique challenges during this time, and it is essential to understand your experiences to provide the necessary support. This survey aims to gather your insights and experiences as medical students in Gaza, focusing on the obstacles you have encountered in your studies, clinical training, and overall well-being. Your participation is crucial in helping inform the international community and relevant organizations about the current situation and the support needed for medical students like you. The survey is anonymous and will take no more than 5 minutes to complete. If you wish to be included as a contributor to this work, please share your name and email address at the beginning of the survey. By completing this survey, you agree to share its results. We deeply appreciate your time and contribution.

Section 1: Personal Information

1. What is your full name?
2. How old are you?

Section 2: Educational Background

3. Which university in Gaza did you study at?
4. What program are you enrolled in?
5. What is your current academic year?

Section 3: Impact of War on Education and Clinical Studies

6. Was the area where you study an active conflict zone? (Yes/No)

7. Is the university building still intact? (Yes/No)
8. When was the last time you went to the university?
 - Have any restrictions affected your ability to study due to the war? (Yes/No)
 - If yes, please specify all applicable restrictions.
 - If you have started clinical studies, has the damage to hospitals affected your training? (Yes/No)
 - If yes, please provide details.
 - Have you worked in a hospital since the beginning of the war? (Yes/No)
 - If yes, please provide details.
 - 9. Are you working beyond your skill level? (Yes/No)
 - 10. Please describe the impact of the war on your education and clinical studies.
 - 11. Please describe any alternative measures that have helped with your studies (e.g., online lectures, field training).

Section 4: Financial and Logistical Support

12. Has the war affected your financial or logistical support? (Yes/No)
 - If yes, has it been reduced? (Yes/No)
 - If yes, are you currently able to pay your tuition fees? (Yes/No)

Section 5: Psychological Support and Well-being

13. Has this war affected you psychologically? (Yes/No)
If yes, are you receiving any support for your psychological well-being? (Yes/No)

Section 6: Impact of War on Your Life and Well-being

14. Have you been forced to flee your home due to the war? (Yes/No)
 - If yes, how many times have you been displaced?
15. Where are you currently living?
16. Have you, your teachers, or colleagues been injured during the war? (Yes/No)
 - If yes, how many?
17. Have any of your teachers or colleagues been killed during the war? (Yes/No)
 - If yes, how many?
18. Have you lost any family members during the war? (Yes/No)

Section 7: General Impact and Future Outlook

19. How confident are you in completing your education despite the current challenges?
20. What do you need to resume your studies? (Select all applicable options)
21. What are your expectations regarding the impact of the war on your education and future career?
22. Do you have any additional comments or messages for the international medical community?
23. If you would like to help write and review the paper and be included as a co-author in this collaborative publication, please provide your email address.

Appendix:

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