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# Epidemiological Study of Landmines/ ERW Accidents and Victims in Kachin, Kayah, and Shan States, Burma

by Julien Zwang, Ph.D. and Pascal Simon [ Danish Refugee Council / Danish Demining Group ]

In Burma, there is no systematic and organized victim information system (VIS) of landmine and explosive remnants of war (ERW) victims, and few studies have been conducted on the topic, in particular in Kachin, Kayah, and Northern Shan States (NSS), where most of the accidents have recently occurred. Between 2015 and 2016, casualty reports compiled by the Mine Risk Working Group (MRWG) chaired by the Department of Social Welfare (DSW) showed that the number of mine/ERW victims increased by 58% in the country, particularly in Kachin and Shan States, while the number of victims decreased in Kayah State. Documenting victims' profiles and risk behaviors are needed to help design victim assistance and mine risk education (MRE) programs. To collect this information, Danish Refugee Council/Danish Demining Group (DRC/DDG) conducted an epidemiological study in Kachin, Kayah, and NSS to analyze data collected about mine/ERW victims and accidents.<sup>1</sup>

## Method

The study combined a qualitative analysis using an anthropological approach and a quantitative analysis of mine/ERW victims recorded by DRC/DDG using the Information Management System for Mine Action (IMSMA) standards. The qualitative part of the study was conducted in Kachin and NSS from April to May 2017 and used the Washington Group Short Set of Questions on Disability to assess the type and the severity of the functional impairments of the victims. Risk ratios (RR) and adjusted odds ratios (AOR) using multivariate analysis were measured. Confidence intervals (CI) were calculated at 95% (95% CI), and comparisons were considered statistically significant when the  $p$  value was below 0.05 ( $p < 0.05$ ). Data were analyzed using Statistical Package for Social Science (SPSS).<sup>2,3</sup>

## Ethics

Informed oral consent was obtained from all study participants after explaining the interview content, and discussions only started after the respondent agreed. For people under 16 years old, consent was sought from a family member, who was present during all interviews. All interviews were anonymous, and the names were not recorded for confidentiality.

## Results

Overall, 290 mine/ERW victims were included in the study in 211 separate accidents occurring in rural areas up to May 2017. In-depth interviews were conducted with 35 victims, and 255 victims' data were analyzed from a mine/ERW victim register. As a total, over three-quarters (77%) of the accidents happened in Kachin State, 15% in Kayah, 5% in NSS, and 3% in other regions. A higher number of accidents were reported since 2014 in Kachin State, in particular in Bhamo district (Mansi and Momauk townships) and Mhonyin district (Mogaung and Mhonyin townships).



A traditional IDP home.  
All graphics courtesy of DRC/DDG.

### Profile of the Victims

Adults accounted for 83% of the victims, adolescents 13%, and younger children 4%. Most of the victims were farmers (40%), laborers (11%), or students (11%), while army soldiers represented 8% of the victims. Males were over five times more at risk for mine/ERW accidents than females (84%, 16%, respectively, RR 5.83,  $p = 0.001$ ).

The fatality rate among all mine/ERW victims was 24%. Nearly two-thirds of survivors (60%) had to stop their routine activities because of the severity of the disability caused by the accident (59% of the farmers, 61% of the laborers, and 68% of the soldiers). The fatality rate in students was higher (38%) than in other population groups, and 54% of the student survivors had to drop out of school. Unemployment was multiplied by fourfold, and 67% of the survivors were unemployed following their accident.

Landmine accidents caused extreme livelihood hardship for the extended family, particularly in cases of severe injuries or death of the victim, since 80% of the adult victims had children. Of the victims, 62% were settled and 33% were internally displaced persons (IDP). In Kachin State, IDPs (who represent a smaller population compared to settled villagers) are over nine times more at risk for an accident (RR 9.49,  $p = 0.001$ ) than settled villagers, while in NSS only settled villagers had a landmine accident (as recorded in the DRC/DDG database).

