

## Medico-Psychosocial Care for Mine Victims in Ziguinchor (Senegal)

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### ABSTRACT

**Introduction:** Landmine accidents cause great physical and psychological suffering to civilian populations around the world. Senegal is among the 30 countries hardest hit by antipersonnel mines [9]. In 2019, the National Center for Antimine Action in Senegal (CNAMS) estimated the total number of victims at 831, including 595 civilians with 152 killed and 443 injured [3]. The objectives of this study were to determine the percentage of victims who had benefited from medico-psychosocial care, to assess the victims' degree of satisfaction and to assess their social reintegration's quality.

**Materials and Methods:** This was a descriptive transversal study of listed mine accident survivors in the department of Ziguinchor over a period of 26 years, from 1983 to 2009.

**Results:** In our study, 53 victims were included out of 60 listed ones. The results showed a significant proportion of men, adults, married, with little or no education, unemployed, with a low socio-economic level and residing in urban areas at the time of the survey. The accident was related to agricultural activities in 56.6% (n = 30). The victims had lower limb injuries in 94.3% (n = 50), they were hospitalized in 92.5% (n = 49) and stump amputated in 73.58% of cases. Psychological support was provided to 56.6% (n = 30) of the victims. Of these, 45% (n = 24) had received support from a mental health professional. They were very satisfied in 63.3% (n = 19) of cases. Forty-seven victims, or 88.7%, had received social support during hospitalization and 77.4% (n = 41) assistance with social reintegration.

**Conclusion:** Mine accidents concern more the lower social classes. In addition, our study shows that survivors need psychosocial support for their reintegration.

### Keywords

Medico-psychosocial, Victims, Mines, Ziguinchor.

### Introduction

The armed conflict that has been raging in Casamance (south-west region of Senegal) for nearly 40 years made lot of victims, including mine victims.

The Emergency Study on the Impact of Mines in Casamance (EUIMC) carried out in 2005-2006 identified 93 villages affected by mines and/or explosive remnants of war, 149 suspect areas

including approximately 63 km of tracks, trails and roads [1]. The Ziguinchor region encompasses 54 out of 93 contaminated localities with 87 out of 149 suspected areas including 72 in the department of Ziguinchor [2].

In 2019, according to the report of the National Center for Antimine Action in Senegal (CNAMS), the total number of civilian victims was estimated at 595 with 152 killed and 443 injured. These victims are mainly listed in the departments of Ziguinchor and Bignona [3].

Numerous studies have shown a link between traumatic events of war such as mine accidents and long-term negative effects on the mental health of victims [4]. Senegal, through the CNAMS, assists victims and coordinates care activities on the territory. The objective of this study is to evaluate the medico-psychosocial care of civilian victims of mines.

### Materials and Methods

This is a transversal and descriptive study of civilian mine victims listed over a 26-year period from 1983 to 2009 who reside in the department of Ziguinchor were included all victims who gave their free and informed consent to participate in the study. The recruitment of victims was possible thanks to the use of CANMS and ASVM (Senegalese Association of Mine Victims) databases. Data was collected by survey of survivors based on a pre-established and previously tested form, which includes socio-demographic data, accident and care data. The collected data was entered into an Excel 2013 spreadsheet, processed for statistical analysis with the Epi-info 7 software. The results were presented in the form of a proportion.

### Results

#### Sociodemographic Data

Out of 60 mine survivors identified and residing in the department of Ziguinchor, 53 were investigated, representing a percentage of 88.33%.

The average age of the victims was 47.53 years  $\pm$  15.12 with extremes of 25 and 89 years. The most represented age group was that of [30-39 years] with 32.1% (n = 17) while the average age at the time of the accident was 27  $\pm$  15 years with extremes of 2

years and 65 years.

We note in our series 66% of men (n = 35) against 34% of women (n = 18) with a male/female sex ratio of 1.94.

Sixty percent of survivors live in urban areas (60%; n=32), compared to 40% (n=21) in rural areas.

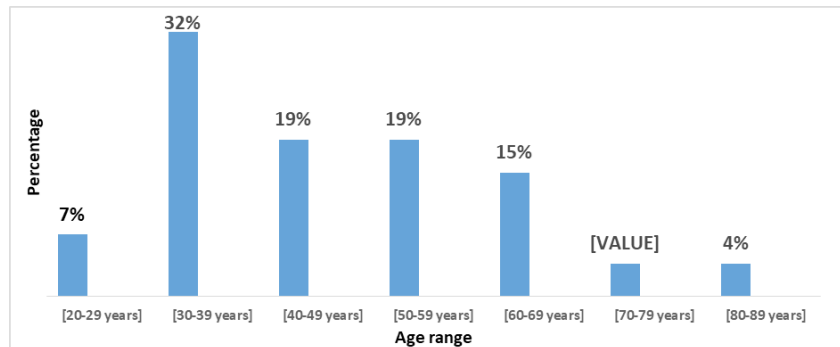
Married are 36% (n = 19) and single 34% (n = 18).

