Trends and Characteristics of Security Incidents Involving Aid Workers in Health Care Settings: A 20-Year Review

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Abbreviations:
AWSD: Aid Worker Security Database
ICRC: International Committee of the Red Cross
IFRC: International Federation of Red Cross and Red Crescent Societies
INGO: international non-governmental organization
LNGO: local non-governmental organization
LRCS: local Red Cross/Red Crescent Society
NGO: non-governmental organization
UN: United Nations

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Abstract

Introduction: In recent years, several high-profile attacks on hospitals providing medical aid in conflict settings have raised international concern. The International Humanitarian Law prohibits the deliberate targeting of health care settings. Violation of this law is considered a war crime and impacts both those delivering and receiving medical aid.

Problem: While it has been demonstrated that both aid workers and health care settings are increasingly being targeted, little is known about the trends and characteristics of security incidents involving aid workers in health care compared to non-health care settings.

Methods: Data from the publicly available Aid Worker Security Database (AWSD) containing security incidents involving humanitarian aid workers world-wide were used in this study. The security incidents occurring from January 1, 1997 through December 31, 2016 were classified by two independent reviewers as having occurred in health care and non-health care settings, and those in health care settings were further classified into five categories (hospital, health clinic, mobile clinic, ambulance, and vaccination visit) for the analysis. A stratified descriptive analysis, χ^2 Goodness of Fit test, and Cochran-Armitage test for trend were used to examine and compare security incidents occurring in health care and non-health care settings.

Results: Among the 2,139 security incidents involving 4,112 aid workers listed in the AWSD during the study period, 74 and 2,065 incidents were in health care settings and non-health care settings, respectively. There was a nine-fold increase from five to 45 incidents in health care settings ($\chi^2 = 56.27$; $P < .001$), and a five-fold increase from 159 to 852 incidents in non-health care settings ($\chi^2 = 591.55$; $P < .001$), from Period 1 (1997-2001) to Period 4 (2012-2016). Of the 74 incidents in health care settings, 23 (31.1%) occurred in ambulances, 15 (20.3%) in hospitals, 13 (17.6%) in health clinics, 13 (17.6%) during vaccination visits, and six (8.1%) in mobile clinics. Bombings were the most common means of attack in hospitals (N = 9; 60.0%), followed by gun attacks (N = 3; 20.0%). In health care settings, 184 (95.3%) were national staff and nine (4.7%) were international staff.

Conclusion: Security threats are a growing occupational health hazard for aid workers, especially those working in health care settings. There is a need for high-quality data from the field to better monitor the rapidly changing security situation and improve counter-strategies so aid workers can serve those in need without having to sacrifice their lives.

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Introduction

The humanitarian aid organizations have been delivering health care services in conflict settings for decades. In these settings, often medical services are delivered by national and international staff from non-governmental organizations (NGOs), multilateral, and international organizations to fill the gaps of the existing health care system in countries where this is often no longer fully functioning due to the conflict. However, in recent years, several high-profile hospital bombings have concerned the humanitarian sector, as it is increasingly challenging to protect aid workers working in the frontline.[1]

According to the International Humanitarian Law, during an armed conflict, individuals who are not or no longer actively involved in the conflict (such as civilians, medical and religious personnel, and wounded combatants) must be protected.[2] Under Article 19, the

Geneva Convention states that: "fixed establishments and mobile medical units of the Medical Service may in no circumstances be attacked;" while under Article 24, it states that:

> Medical personnel exclusively engaged in the search for, or the collection, transport, or treatment of the wounded or sick, or in the prevention of disease, staff exclusively engaged in the administration of medical units and establishments, shall be respected and protected in all circumstances.[2]

Violation of the Geneva Conventions under the International Humanitarian Law is considered a war crime, as reiterated by the United Nations (UN) Security Council (New York USA) in 2016 following recent targeted attacks in health care settings.[3] Unfortunately, increasingly, the world is seeing a violation of this law and the deliberate targeting of individuals, facilities, and organizations that are delivering medical services.[1,4–7] More than ever, the long-held idea that hospitals and medical professionals are guaranteed safety in conflict settings is being challenged.

