



War Attacks on Medical Staff, Hospital and Healthcare System During 225 Days in Gaza: A Scoping Review and Efficiency Assessment of the International Humanitarian Law

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Abstract

During wars, hospitals, medical staff, and civilians are protected by International Humanitarian Law (IHL). However, this importance is not observed in some instances. We examined the killing of medical staff and attacks on medical facilities during the Gaza war. In this scoping review, we gathered data from primary and secondary sources, such as newspapers, peer-reviewed journals, open-source platforms, social networks, and Non-Governmental Organization (NGO) websites from October 27, 2023 to May 21, 2024. Additionally, we collected data from some organizations, such as Physicians for Human Rights (PHR), the World Health Organization (WHO), Palestine Ministry of Health, World Bank, and United Nations Children's Fund (UNICEF).

According to different reports, between 400 to 800 incidents of violence against the healthcare services were documented in Gaza from the start of the war on October 27, 2023 until May 21, 2024. These incidents include obstruction of access to medical facilities, attack on ambulances, damage to hospital buildings, and targeting of medical staff and healthcare volunteers. Although the WHO issued warnings to stop the violence against medical staff and health facilities, these efforts were unsuccessful.

The results revealed that unprecedented tragedies are occurring in Gaza, where medical facilities and staff are being targeted and killed. However, the response of international organizations appears to be passive and not appropriate to the extent of the war crimes. Moving forward, the international community should consider developing more effective solutions to address criminal behavior within the healthcare sector.

Keywords: Gaza, Medical facilities, Medical staff, War attacks

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Introduction

Based on studies conducted in at least 23 countries that have experienced conflicts or unrest, employees, health centers, and patients have increasingly been exposed to various forms of violence, such as bombings, rape, shooting, looting, attacks, arrests, and sieges (1). The Palestinian Ministry of Health reported 34,262 deaths and 77,229 wounded from the beginning of the Gaza war on October 27, 2023 until May 21, 2024.

Despite the Geneva Convention (1949) and United Nations Security Council Resolution 2286 prohibiting attacks on healthcare centers, deliberate violations of the international law continue to occur, hindering the provision of medical facilities. Attacks on health centers are defined as any intentional act of violence leading to destruction, damage, or loss of function, affecting both healthcare workers and patients (1,2). Hospitals, medical staff, and civilians are protected under International Humanitarian Law (IHL), particularly the Geneva Convention (1949). Attacks on health and humanitarian service workers not only endanger lives but also impede the delivery of life-saving services (3,4).

Violence against medical staff is often underreported in many wars, and statistics may not be readily available. During the Gaza war, deliberate destruction of hospitals and health centers, as well as arrests and killings of medical staff has been frequently reported (5). These attacks disrupt the healthcare system and reduce its ability to provide treatment and care services (6).

Addressing the serious challenges facing the healthcare system in Gaza requires effective international intervention, outstanding cooperation, and humanitarian assistance.

In this review, we attempted to answer the following questions:

1. How many medical staff were killed from the start of the Gaza war on October 27, 2023 until May 21, 2024 (225 day)?
2. How many hospitals and medical facilities were damaged and destroyed in Gaza during this period?
3. What was the reaction of the United Nation and international community to the attacks on the medical staff and facilities in Gaza?

Materials and Methods

This study, conducted in 2024, followed a scoping approach in Gaza over 225 days from the start of the war on October 27, 2023 until May 21, 2024. The method, suggested by Arksey and O'Malley and Levac *et al* (7,8), consisted of five steps: (a) defining research questions, (b) identifying relevant studies, (c) selecting studies meeting eligibility criteria, (d) extracting data, and (e) collecting, summarizing, and reporting results. The aim of this scoping review is to gather comprehensive information on the dimensions, components, strategies, and approaches concerning attacks against medical staff and facilities during the Gaza war.

First, research questions were formulated to identify incidents and events involving the healthcare facilities and medical staff during the Gaza war. Searches were conducted on PubMed, ProQuest, Google, and Google Scholar using keywords, such as hospitals, clinics, healthcare facilities, private healthcare, number of doctors, nurses, attacks, bombings, casualties, and Gaza war.