**Seasonal trend.** Over the years, rural populations were significantly more at risk of suffering mine/ERW accidents in April and May (RR 1.72,  $p = 0.001$ ) compared to other months, while the number of accidents significantly decreased (RR 0.41,  $p = 0.001$ ) during the first part of the rainy season (from June to August).

**Place of accident.** All accidents took place in rural areas, mostly in the forest (31%), on a foot path (17%), or on the side of a path (13%). Other accident locations (< 6%) were in villages, along a riverbank, or on grazing land, fields, farming land, residential or military areas.

**Activities at the time of accident.** At the time of an accident, the most frequent activities were travelling on foot (28%); collecting firewood (13%); tending animals (12%); travelling by vehicle such as bullock cart, motorcycle, or bicycle (8%); military duty (7%); or hunting or fishing (7%).

Compared to settled victims, IDPs were slightly more at risk of having an accident while travelling on foot (RR 1.32, 33%, 25%, respectively,  $p = 0.141$ ). IDPs were also more at risk than settled victims of having an accident while hunting or fishing (11%, 5%, respectively,  $p = 0.042$ ). On the other hand, settled victims were at significantly higher risks for accidents

while tending animals (5%, 16%, respectively,  $p = 0.008$ ) and tampering with landmines and ERW (0%, 4%, respectively,  $p = 0.063$ ) compared to IDPs.

**Perception of danger.** According to respondents, “in conflict zones, there is no mine sign indicating dangerous areas,” and the vast majority of the victims did not think that the place of the accident was hazardous (79%). Compared to adult victims, younger victims were at higher risks (AOR 3.53, 95% CI 3.20–3.88,  $p = 0.051$ ) of believing that the location of

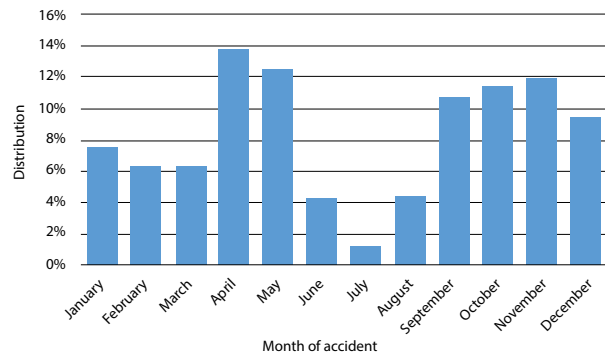


Figure 1. Month of the landmine/ERW accidents.

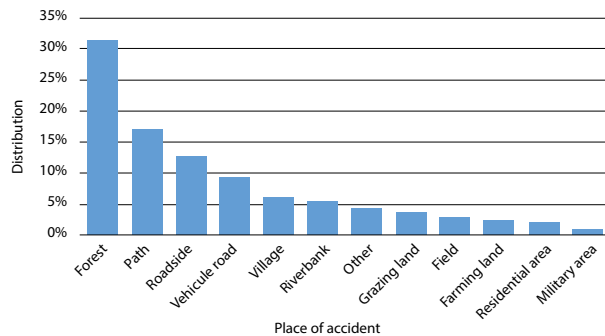


Figure 2. Place of the landmine/ERW accidents.



Figure 3. Activity at the time of the accident, landmine/ERW victims.

their accident was not a hazardous area (91%, 76%, respectively). Among victims who were conscious of the danger, the most frequent activities during the accident were military duty (30%) and travelling on foot (29%), while for those not conscious of the danger, the activities were travelling on foot (29%) and collecting firewood (15%).

**Reasons for entering hazardous areas.** For most of the respondents, the perception of danger was distorted by their extreme poverty and livelihood, which led to unsafe behaviors. Most of the respondents had an accident in hazardous areas because of economic necessity (51%), because of no other access (8%), or by peer pressure (8%). Despite knowing they were travelling across hazardous areas, farmers still need to make a living and cannot abandon their livelihood activities (farming, fishing, or collecting leaves in the forest). Despite understanding that the area was potentially dangerous, some people thought that going to the same area or using routine strategies by walking on the same path would reduce the risk of having an accident. The perception of danger was also related to the knowledge of the number of accidents occurring in the area. Other reasons for entering hazardous areas (33%) were when victims had to flee their village because of hostilities or were engaged in forced labor or military duties.