The Aid Worker Security Database (AWSD) is a project that was started in 2005 by an independent research entity, Humanitarian Outcomes (London, United Kingdom), to track serious security incidents against aid workers world-wide.[8] Monitoring this trend is critical, as the working environment of aid workers is becoming increasingly dangerous as they are now becoming the targets themselves.[9,10] Data from the field are challenging to obtain, and many of the databases containing security incidents have primarily focused on health care settings alone and were mainly conducted over relatively short review periods.[6,10–12] The AWSD is rare as it captured attacks involving a very particular group of individuals who work to provide aid to vulnerable populations world-wide, and it offered a unique opportunity to examine and compare attacks in health care settings with those in non-health care settings over the past 20 years.

The objective of this study was to conduct a 20-year retrospective review to describe the trends and characteristics of severe security incidents involving aid workers in health care and non-health care humanitarian relief settings.

Methods

Data Source

Data from the publicly available AWSD collected from January 1, 1997 through December 31, 2016 were used in this study.[8] This database contains information about major security incidents against aid workers, defined as "killings, kidnappings, and attacks that result in serious injury," collected from active media scanning, aid organizations, and security agencies. This database is completely anonymized and does not contain personal identifying information or names of the organizations to which the aid workers belong. Although the AWSD project was started in 2005, the data have been retrospectively collected since 1997 from various sources, including active media scanning using a specially developed data scraper tool and direct reports from aid organizations and security agencies. Direct information sharing and verification of incidents are done with regional- and field-level security consortiums. Incidents are cross-checked and verified with the relevant agencies on an annual basis under an AWSD verification project.[8] Aid workers are defined as: "the employees and associated personnel of not-for-profit aid agencies (both national and international) that provide material and technical assistance in humanitarian relief contexts."[8] The AWSD project is funded by the Government of Canada, Department of Foreign Affairs and International Trade (DFAIT; Ottawa, Ontario, Canada); the Office of US Foreign Disaster Assistance (OFDA/USAID; Washington, DC USA); and the Government of Ireland, Irish Aid (Dublin, Ireland).[8]

For each incident, variables collected included date, country, specific location, number of aid workers affected, sex of victims, institutional affiliation of victims, type of staff (national/international), the outcome of the incident, means of attack, the context of the attack, and a narrative summary of the incidents.

Data Coding and Analysis

Attacks in health care and non-health care settings that affected aid workers were examined in this study. To identify health care settings, all security incidents occurring in the "project sites (PS)" and "on the road (R)" under the "location" variable were screened.[8] Incidents in health care settings were then classified into five categories for the analysis based on the narrative information. "Hospital" was defined as a tertiary health care facility, or if it was clearly stated as a hospital. "Health clinic" was defined as a small to medium-size health care facility, or if it was clearly stated as a clinic. "Mobile clinic" was defined as a health care clinic without a permanent structure, or if it was clearly stated as a mobile clinic, and includes mobile clinic teams who are on their way to provide medical services. "Ambulance" was defined as a medical vehicle on route to take patients to health care facilities, including medical evacuation but not including body collection, or if it was clearly stated as an ambulance. An incident was classified as being an attack during a "vaccination visit" when it was clearly stated as a vaccination campaign or involved vaccinators. Coding was conducted by two independent reviewers and discrepancies resolved by a third reviewer. Cohen κ coefficients were calculated, and the inter-coder agreement was 0.96 for coding of health care/non-health care settings, and 0.76 for coding of the types of health care settings.

A stratified descriptive analysis of security incidents occurring in health care and non-health care settings was conducted. To measure the change in trends and difference between trends, the χ^2 Goodness of Fit Test and the Cochran-Armitage Test were calculated in Microsoft Excel spreadsheet Version 2016 MSO and Excel XLSTAT Version 2018.2 (Microsoft Corporation; Redmond, Washington USA), respectively. All statistical tests performed were two-sided with a significance level of 0.05.

Results

During the study period, based on the classification criteria described above, 74 (3.5%) and 2,065 (96.5%) security incidents were identified in health care settings and in non-health care settings, respectively (Table 1). From Period 1 (1997-2001) to Period 4 (2012-2016), there was a nine-fold increase from five to 45 incidents in health care settings ($\chi^2 = 56.27$; $P < .001$), and a five-fold increase from 159 to 852 incidents in non-health care settings ($\chi^2 = 591.55$; $P < .001$; Table 1). The trends of incidents over time were different between health care and non-health care settings ($Z = 2.71$; $P = .007$; Table 1). In health care settings, peaks were seen in 2006, 2009, and 2013. Since 2011, there were at least five incidents involving aid workers in health care settings per year (Figure 1).