Survivors who had primary education and those with no schooling were respectively 39.6% (n = 21) and 28.3% (n = 15) while the others were 11.3% (n = 6) for middle and secondary education and 9.4% (n = 5) for advanced studies. The victims were unemployed in 32% of cases (n = 17) before the accident.

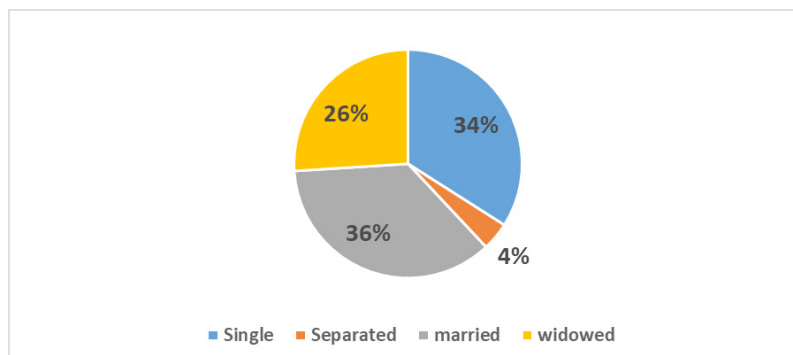
**Table 1:** Distribution of Mine Victims According To Occupation before the Accident (n = 53).

Occupation before accident	Workforce	Percentage (%)
None	17	32 %
Farmer	10	18,9 %
Trader	9	17 %
Household	5	9,4 %
Metal carpenter	4	7,5 %
Cabinetmaker	2	3,8 %
Unemployment	2	3,8 %
Hotel	1	1,9 %
Baker	1	1,9 %
Butcher	1	1,9 %
Carrier	1	1,9 %
<b>Total</b>	<b>53</b>	<b>100 %</b>

After the accident, more than half of the victims 54.7% (n = 29) had become unemployed.



**Figure 1:** Distribution of Mine Survivors by Age Group (n = 53).



**Figure 2:** Distribution of Mine Survivors by Marital Status (n=53).

**Table 2:** Distribution of Mine Victims According To Occupation after the Accident (n = 53).

Curent Occupation	Workforce	Parentage
Unemployed person	29	54,7 %
Breeder	4	7,5 %
Metal carpenter	3	5,6 %
Cabinetmaker	2	3,8 %
Project Manager	2	3,8 %
Trader	2	3,8 %
Farmer	2	3,8 %
Household	2	3,8 %
Dyeing	1	1,9 %
Secretary	1	1,9 %
Teacher	1	1,9 %
Broker	1	1,9 %
Support agent at ANSD	1	1,9 %
Student	1	1,9 %
Computer scientist	1	1,9 %
<b>Total</b>	<b>53</b>	<b>100 %</b>

The socio-economic standard of living of the victims was low in 68% of the cases (n = 36).

**Table 3:** Distribution of Mine Victims According to Socio-Economic Level (n = 53).

Socio-economic Level	Workforce	Percentage
Low	36	68 %
Medium	12	22,6 %
Good	5	9,4 %
<b>Total</b>	<b>53</b>	<b>100 %</b>

### Accident data

56.6% (n = 30) of the victims had suffered their mine accidents during agricultural activities.

**Table 4:** Distribution of Mine Victims According to the Circumstances of the Accident (n = 53).

Circumstance of the Accident	Frequency	Percentage
Agricultural activities	30	56,6 %
Travel	8	15,1 %
Socio-cultural activities	6	11,3 %
Others	9	17 %
<b>Total</b>	<b>53</b>	<b>100 %</b>

In our series, the victims had injuries to the upper and lower limbs with respectively 15.1% (n = 8) and 94.3% (n = 50) of the cases. Trunk injuries were not significant, as were eye injuries with respectively 7.5% (n = 4) and 3.7% (n = 2) of cases. The injuries led to stump amputation in 73.58% (n = 39) of the victims.

### Support data

#### • Medical and surgical care

Victims were hospitalized in 92.5% (n = 49) of cases. The duration of hospitalization was mainly 3 to 4 months with 30.6% (n = 15).