Data were extracted from primary and secondary sources, including journals, peer-reviewed articles, open-access platforms, social networks, and NGO websites. Data were also collected from Physicians for Human Rights (PHR), the World Health Organization (WHO), the Palestine Ministry of Health, the World Bank, and UNICEF from October 27, 2023 until May 21, 2024. Two researchers reviewed the extracted data and agreed on the inclusion of unbiased sources. A final search was conducted using the PRISMA 2020 chart, with two independent researchers extracting data following the Joanna Briggs Institute model. The collected data were systematically summarized, analyzed, and reported, with findings related to each research question extracted from the problem statement (Diagram 1).

Results

The number of deaths of medical staff in the Gaza war

The information reported in this section was derived from various reliable news sources. Notably, no single set of statistics was found in this regard. According to the International Rescue Committee (IRC), since the start of the war in Gaza in October,

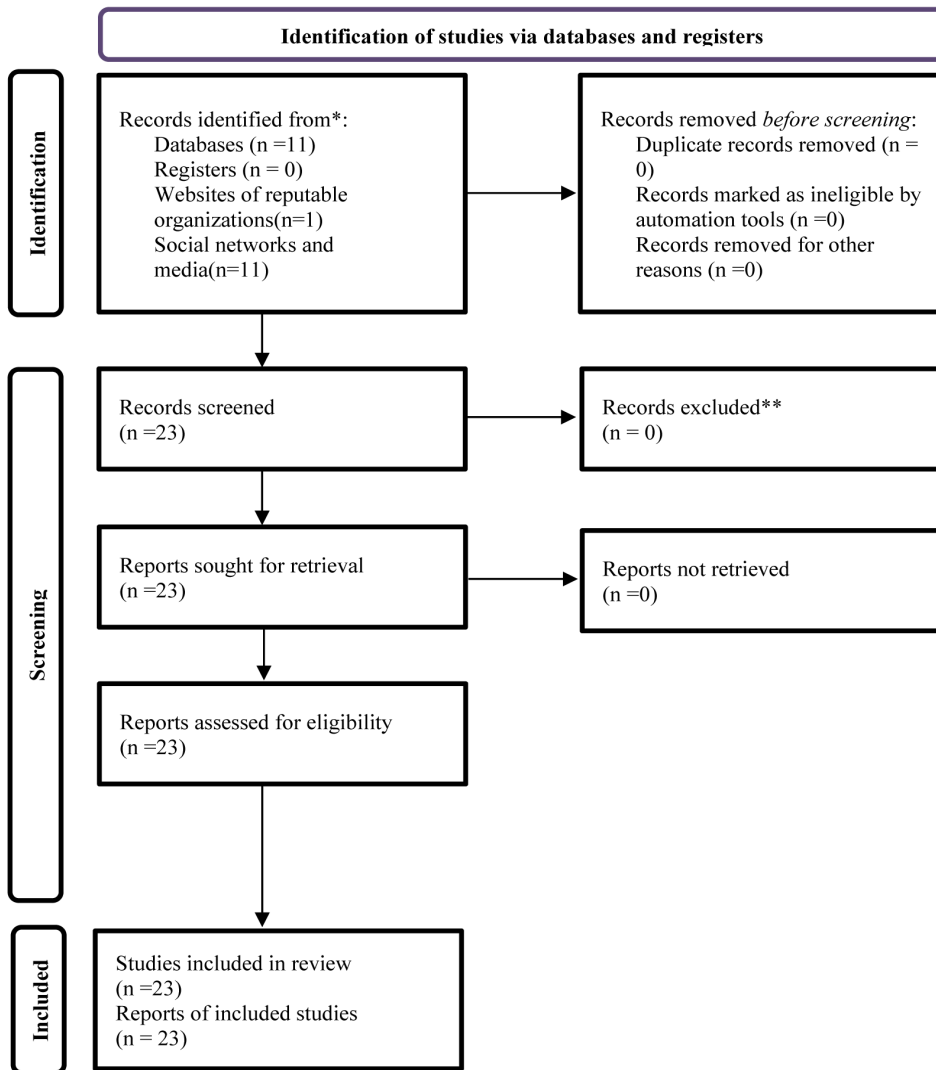


Diagram 1. including studies and news in the review.