Context and Means of Attack in Health Care Settings

eFigure 1 in the supplementary material (available online only) shows the highest number of aid workers affected in health care settings was in Afghanistan (N = 100; 51.8%), followed by Syrian Arab Republic (N = 20; 10.4%), and Pakistan (N = 15; 7.8%). Proportional fatality by country was highest in Nigeria (N = 9; 100.0%), Syrian Arab Republic (N = 16; 80.0%), and Yemen (N = 9; 75.0%) for countries with five or more deaths.

In health care settings, the most common means of attack were gun attacks (N = 23; 31.1%), kidnappings (N = 23; 31.1%), and

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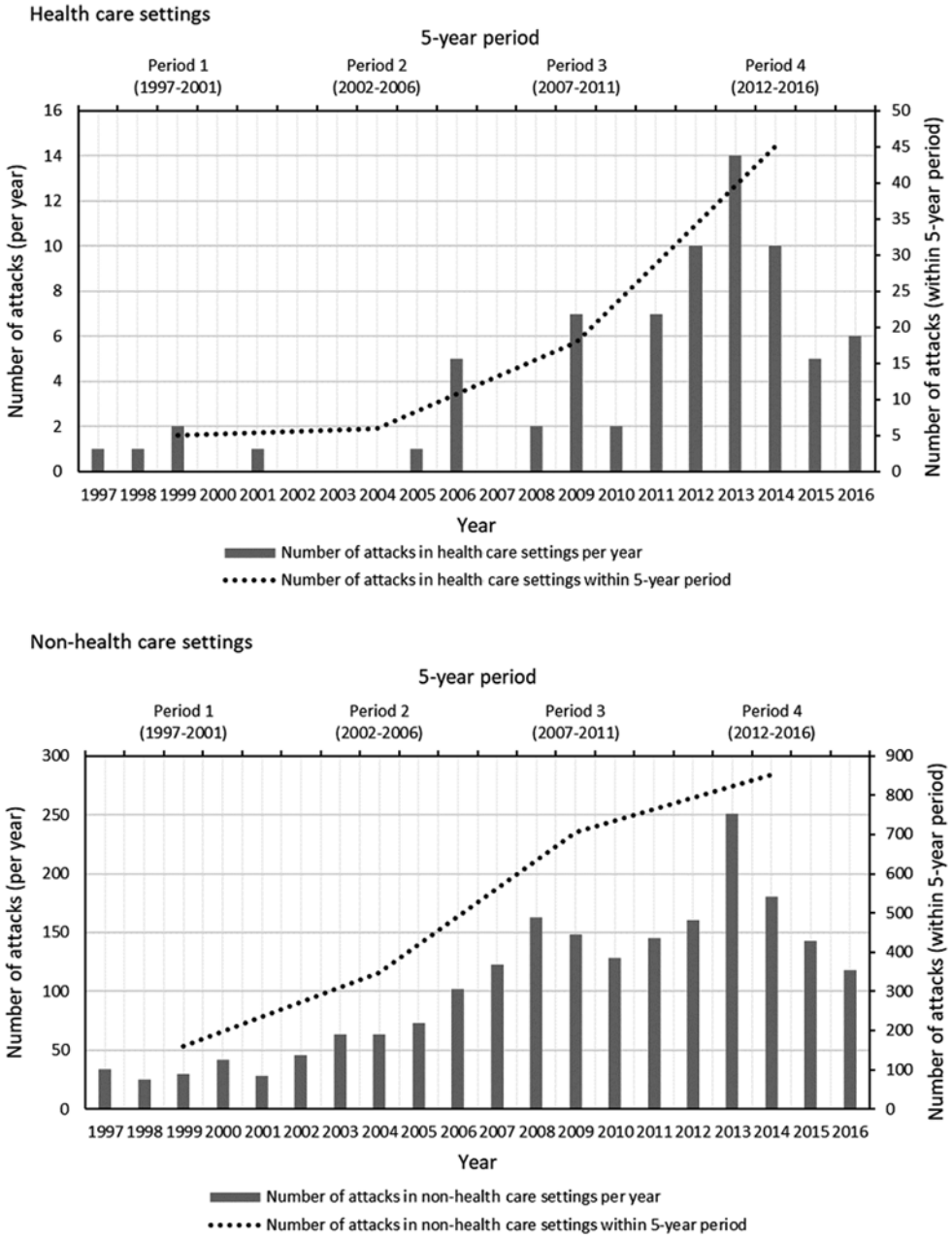