**Table 5:** Distribution of Mine Victims According to Length of Hospitalization (n = 49).

Length of hospitalization	Workforce	Percentage
Less than 1 month	5	10,2 %
1-2 months	14	28,6 %
2-3 months	4	8,2%
3 to 4 months	15	30,6 %
More than 4 months	11	22,4 %

All victims received medical care, 88.7% (n = 47) surgery and 81.1% (n = 43) rehabilitation care.

Among victims who received surgical care, 89.4% (n = 42) had amputations.

**Table 6:** Distribution of Mine Victims According To Type of Surgery (n = 47).

Medical-surgical care	Workforce	Percentage
Amputation	42	89,4 %
Neurosurgery	2	4,2 %
Other surgeries	3	6,4 %
<b>Total</b>	<b>47</b>	<b>100 %</b>

#### • Psycho-social care

In our series, 94.3% (n = 50) of the victims stated that they had benefited from psychological support at the hospital. This support was provided by family members, health workers and friends with 85% (n = 45), 72% (n = 38) and 70% (n = 37) of cases respectively.

Thirty victims in our series or 56.6% declared having received long-term psychological support.

**Table 7:** Distribution of Mine Victims According to the Category of Mental Health Staff Providing Psychological Support After Hospitalization (n = 30).

Mental Health Professional	Workforce	Percentage
Psychiatrist	19	63,3 %
Initiated in psychological support	6	20 %
Psychologist	5	16,6 %
<b>Total</b>	<b>30</b>	<b>100 %</b>

Twenty-three victims or 76.6% had waited more than 12 months before starting the psychological care provided by a mental health professional, as shown in the table below.

**Table 8:** Distribution of Mine Victims According To the Waiting Time for Psychological Care (n = 30).

Waiting Time Before Starting Support	Workforce	Percentage
Less than 3 months	5	16,6 %
6 months	2	6,6 %
More than 12 months	23	76,6 %
<b>Total</b>	<b>30</b>	<b>100 %</b>

The average duration of support provided by a mental health professional was 27 months  $\pm$  34.7 with extremes of 1 month and 12 years. This psychological care was occasional in 63.3% of cases (n = 19).

**Table 9:** Distribution of Mine Victims According To the Frequency of Psychotherapy Sessions (n = 30).

Frequency of Psychotherapy Sessions	Workforce	Percentage
Occasional	19	63,3 %
Monthly	5	16,7 %
Quarterly	4	13,3 %
Weekly	1	3,3 %
Annual	1	3,3 %
<b>Total</b>	<b>30</b>	<b>100 %</b>

Nineteen victims out of thirty, or 62.1%, had benefited from individual psychotherapy. Regarding satisfaction, victims who received psychological support were very satisfied in 63.3% (n = 19) of cases, satisfied in 30% (n = 9) of cases and not at all satisfied in 6.7 % (n=2) of cases. Forty-eight victims out of the 53 in our series, i.e. 90.6%, had declared that psychological care was necessary. Forty-four victims or 83% of the series had expressed a need to continue psychological care.

Regarding social support, the victims who received support during the hospitalization period were 88.7% (n = 47). This support was mainly provided by family members in 59.6% (n = 28) of cases.

**Table 10:** Distribution of Mine Victims According to Hospitalized Benefactor (n = 47).

The Benefactor	Workforce	Percentage
Family member	28	59,6 %
State	23	48,9 %
person of good will	19	40,4 %
NGO	18	38,3 %

Victims who received support for social reintegration accounted for 77.4% of cases (n = 41). Financial aid accounted for 73% (n=30), in-kind assistance 44% (n=18) and professional retraining aid 34% (n=14) of the cases. Support for social reintegration was provided by NGOs for 80% (n = 33), followed by the state 22% (n = 9) and by a third person 9.7% (n = 4).

## Discussion

### Sociodemographic Aspects

The average age of the victims was 47.53 years  $\pm$  15.12 with extremes of 25 and 89 years. This more or less advanced age is due to the fact that the average age of the victims at the time of the accident was 27  $\pm$  15 years; however, the accident had occurred in 79% of the cases (n = 42), about 20 years ago on average (1995-2004). The victims were men with 66% (n = 35) against 34% women (n = 18) with a sex ratio of 1.94. Several studies carried out in Asia had shown a much higher male predominance, compared to our study.

Indeed, the study by Gunaratnama et al. [5], in a series of 67 landmine victims from April 1996 to March 1998 in the Valikamam region of Jaffna (Sri Lanka), found three times as many men as women. In addition, the study by Afshar et al. [6] focused on a series of 156 mine victims and that of Soroush et al. [7] on a series of 3,713 victims in Iran found 95% and 92% of the cases respectively.