nearly 800 cases of violence against the healthcare services or obstruction preventing access to these services have been recorded in Gaza (9). On January 10, an attack on an ambulance approaching Al-Aqsa Hospital killed four humanitarian service volunteers. On January 18, a residential complex housing IRC Emergency Medical staff, working in partnership with Medicine for All People (MAP), was hit by an airstrike, injuring several team members and causing significant damage to the building (10).

The Israeli army carried out more than 400 attacks on medical facilities and staff in Gaza during the study period. According to the Palestinian Ministry of Health, over 480 healthcare personnel were killed and more than 160 others were arrested. There were also reports of torture against the health workers (11).

A number of 53 cases of physical violence against healthcare service providers were reported. 17 cases of ambulance seizures and arrests of medical staff were also reported. Additionally, electricity and water cuts and non-discharge of sewage caused severe disruptions in the operation of health services and hospitals. Many believe that the crimes and tragedies of al-Ahli hospital in Gaza have not yet been fully disclosed, and these tragedies will be revealed in the near future (12). According to the WHO, 21 patients lost their lives during the siege of Al-Shifa Hospital due to the Israeli army's continued blockade. Additionally, 24 health centers and 212 ambulances were damaged (13). The United Nations Relief and Works Agency for Palestinian Refugees (UNRWA) reported that the total number of medical staff killed

in the conflict reached 142 (13).

Al-Mayadeen TV reported that over 350 employees of medical institutions in the Gaza Strip were killed during the study period (14). The Palestinian Ministry of Health stated that among the deceased were 500 male doctors and nurses, as well as 138 female nurses (15). As of late April, the WHO informed TASS that there have been more than 430 attacks on Gaza's healthcare system since October 2023, resulting in 722 deaths and 924 injuries (16).

The Gaza Ministry of Health announced on International Nurses Day that at least 500 medical staff were killed during the study period. Khalil Al-Daghran, the spokesman for the Palestinian Ministry of Health, stated during a news conference at the nurses' sit-in in Al-Aqsa Martyrs Hospital that this year should be recognized as an exceptional International Nurses Day, declaring it the year of nursing (17).

The death of a renowned Palestinian orthopedic surgeon after nearly four months in detention was described as "horrific" by a UN expert, who called for an independent international investigation into the circumstances of his death. "I am appalled by the news of Dr. Adnan al-Barash's death while in Israeli custody", said Tlalang Mofokeng, the UN's special reporter on the right of all people to the highest standards of health.

Dr. Al-Barash, was the head of the Orthopedics Department at Al-Shifa Hospital in Gaza City. He reportedly died on April 19, 2024, in Ofer Prison, an Israeli detention center in the West Bank, and his body has not yet been released yet by Israeli authorities (9). Mofokeng stated that Dr. Al-Barash was detained along with other doctors and medical staff by Israeli forces on December 18, 2023, at al-Awda Hospital in northern Gaza. At that time, he was generally well and performing his duties normally (12). The expert added that Dr. Al-Barash was arrested while fulfilling his duties towards the patients, adhering the medical oath. He died while trying to protect the rights to life and health of his patients. Reports indicate that before his death, Dr. Al-Barash was beaten in prison, and his body showed signs of torture.

"I am deeply saddened to continue receiving reports of doctors being killed in the conflict", Mofokeng said. The Gaza Ministry of Health reported that at least 493

Gazan health workers were killed and many more injured during the study period. The WHO reported that at least 214 healthcare staff were detained by Israeli forces while on duty. "Killing and detaining health care workers is not a legitimate method of warfare", the UN expert emphasized, stating that they have a legitimate and fundamental role in taking care of the sick and wounded during conflict (18,19).