Figure 1. Security Incidents Involving Aid Workers Working in Health Care and Non-Health Care Settings by Year, World-Wide, 1997-2016.

bombings (N = 16; 21.6%; eTable 1 in the supplementary material [available online only]). Of the 16 bombings in health care settings, it was most frequently used in the Syrian Arab Republic (N = 3; 16.7%), Sudan (N = 3; 16.7%), Yemen (N = 3; 16.7%), and Afghanistan (N = 3; 16.7%).

Of the 74 incidents that occurred in health care settings, 23 (31.1%) occurred in ambulances, 15 (20.3%) occurred in hospitals, 13 (17.6%) occurred in health clinics, 13 (17.6%) occurred during vaccination visits, and six (8.1%) occurred in mobile clinics (Table 2). The most common means of attack in ambulances were gun attacks (N = 13; 56.5%) and kidnappings (N = 6; 26.1%). For incidents occurring in hospitals, bombings were the most common means of attack (N = 9; 60.0%). In mobile clinics, all incidents were kidnappings (N = 6; 100.0%; Table 2).

Characteristics of Affected Aid Workers

Among the affected aid workers, the proportions of male (N = 74; 38.3%), female (N = 11; 5.7%), and unknown (N = 108; 56.0%) in health care settings were similar to those in non-health care settings (male = 1,598 or 40.8%; female = 257 or 6.6%; unknown = 2,064 or 52.7%; Table 3). In health care settings, 184 (95.3%) were national staff and nine (4.7%) were international staff, whereas in non-health care settings, 3,254 (83.0%) were national staff and 665 (17.0%) were international staff (Table 3).

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	N	%	N	%
Health Care Settings				
Ambulance			**23**	31.1%
Gun Attack	13	56.5%		
Kidnapping	6	26.1%		
Bombing	2	8.7%		
Physical Assault	1	4.3%		
Unknown	1	4.3%		
Hospital			**15**	20.3%
Bombing	9	60.0%		
Gun Attack	3	20.0%		
Kidnapping	2	13.3%		
Physical Assault	1	6.7%		
Health Clinic			**13**	17.6%
Kidnapping	4	30.8%		
Gun Attack	2	15.4%		
Physical Assault	2	15.4%		
Bombing	1	7.7%		
Unknown	4	30.8%		
Vaccination Visits			**13**	17.6%
Gun Attack	5	38.5%		
Kidnapping	4	30.8%		
Bombing	2	15.4%		
Physical Assault	1	7.7%		
Unknown	1	7.7%		
Mobile Clinic			**6**	8.1%
Kidnapping	6	100.0%		
Unknown			**4**	5.4%
Total	74		**74**	**100%**

Table 2. Types of Health Care Settings Where Security Incidents Involving Aid Workers Occurred, World-Wide, 1997 to 2016

Among the nine international staff affected in health care settings, eight (88.9%) resulted in deaths (Table 3). The eight deaths occurred during four separate incidents in Somalia in 1997 (N = 1; 12.5%), Yemen in 2009 (N = 5; 62.5%), Syrian Arab Republic in 2013 (N = 1; 12.5%), and Afghanistan in 2014 (N = 1; 12.5%). All incidents occurred in hospitals, and all affected aid workers were from international NGOs (INGOs). Gun attack was used in the two incidents in Somalia and Afghanistan, kidnapping occurred in the incident in Yemen, and bombing was used in the incident in Syrian Arab Republic.