This male predominance could be explained by the fact that the mines are predominantly scattered in rural areas where the land is used for agricultural activity or grazing. These activities considered as the main means of subsistence of these populations are ensured for the most part by men.

In our series, only 40% (n = 21) of the victims lived in rural areas at the time of the survey. Conflict-related insecurity and the high risk of mine accidents are causing increased rural exodus in the region. In 2006 alone, Casamance registered 61,000 displaced persons and refugees [8].

The victims in our series were married at 36% (n=19), followed by single and widowed with respectively 34% (n=18) and 26% (n=14) of the cases. These results are similar to those of Gunaratnama et al. [5] where the majority of victims (48%) were married and 42% were single. The responsibility incumbent can explain this high percentage on married couples to meet the needs of their families, even if they have to expose themselves to the risk of mine accidents.

Victims who had a primary level of education and those with no schooling were the most represented in our study with 39.6% (n = 21) and 28.3% (n = 15) of cases respectively. These results are similar to those of Soroush et al. [7], where the majority (48.2%) of victims had little or no education. The low level of education observed among the populations made mine risk education difficult and exposed this category of the population to mine accidents.

We obtained in our series 32% (n = 17) of victims without professional activity, 18.9% (n = 10) of farmers and 3.8% of unemployed among others. Whereas in the series by Gunaratnama et al. [5], 65% of the victims were workers and a third (1/3) of the victims were students. The percentage of unemployed in the series of Gunaratnama et al. [5] at the time of the accident is much higher (16%), compared to the results of our study.

After the accident, 29 victims (54.7%) became unemployed. The unemployment rate was multiplied by 14 after the accident, thus increasing from 3.8% (n = 2) to 54.7% (n = 29). These results are consistent with those found in Asia in Sri Lanka and in Europe in Bosnia and Herzegovina. Indeed, in the series of Gunaratnama et al. [5], half of the victims had lost their earning capacity after the injury. In the study by Rykena et al. [10] of a series of 42 landmine survivors in Bosnia and Herzegovina 20 years after the war, most survivors relied on others to take care of them: only 41.5% responded that they were able to take care of themselves. In addition, 63.4% of respondents said that their injury had limited their ability to take training, go to school and work. The increased unemployment rate among victims could be explained by the fact that the injury caused by a mine is often disabling. According to ICRC data, 28% of mine-injured patients undergo lower limb amputation [11]. While these victims often relied on their physical ability to support themselves.

The socio-economic level of the victims was low for 68% of the cases (n = 36). This result is similar to that of Gunaratnama et



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al. [5], where the majority belonged to the lower socio-economic classe. Rural populations generally have a low socio-economic level in our regions and they most often devote themselves to agricultural activities and pastures to meet their needs. This group is at greater risk of injury from landmines, as they are the ones who dig the ground, chop wood and collect firewood. On the other hand, after the accident, the majority of victims lose their earning capacity and become unemployed [5,10].

### Aspects Related to the Accident

The average age of the victims at the time of the accident was  $27 \pm 15$  years with extremes of 2 years and 65 years. This result is similar to those of Soroush et al. [7] and Bénov et al. [12] where the average age of the victims at the time of the accident was  $23 \pm 13$  and 23.6 years respectively. In the series by Afshâr and Mirzatoloei [6], 65.3% of the victims were aged 15 to 35, while the study by Gunaratnama et al. [5] had found 48% of victims aged 20 to 39 at the time of the accident. This suggests that all age groups are affected by mine-related accidents. However, young adults are more exposed to this type of accident because they represent the active population.

In our series, 56.6% (n = 30) of mine accidents occurred because of agricultural activities. This result is confirmed by the study by Andersson et al. [13] on the social cost of landmines in four countries: Afghanistan, Bosnia, Cambodia and Mozambique, which suggests that the activities most frequently associated with landmine incidents, were agricultural or pastoral. Elsewhere on a series of 3,713 victims carried out by Soroush et al. [7] in post-war Iran the most frequent activity at the time of the incident was cattle grazing (29.6%), followed by agriculture (8.1%), manipulation of a mine accidentally discovered out of curiosity (7.9%) and gambling (4.5%). This incidence is linked to the fact that mines are mainly concentrated in rural areas where the land is used for agriculture or grazing as the main means of subsistence [14].

However, the study by Andersson et al. [13] found that more than half of the activities associated with landmine incidents were the result of military activities, usually during patrols in Bosnia.