### Medical Assistance

The fatality rate among mine/ERW victims was 24% with no difference between genders. Half of the deceased were killed in situ, while the other half died during medical evacuation or at the medical facility.

Among mine/ERW survivors, 40% had multiple injuries. A large majority of the survivors (62%) had an injury below the knee and 21% above the knee. Other injuries involved the arm (19%), finger (14%), and abdomen (12%). The prevalence of each other injury—eyesight, back, head/neck, chest, pelvis, and hearing—was below 10%. In many cases, landmines' metallic fragments were not all removed by the medical services, in particular in Kachin State. Leaving fragments in the body increases the risk of severe pain, which prevents victims from working.

Comparing the prevalence of injuries between survivors and deceased victims (not in situ, i.e., during evacuation or at the health facility), we observed that multiple injuries increased the risk of fatality (AOR 4.36, 95% CI 1.11–17.06,  $p = 0.023$ ). Other risk factors for fatality were an injury above the knee (AOR 5.12, 95% CI 1.46–17.90,  $p = 0.005$ ) or at the abdomen (AOR 4.74, 95% CI 1.26–17.88,  $p = 0.013$ ). Most of the victims (52%) could not reach the first hospital in less than four hours, while 28% took from two to four hours to reach a hospital and 20% took less than two



Tea leaf garden.

hours. Overall, victims of an accident in Kachin State were at higher risks for fatality (AOR 2.79, 95% CI 1.18–6.61,  $p = 0.020$ ) than in other states, and teenagers (AOR 2.84, 95% CI 1.29–6.27,  $p = 0.010$ ) were at higher risks for fatality than other age groups.

### Alternative Livelihood

Particularly for persons with a severe disability or for family members of a deceased victim, home-based livelihood activities seemed to be a good way to generate an income and avoid travelling to hazardous areas. To promote home-based livelihood activities, DRC/DDG provides support to victims by donating two piglets or a cash grant to open a small shop in front of the house.<sup>4</sup> For the respondents, these home-based solutions are good livelihood alternatives as it is safer than travelling to hazardous areas or, for IDPs, than returning to their village of origin that could be contaminated by landmines and where the conflict can resume.

### MRE and Perception of Populations Most at Risk

For respondents, while landmines are theoretically supposed to target military personnel, the groups most at risk of accidents in Kachin and NSS are rural, low-income people of all ages. Respondents indicated that, even if they are aware that the area might be dangerous, they still have to take a chance for their daily livelihood and the survival of their family.





Piglets donated by DRC/DDG to landmine survivors as an alternative source of income

Respondents noted that receiving MRE training increases awareness about the dangers of landmines and can reduce casualties. Respondents also indicated that adults who receive MRE training can also teach their children safe behaviors in hazardous areas.

### Conclusion

The mine/ERW study conducted in Kachin, Kayah, and NSS identified a total of 290 mine/ERW victims combining both quantitative and qualitative techniques. All mine accidents happened in rural areas and involved IDPs as well as settled villagers.

Recent casualty reports showed that the number of mine/ERW victims increased in Burma, mainly because of a surge of accidents recorded in Kachin and NSS. Moreover, in Kachin State, IDPs are nine times more at risk of mine/ERW accidents than settled villagers while in NSS, the victims were settled villagers.

During ongoing armed conflicts and without mine/ERW clearance activities, vulnerable people from rural areas are forced to travel to hazardous areas for their livelihood needs, indicating that they are prone to extreme poverty and that their perception of danger is distorted because of financial necessity.

Overall, people from rural areas have frequent accidents because they are more exposed to landmines and ERW while walking on a footpath or driving a vehicle in hazardous conflict areas or next to armed groups' camps on their way to livelihood activities (collecting leaves or firewood, farming, fishing, or tending to livestock). Tampering with or using artisanal explosives are also unsafe behaviors that were reported.

IDPs traveling on foot to their villages of origin (to check their homes or their livestock) face increased risks of mine/ERW accidents. In addition, IDPs are at a higher risk of mine/ERW accidents when they are fleeing the conflicts while their home village is besieged by armed groups and must escape to the forest, or while they are walking outside an IDP camp to collect food in the nearby forest.