Organizations of Affected Aid Workers

For the 193 (4.7%) aid workers who were involved in security incidents in health care settings, 112 (58.0%) were from INGOs, 72 (37.3%) were from local NGOs (LNGOs) or Local Red Cross/Red Crescent Society (LRCS), eight (4.1%) were from the UN, and one (0.5%) was from International Committee of the Red Cross (ICRC; Geneva, Switzerland) or International Federation of Red Cross and Red Crescent Societies (IFRC; Geneva, Switzerland). For the 3,919 (95.3%) aid workers who were involved in security incidents in non-health care settings, 1,855 (47.3%) were from INGOs, 923 (23.6%) were from the UN, 909 (23.2%) were from LNGO/LRCS, 178 (4.5%) were from ICRC/IFRC, and 54 (1.4%) were from other organizations.

Outcomes of Affected Aid Workers in Health Care and Non-Health Care Settings

Among the 193 (4.7%) aid workers who experienced a severe security incident in health care settings, the number of aid workers affected increased from 13 (6.7%) in Period 1 (1997-2001) to 134 (69.4%) in Period 4 (2012-2016; Table 4). Among the 3,919 (95.3%) aid workers who experienced a severe security incident in non-health care settings, the number of aid workers affected increased from 381 (9.7%) in Period 1 (1997-2001) to 1,456 (37.2%) in Period 4 (2012-2016; Table 4). The proportion of aid workers affected in health care settings ($\chi^2 = 209.59$; $P < .001$) and non-health care setting ($\chi^2 = 768.75$; $P < .001$) both increased over time (Table 4). The Cochran Armitage test of trends indicated that health care settings differed from non-health care settings ($Z = 7.10$; $P < .0001$).

Discussion

The Growing Security Risk for All Aid Workers

This study was a retrospective 20-year review of security incidents occurring in health care and non-health care settings, using the AWSD. The data showed the numbers of security incidents and affected aid workers have significantly increased both in health care and non-health care settings, consistent with previous studies and AWSD reports.[9,13,14] However, it was surprising that this increase was significantly more pronounced in health care settings. Humanitarian space has been increasingly disrespected in recent years with a number of hypotheses proposed, including the resurgence of the politicization of humanitarian aid during the 2003 Iraq war, which resulted in international aid organizations becoming potential targets.[15] Intentional targeting of health care facilities has also been suggested as a way to seek military advantage.[16] However, it is important to note that the reasons are highly context-dependent. In countries such as Pakistan, vaccinators were targeted following a fake vaccination campaign that was used to trace the location of the former leader of Al-Qaeda, which later resulted in distrust of international aid and health care workers.[17–19] On the other hand, in the Syrian Arab Republic, the increasing "weaponization of health care" in recent years deprived the population of essential health care services.[5,20] Despite the context-dependent reasons, collectively, if the trend continues, the international community has to recognize security threats as a growing occupational health hazard for aid workers in health care settings.

Higher Risk for National Staff in Health Care Settings

Consistent with previous studies and reports, this study showed a higher number of national staff experiencing security incidents compared to international staff.[9,14,21] Often, in high-security settings, many more local aid workers are hired instead of international staff, which may explain the greater number of national staff being exposed to security threats.[9,14,21] Although it was not possible to access denominator data in this study, it has been previously shown that despite the absolute numbers of national staff attacked are higher, the incidence is higher among international staff. [9]

However, this study also indicated that more national staff experienced a security incident than international staff in health care settings compared to non-health care settings. Although it is not possible to explain the reasons for this using the AWSD,

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there are a few hypotheses. One possibility may be the nature of health care settings, such as hospitals, which operate 24 hours of the day, seven days a week. Often, international staff are only present during daylight hours when the security risk is lower. Consequently, national staff's continual presence in the hospitals also increases their chance of being exposed to potential threats. In addition, in many contexts where it is too dangerous to send international staff (such as surgical projects in conflict settings or countries with on-going conflict such as the Syrian Arab Republic), often projects are remotely managed and staffed with only national staff who already live in the area.[22]

Bombing as a New Trend of Attack in Health Care Settings

This study showed that ambulance was the most common target for security incidents in health care settings. This was not a surprise as it is commonly known that security incidents are more likely to occur during movement between locations where staff are more vulnerable and challenging to protect.[23] In addition, if attackers wish to target a specific health care worker or patient considered as their enemy, ambulances are also easier targets compared to a health care facility with additional security measures.[24]