The number of hospitals and medical facilities attacked in Gaza

The WHO has recorded 96 attacks on healthcare staff and medical facilities in the West Bank, resulting in damage to 77 ambulances providing aid and 49 attacks preventing the provision of healthcare services to the people of Gaza during the study period (20).

More than a third of hospitals in Gaza (12 out of 35) and almost two-thirds of primary healthcare clinics (46 out of 72) closed due to the damage or fuel shortages. A residential complex housing IRC Emergency Medical staff, working in partnership with MAP, was hit by an airstrike on January 18, injuring several team members and causing significant damage to the building (21).

On November 17, around 9:15 p.m., the Wafa Hospital for the Elderly was attacked in An Nusirat, Middle District (south of Gaza Wadi) (22).

The Palestine Red Crescent Society (PRCS) announced on November 18 that its emergency medical staff were still trapped in Al-Ahli. The Baptist Hospital in Gaza City was under heavy shelling for the third consecutive day, preventing medical staff from leaving the hospital to provide aid to the injured outside. According to a report from the WHO, as of November 17, 25 out of 36 hospitals in Gaza were unable to provide services to patients due to the lack of fuel, damage, attacks, and insecurity. Only 11 hospitals remained partially active (20).

The WHO reported that Al-Shifa Hospital was destroyed by Israeli army attacks and could no longer function as a hospital. Important ultrasound machines crucial for ensuring safe births were disconnected. The Gaza's Ministry of Health stated that only one-third of Gaza's 36 hospitals and health centers were operational, all facing severe shortages of medicine, basic medical equipment, fuel, and staff. Hundreds of thousands of wounded and sick people were at risk

of death due to the shortage of active hospitals (23). Three hospitals (Al-Najjar, Al-Hilal Al-Emarati, and Kuwait Hospitals) in Rafah were partially active, but with hostilities escalating in their vicinity, access for patients, staff, ambulances, and humanitarian aid will be unsafe. Gaza's European Hospital located on the east of Khan Yunis and currently serving as a tertiary referral hospital for critically ill patients, was also vulnerable to becoming isolated and inaccessible during an invasion. As a result, the south will have six field hospitals, with Al-Aqsa Hospital in the middle region serving as the only referral hospital (24).

Attacks on health centers led to 166 unsafe births per day and the admission of 50 Palestinians, including children, every hour. Tragically, a child was lost every 15 *min*. Israeli airstrikes damaged 205 educational centers, 69 healthcare centers, and 24 ambulances, resulting in the loss of 46 medical staff. Over 1.4 million people were displaced, 21 health facilities were disrupted due to the lack of fuel, and 1,400 people, including 720 children, were still trapped under rubble. Approximately 70% of the victims were children, women, and the elderly, with 50% of Gazan families experiencing food shortages. The total casualties exceeded 7,700 people, with over 20,000 injured, including 4,000 children and 1,750 women (25).

The international community's response to the attacks on medical staff and facilities in Gaza

The WHO (October 12, 2023) called for an end to hostilities and for the protection of medical staff and civilians from attacks. The WHO urged the immediate establishment of a humanitarian corridor to ensure unimpeded access for health and humanitarian supplies and personnel as well as the evacuation of the sick and injured. The WHO also called for the respect of medical staff and protection of healthcare facilities (25).

The WHO announced its readiness to promptly dispatch essential medical equipment through its logistics center in Dubai and collaborate with partners to ensure their delivery to the Gaza Strip via the Rafah border crossing. Swift access through the crossing was crucial for the WHO and other humanitarian organizations to respond promptly and

save lives (25).

The WHO reported over 115 attacks on medical and health organizations in Palestine during the study period. Multiple hospitals in Gaza City, northern Gaza, and Rafah received repeated evacuation orders from the occupying army, with 77 attacks recorded in the West Bank, 43 of which resulted in physical violence against medical staff (26).

The UN Special Rapporteur on the right to health and sanitation, Telalang Mofokeng, expressed concern over the irreparable damage to Gaza's medical infrastructure, highlighting the dire conditions in which health service providers were operating. Limited access to medical equipment and poor conditions hinder the delivery of timely and quality healthcare (27).