Remaining mine/ERW metallic fragments that are not removed from the victims' bodies indicate a need for better health care services and infrastructure. Poor responses from medical services after an accident might lead to irreversible and severe pain as well as physical impairments. Unemployment could be the consequence of these disabilities, resulting in economic hardship for the family as 60% of the survivors had to abandon their professional activity after the accident and 80% of the adult victims, including deceased victims, had children at the time of the accident.

Combatants, who were supposed to be the primary targets for landmines, often receive better medical assistance in military medical facilities than other population groups. High fatality rates in mine/ERW accidents, particularly in Kachin State, are probably due to the remoteness of the accident locations and poor transportation infrastructures, which increase the time of evacuation.

### Recommendations

**Mine risk education.** Because of an increase in military activities at the end of 2016 and the beginning of 2017, some areas still subject to armed conflicts lack MRE training and victim assistance, and the number of accidents has recently increased in Kachin and NSS. MRE training sessions in IDP camps and villages should therefore be continued and strengthened. MRE should also be included in school curriculums to increase awareness about the danger of landmines and ERW, and reduce unsafe behaviors among children and youth. While taking into account seasonal variations (increased risk of accidents from April to May), MRE programs should primarily focus on IDPs who are at higher risk of accidents while traveling on foot to their village of origin.

**Advocacy.** Overall, we recommend raising awareness of the study results and subsequent training on disability-inclusive development (i.e., including marginalized and excluded groups as stakeholders in development processes) to State level authorities (district, township, and village). By creating more awareness of mine/ERW victims with disabilities, especially relating to livelihoods, and the access and inclusion of persons with disabilities in educational and health programs, the situation in Burma will improve.



Hills in Kachin State.

**Victim assistance and rehabilitation.** The remoteness of accident locations and the poor transportation infrastructures in Kachin and NSS increases evacuation times and highlights the difficulties victims have in accessing medical services. Mapping available services and delivering training on referral pathways (i.e., efficient lines of communication between health services) is recommended, in particular for medical emergency and physical rehabilitation services. Information campaigns on access to services would be an asset for landmine victims with severe disabilities to promote access to health and medical rehabilitation as well as economic and education services.

In a context of extreme poverty faced by mine/ERW victims and their families in Burma, forthcoming interventions should focus on inclusive vocational training programs and livelihood opportunities. Mine/ERW victims' reintegration assistance should preferably be community-based, conflict sensitive, and delivered through local organization networks providing vocational training, small business grants, and livelihood support. Grants for surgical support could be provided to survivors with metallic fragments remaining in their bodies to help relieve them of severe pain, which in turn limits their job opportunities.

Psychosocial support should be delivered through community-based organizations, and the creation and strengthening of self-help or peer support groups should be

applied to increase social cohesion, dissemination of information, and awareness raising on the rights of persons with disabilities. Persons with disabilities must be included in the provision of assistance services, especially services essential to basic needs (primary healthcare, food distribution, water access, sanitation, and hygiene). This includes the consideration of mine/ERW victims with disabilities in a humanitarian crisis. Physical and communication accessibility must also be considered. For mine/ERW victims with severe food shortages, food aid interventions should first focus on children and persons with severe disabilities.

**Victim information system.** Without a national mine/ERW accident notification system, the methodology used to record the accidents by mine action organizations is likely to underestimate the number of victims. While these organizations have developed a simple system to collect information on the victims through their own networks to guide their strategic interventions, a national, organized, and systematic victim information system complying with international standards should be established. ©

*See endnotes page 66*

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Julien Zwang has been working in different areas of Burma since 2005. He is an expert in population studies, management, and analysis. He previously worked as a lecturer and researcher for universities in France, South Africa, and Thailand. More recently, he worked for Handicap International as a consultant in mine risk education as well as for DRC/DDG in Myanmar. He holds a Master's in Demography and completed a Ph.D. in Epidemiology at Paris 6 (France) in 2004.

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