However, the most alarming finding was the indication that attack strategies are changing over time in a dangerous direction, with not only the increasing targeting of health care settings, but also the utilization of bombing as the means of attack. As previous reports and studies have noted, attackers are changing war tactic and strategy by attempting to inflict more damage by attacking large health care facilities.[6,14,20] Not only is this a war crime and results in casualties of medical staff and patients, but it also causes severe facility and equipment damage with long-term impact on the community, with many health care services often temporarily interrupted or permanently suspended after attacks.[6,25] Some organizations have had to consider various countermeasures to protect hospitals from becoming targets in light of recent attacks, including taking the counter-intuitive step of not sharing hospital global positioning system (GPS) locations, keeping hospital buildings unmarked, creating make-shift hospitals that cannot be easily identified, and restricting access and entry to minimize risks.[6,26]

The High Fatality Rate for International Staff in Health Care Settings

According to the AWSD, although the number of international staff affected in health care settings is low, almost all were killed. Given the various context where these deaths occurred, it is difficult to identify one explanation for this. Among the myriad of possibilities, some hypotheses that may explain this phenomenon include: (1) the more prominent role of international staff in health care settings may make them easier to identify as well as potential impactful targets; (2) international staff often do not speak the local language so it may be harder to negotiate their survival during a security incident; and (3) international staff may have less understanding of the security risks, as well as a lower level of awareness of the local culture to assess the threats and appropriately mitigate the risk. Although the likelihood of under-reporting is high, as well as misclassification bias towards non-health care settings, this is a potentially important finding, and therefore needs further verification by those who can access other data sources, or once better data become available.

Afghanistan – The Most Dangerous Place for Aid Workers Working in Health Care Settings?

According to the AWSD, Afghanistan had the highest number of security incidents and affected aid workers. Although, it is true that the high number of attacks could be partly attributed to the underlying high level of security risk in the country, but Afghanistan is ranking one of the top 20 countries receiving humanitarian aid, thus exposing a greater number of aid workers to these security risks.[27] However, without denominator data of the number of projects or aid workers in each country, it is hard to compare the true risk to aid workers in different countries. It was surprising that countries with on-going conflict such as the Syrian Arab Republic and Yemen do not have more security incidents involving aid workers. This could be due to the challenge of obtaining reliable data from conflict zones. In addition, often countries with the most needs are also the countries which have the highest level of security concern, thus paradoxically have fewer aid projects as it is challenging to send aid workers to these settings.[28,29]

Recent Progress and Future Directions

The landscape of humanitarian aid has been changing in the past two decades, increasing the security risks that aid workers face in the field. However, ultimately, the greatest harm is to the population in need.[1,25,26,28,30] On May 3, 2016, the UN Security Council held a meeting to re-affirm the importance of respecting the provision of health care in the humanitarian space guided by the principles of the International Humanitarian Law.[3] There is no one universal solution to address the diverse context in which the security incidents take place. A multi-faceted approach is most probably needed. Besides the world leaders' acknowledgement of the problems and commitment to hold the perpetrators accountable, aid organizations also need to keep enhancing security management in the field, improving their understanding of armed actors' underlying motivations for the attacks, applying risk-mitigation strategies that have been proven effective, and adhering by the principles of neutrality, impartiality, and independence, which may further offer aid workers additional protection.[9,31,32]

Many of the above strategies require reliable data sources from the field to monitor the effectiveness of the strategies implemented. There is a continual challenge of obtaining comprehensive, long-term data from the field. The AWSD also had this same challenge, which can limit the conclusions that may be drawn. Therefore, it is encouraging to see the recognition of this problem and the collective effort the World Health Organization (WHO; Geneva, Switzerland), ICRC, Médecins Sans Frontières (MSF; Geneva, Switzerland), and other partner agencies to build a global repository of violence against health care workers to monitor this.[10,33] Although security data can be highly sensitive, it may be necessary to identify ways to promote transparency and data sharing for individual organization through some form of formal international agreements.