The WHO advocated for an immediate and sustainable ceasefire, as well as the removal of barriers to delivering urgent humanitarian aid throughout Gaza. Respect for the sanctity of healthcare was paramount, with health facilities' coordinates known to all parties involved. Active protection and accessibility to patients, health workers, and partners were essential, ensuring the safety of those dedicated to saving lives without risking their own (23).

Discussion

Israel has not set any limits to its attacks on medical staff and facilities in the Gaza war. According to the Geneva Convention, the sick and wounded, medical staff, hospitals, and mobile medical facilities must be protected during wartime. They should not be attacked in any way, as targeting them is considered a war crime:

“Civil hospitals established to care for the wounded, sick, disabled patients, and cases related to childbirth should not be attacked under any circumstances. They should always be respected and protected by the parties in conflict. This protection will only cease if they are used to commit harmful acts against the enemy, beyond their humanitarian duties. However, this protection can only be terminated after giving due notice, detailing all relevant matters, stating a reasonable time limit, and if the warning is not heeded” (28).

It is also emphasized that nursing sick or wounded armed forces in these hospitals, or the presence of

light weapons and ammunition taken from these forces is not harmful to the enemy (29).

Despite these clear and humanitarian laws, the war crimes of Israel have been repeatedly seen in the world news headlines. For example, "Israeli forces fired tear gas at a hospital in the West Bank", "Medical staff moved incubators while Israeli forces fired tear gas near a hospital in Jenin", "Israeli army forces accused of firing tear gas at a Palestinian hospital", "Police accused of throwing tear gas into a hospital in Quds while dispersing the riot" (30).

Numerous media reports over recent months and years have documented violations by the Israel armed forces, specifically targeting hospitals and medical facilities in the occupied Palestinian territories, despite the fact that these facilities are protected under international protocols. The actions of the Israeli forces have reportedly resulted in the deaths of infants in intensive care units. The Israeli forces do not deny these reports, instead frequently claiming a lack of awareness regarding the events occurring within the hospitals.

The Palestine Red Crescent Society continuously files complaints against the Israeli army for violating its employees, physically attacking doctors, and obstructing fieldwork. May Salem Hana al-Kila, the Minister of Health of Palestine, consistently calls on the international community to intervene and support the Palestinian people and medical institutions, as the actions of the Israel are serious violations of international humanitarian laws regarding medical institutions and workers (31).

Attacks on health and treatment centers during wars are not unique to this conflict. Reports from Afghanistan, Syria, and Yemen have also detailed attacks on medical supplies, such as painkillers, antibiotics, and blood products as well as damage to medical equipment, including anesthetics, imaging devices, and CT scans during the war. Additionally, lack of access to clean water and electricity has caused many problems in providing medical facilities. The lack of electricity affects not only operating rooms but also the storage of refrigerated drugs, mechanical ventilation devices, and hemodialysis machines, leading to many issues (32,33).

Violence increases the demand for care and places a burden on facilities and resources. For example,

the daily admission in a field hospital in Idlib, Syria increased from 15 to 200-250 patients, although the time period was not specified. Hospitals in Gaza were overwhelmed with complex injuries during the 2014 military offensive (34).

Health centers under attack or threat have had to change their operations. In Syria, doctors created a network of underground field hospitals in response to regular targeting of hospitals. These field hospitals, set up in basements, fields, abandoned buildings, mosques, and factories, have become more complex during the conflict, now including emergency rooms, operating theaters, and intensive care units (35).

Obstruction in healthcare delivery can take many forms, all with negative implications. In Yemen, the naval blockade and airport closure by the Saudi-led coalition are major factors in the collapse of the healthcare system. Yemen imports 90% of its medical equipment, but the blockade prevents these supplies from reaching hospitals (36).

UNICEF (2016) reported that declining health services led to additional 10,000 deaths in children under 5 last year. In Yemen, 90% of fuel is imported. Destroyed power plants have forced facilities to rely on generators, but fuel shortages prevent them from powering essential equipment like ventilators and incubators. The only plant supplying oxygen closed in April 2015 due to fuel shortages. While there are no figures indicating how many facilities are closed due to fuel shortages, only 45% of the country's facilities are fully operational (36,37).