Limitations

Despite AWSD being one of the main databases monitoring longer-term trends, there are important limitations in this database which restricted the types of analysis that can be conducted, as well as the generalizability of the study. Firstly, the AWSD dataset only contains security incidents when an aid worker was injured, kidnapped, or killed. Therefore, it does not represent all attacks occurring in health care settings, such as incidents in health care

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settings that only affected patients or incidents in health care settings that are not run by aid organizations. Consequently, the number of security incidents seen here may be much lower than estimates from other reports. Secondly, given that the total number of aid projects and aid workers deployed is not known, there is no denominator to calculate incidence and relative risks. Thirdly, despite this being one of the most comprehensive databases for security incidents involving aid workers, there is the possibility of under-reporting, thus the probable under-estimation of those affected. Finally, as mentioned previously, there may be some level of misclassification bias associated with the limited information to identify all incidents occurring in health care settings, resulting in a possible under-estimation of security incidents in these settings. For the reasons mentioned above, it is not possible to draw certain conclusions based on this database alone. However, in reviewing these data, some potentially important topics have emerged which warrant further exploration in future studies, especially once better-quality data become available.

Conclusions

Security threats are a growing occupational health hazard for aid workers, especially for national staff and those working in health care settings. There is a need to advocate for the respect of the International Humanitarian Law and to identify better ways to enhance security in health care facilities and ambulances to ensure staff can work safely. To do this, first, vigilant monitoring of the rapidly changing security situation is needed. There is also a need to improve data quality of security incidents in health care settings so there can be a better understanding of their magnitude, characteristics, and continually evolving patterns to more effectively counter these threats, so aid workers can once again serve those in need without having to sacrifice their lives.

Author Contributions

Ms. Morokuma performed the data analysis and co-drafted the manuscript. Dr. Chiu conceived the study, performed the statistical analysis, and co-drafted the manuscript. Ms. Morokuma and Dr. Chiu contributed equally as co-first authors.

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Supplementary Material

To view supplementary material for this article, please visit https://doi.org/10.1017/S1049023X19004333.

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		Type of Setting	Period 1 (1997-2001)	Period 2 (2002-2006)	Period 3 (2007-2011)	Period 4 (2012-2016)	Total	χ^2 Goodness of Fit Test		Cochran-Armitage Test	
								χ^2	*p*	*Z*	*p*
All Incidents		**Health Care Settings**	5 (6.8%)	6 (8.1%)	18 (24.3%)	45 (60.8%)	74 (100%)	56.27	<**.001**	2.71	**.007**
		Non-Health Care Settings	159 (7.7%)	347 (16.8%)	707 (34.2%)	852 (41.3%)	2065 (100%)	591.55	<**.001**		
Main Forms of Attack	**Bombing**	**Health Care Settings**	1 (6.3%)	1 (6.3%)	2 (12.5%)	12 (75.0%)	16 (100%)	21.50	<**.001**	1.09	.275
		Non-Health Care Settings	9 (3.7%)	36 (14.9%)	65 (27.0%)	131 (54.4%)	241 (100%)	136.81	<**.001**		
	Gun Attack	**Health Care Settings**	2 (8.7%)	1 (4.3%)	3 (13.0%)	17 (73.9%)	23 (100%)	29.70	<**.001**	1.89	.058
		Non-Health Care Settings	34 (5.6%)	103 (17.0%)	202 (33.3%)	267 (44.1%)	606 (100%)	211.54	<**.001**		
	Kidnapping	**Health Care Settings**	1 (4.3%)	2 (8.7%)	8 (34.8%)	12 (52.2%)	23 (100%)	14.04	<**.01**	1.14	.255
		Non-Health Care Settings	39 (7.6%)	72 (14.1%)	187 (36.5%)	214 (41.8%)	512 (100%)	171.36	<**.001**		
	Physical Assault	**Health Care Settings**	0 (0%)	0 (0%)	2 (33.3%)	4 (66.7%)	6 (100%)	7.33	>.05	1.02	.306
		Non-Health Care Settings	5 (1.7%)	46 (15.2%)	94 (31.1%)	157 (52.0%)	302 (100%)	169.87	<**.001**		
	Unknown	**Health Care Settings**	1 (16.7%)	2 (33.3%)	3 (50.0%)	0 (0%)	6 (100%)	-	-	-	-
		Non-Health Care Settings	72 (17.8%)	90 (22.3%)	159 (39.4%)	83 (20.5%)	404 (100%)	-	-		

Table 1. Trend of Security Incidents Involving Aid Workers in Health Care and Non-Health Care Settings, World-Wide, 1997-2016