Unfortunately, little attention has been paid to the protection of medical facilities in conflicts since 2011. For example, between 2011 and 2017 in Syria, Human Rights Watch documented over 465 attacks on 315 medical facilities (38). The Monitoring Violence against Health Care (MVH) network launched by the WHO in Turkey has reported over 402 attacks on 135 health centers in Syria from November 2015 to December 2016 (39). In Yemen, the WHO announced that more than 102 health centers were completely or partially damaged between March 2015 and August 2016. UNICEF has also confirmed 93 attacks on Yemeni hospitals between March 2015 and December 2016, but has not officially released a report (40). During the Iraq war, from March 2003 to December 2011, it is estimated that more than 12 health centers

were bombed. In Bosnia and Herzegovina, over 30% of health centers were destroyed (41). As of March 31, 2022, the WHO's Surveillance System for Attacks on Health Care (SSA) reported at least 82 attacks on health centers in Ukraine, resulting in 72 deaths and 43 injuries. Most of the attacks involved the use of heavy weapons against healthcare facilities, staff, patients, and medical equipment. In Mariupol, a direct Russian airstrike on a hospital complex reportedly injured at least 17 health workers and patients, leading to the death of a pregnant woman. Russian forces allegedly took 100 patients and health workers, as well as 400 civilians, hostage at the intensive care units of hospitals. Since 2020, more than 4000 incidents of violence against healthcare in conflict areas have been reported (42).

Countries involved in wars, like the Gaza Strip, suffer from similar healthcare infrastructure issues (17). In the Occupied Palestinian Territories (OPT), West Bank ambulances are not permitted to cross the border to East Jerusalem. Patients must be transferred from a Palestinian ambulance to an Israeli-registered ambulance at the checkpoint, a process that can take up to five times longer. In December 2015, the Palestine Red Crescent Society reported an average delay of 27 min, 12 min longer than recommended. These delays can be deadly: between 2000 and 2007, 10% of pregnant women were delayed at checkpoints, resulting in 69 births, 35 infant deaths, and 5 maternal deaths (17). Reiter *et al* found that individuals delayed by Israeli checkpoints or detours on their way to the emergency department were more likely to be hospitalized, showing that access restrictions worsened the severity of their conditions (43).

Conclusion

The results of our review reveal that significant tragedies are occurring in Gaza, where medical staff and patients are being targeted and killed by the opposing side of the war. The scale of these attacks and crimes against healthcare facilities, staff, and defenseless patients is unprecedented in the history. According to the Palestinian Ministry of Health and reports of many other UN agencies and many other independent resources, 34,262 deaths and 77,229 wounded were reported between October 27, 2023 and May 21, 2024.

However, the international response is passive and inadequate given the severity of the injuries and crimes committed by Israel. If the conflict persists under these circumstances, the violations in Gaza may undermine the principles of the Geneva Convention. Moving forward, more effective solutions must be considered to address the violence in the healthcare sector.

The current situation of repeatedly destruction of the healthcare system and systematic war attacks against medical staff and hospitals have led to this evident conclusion that the existing international law is not able to stop Israel. Medical facilities and staff are not securely protected in Gaza and many other countries. Therefore, as an urgent plan of action, the United Nation Security Council along with other UN relevant agencies must play an active role in stopping the war against medical staff and centers, rebuilding healthcare infrastructure, ensuring the availability of medical equipment, and supporting provisioning the mental health services. In addition, considering the existing healthcare system in Gaza, diplomatic efforts are crucial for building sustainable peace in the region. These efforts can reduce the frequency and intensity of conflicts, ultimately contributing to the stability and development of the healthcare system. Finally, as a long-term plan of action, the WHO should urge the UN and Member States to revise the provisions of the Geneva Convention 1949. This revision should aim to protect medical staff and hospitals adequately and efficiently, with proper sanctions to ensure their safety and security and enforcement of the obligations imposed by the Convention on Member States.

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Conflict of Interest

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