	Health Care Settings				Non-Health Care Settings				Total
	Kidnapped	Injured	Killed	Total Affected	Kidnapped	Injured	Killed	Total Affected	
Sex									
Male	-	-	-	**74 (38.3%)**	-	-	-	**1598 (40.8%)**	**1672 (100%)**
Female	-	-	-	**11 (5.7%)**	-	-	-	**257 (6.6%)**	**268 (100%)**
Unknown	-	-	-	**108 (56.0%)**	-	-	-	**2064 (52.7%)**	**2172 (100%)**
Nationality Status									
Nationals	41 (22.3%)	73 (39.7%)	70 (38.0%)	**184 (95.3%)**	812 (25.0%)	1164 (35.8%)	1278 (39.3%)	**3254 (83.0%)**	**3438 (100%)**
Internationals	1 (11.1%)	0	8 (88.9%)	**9 (4.7%)**	304 (45.7%)	185 (27.8%)	176 (26.5%)	**665 (17.0%)**	**674 (100%)**
Type of Organization									
LNGO/LRCS	-	-	-	**72 (37.3%)**	-	-	-	**909 (23.2%)**	**981 (100.0%)**
INGO	-	-	-	**112 (58.0%)**	-	-	-	**1855 (47.3%)**	**1967 (100.0%)**
UN	-	-	-	**8 (4.1%)**	-	-	-	**923 (23.6%)**	**931 (100.0%)**
ICRC/IFRC	-	-	-	**1 (0.5%)**	-	-	-	**178 (4.5%)**	**179 (100.0%)**
Other	-	-	-	**0 (0%)**	-	-	-	**54 (1.4%)**	**54 (100.0%)**
Total	**42 (100%)**	**73 (100%)**	**78 (100%)**	**193 (100%)**	**1116 (100%)**	**1349 (100%)**	**1454 (100%)**	**3919 (100%)**	**4112 (100%)**

Table 3. Characteristics of Aid Workers Injured, Killed, and Kidnapped in Health Care and Non-Health Care Settings, World-Wide, 1997-2016
Abbreviations: ICRC, International Committee of the Red Cross; IFRC, International Federation of Red Cross and Red Crescent Societies; INGO, international non-governmental organization; LNGO, local non-governmental organization; LRCS, local Red Cross/Red Crescent Society; UN, United Nations.

		Time Period	Period 1 (1997-2001)	Period 2 (2002-2006)	Period 3 (2007-2011)	Period 4 (2012-2016)	Total	χ^2 Goodness of Fit Test		Cochran-Armitage	
								χ^2	*p*	*Z*	*p*
All Aid Workers Affected		**Health Care Settings**	13 (6.7%)	12 (6.2%)	34 (17.6%)	134 (69.4%)	193 (100%)	209.59	**<.001**	7.10	**<.0001**
		Non-Health Care Settings	381 (9.7%)	753 (19.2%)	1321 (33.7%)	1456 (37.2%)	3919 (100%)	768.75	**<.001**		
Outcome	**Aid Workers Kidnapped**	**Health Care Settings**	6 (14.3%)	3 (7.1%)	10 (23.8%)	23 (54.8%)	42 (100%)	22.19	**<.001**	0.57	.571
		Non-Health Care Settings	114 (10.2%)	140 (12.5%)	379 (34.0%)	483 (43.3%)	1116 (100%)	351.84	**<.001**		
	Aid Workers Injured	**Health Care Settings**	2 (2.7%)	4 (5.5%)	11 (15.1%)	56 (76.7%)	73 (100%)	106.56	**<.001**	5.67	**<.0001**
		Non-Health Care Settings	77 (5.7%)	297 (22.0%)	471 (34.9%)	504 (37.4%)	1349 (100%)	341.13	**<.001**		
	Aid Workers Killed	**Health Care Settings**	5 (6.4%)	5 (6.4%)	13 (16.7%)	55 (70.5%)	78 (100%)	88.36	**<.001**	5.50	**<.0001**
		Non-Health Care Settings	186 (12.8%)	316 (21.7%)	470 (32.3%)	482 (33.1%)	1454 (100%)	162.72	**<.001**		

Table 4. Trend of Aid Workers Kidnapped, Injured, and Killed in Health Care and Non-Health Care Settings, World-Wide, 1997-2016