Our study reveals that the victims had injuries to the upper and lower limbs in 15.1% (n = 8) and 94.3% (n = 50) of the cases respectively. Trunk injuries were not significant as well as ocular lesions with respectively 7.5% (n = 4) and 3.7% (n = 2) of cases.

According to the survey conducted by Jahunlu et al. [15], in Eylam (Iran), in a subgroup of 138 survivors, 78.5% had injuries to the extremities, including 24.6% of the upper extremities and 54.4% of the lower extremities. Only 3.6% of the survivors were injured in the chest. This predominance of injuries to the extremities, especially to the lower limbs, is linked to the fact that the accident was caused in the majority of cases (79%) by an anti-personnel mine.

### Aspects Related to Care

Victims were hospitalized in 92.5% (n = 49) of cases and the duration of hospitalization was 3 to 4 months and 1 to 2 months

for respectively 29.4% (n = 15) and 27.4% (n = 14) of the cases. Furthermore, 21.6% (n = 11) of the victims were hospitalized for more than 4 months. This relatively long hospitalization is related to the severity and complexity of the injuries. According to war surgeons, mine wounds are among the worst they are called upon to treat. Surgical procedures require a long period of convalescence in the hospital as well as post-amputation physiotherapy care [16].

According to the results of our study, all the victims had received medical care, 88.7% (n = 47) surgical care, 73.58% (n = 39) stump amputation and 81.1% (n = 43) rehabilitation care. Studies in Europe and Asia have yielded similar results. Indeed, in Europe, in the series of Rykena et al. [10] of 42 landmine survivors in Bosnia and Herzegovina 20 years after the war, all had undergone at least one surgery related to their injury and in Asia, in the series by Afshar et al. [6] focused on 156 mine victims in Iran, 73.3% of the victims were amputated. The amputation rate is much higher in the series of Rykena et al. [10] who states that among civilians with upper or lower limb injuries, 83.3% had undergone an amputation. The high number of surgical operations, amputations and rehabilitation care among mine victims is explained by the seriousness and complexity of the injuries caused by these devices.

Fifty victims in our series, i.e. 94.3%, had benefited from psychological support at the hospital, support provided by family members, health workers and friends with respectively 85% (n = 45), 72% (n=38) and 70% (n=37). No victim had received psychological support from a mental health professional during hospitalization.

Emergency psychological aid has long been a concern of the health authorities in Europe with the creation of crisis cells which take charge of the immediate psychosocial needs of victims during disasters (example of the CUMPs (medical emergency cell) psychological in France).

In Senegal, after many difficulties encountered in the organization of care and psychosocial support for victims of previous disasters like *Sinking of "Joola" boat in 2002, the Collapse of a building in Dakar in 2009, the disappearance (crash) of a Senegal Air plane in 2015 and the COUS (Health Emergency Operations Center), set up in 2016 in a formal and structured way psychological care units called EMIS-psychosocial (Mobile Intervention and Psychosocial Support Team) [17]. The mine victims in our series only benefited from deferred and discontinuous psychological support from the nursing staff of the Ziguinchor psychiatric center [18].*

Only thirty victims (56.6%) in our series had declared having received psychological support from a mental health professional after hospitalization, of whom 76.6% (n = 23) had waited more than 12 months before starting psychological treatment. The average duration of this care was  $27 \pm 34.7$  months with extremes of 1 and 120 months. This psychological care was occasional in 63.3% of cases (n = 19), in the form of individual therapy in 62.1% (n = 18) of cases. Victims who received psychological support were very satisfied in 63.3% of cases (n = 19). Furthermore, the victims

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had declared that psychological care was necessary in 90.6% (n = 48) of the cases. However, no victim had received psychological support at the time of the investigation. Forty-four victims, or 83%, had expressed the need to continue psychological care.

The relatively long duration of treatment is also found in studies conducted in Europe. Indeed, the studies of Munker-Kramer on the floods in Austria, of Serniclaes on the accident of a train in the center of Belgium and of Korsgaard on the tsunami of Southeast Asia in Denmark had shown that certain victims continued to benefit from psychological care a year after the disaster [19].

On the other side, in France, according to the study of Szepiela on the accident of Toulouse, the official emergency teams (CUMP) had remained only one week and in Italy, according to the study of Fernandez, on the earthquake October 2002, all the emergency response personnel of the security as well as the psychologists, had left the site two or three weeks after the disaster [19].

It should also be noted that long-term psychological care depends on the patient's state of health, whether or not he wishes to continue this care, the availability of mental health personnel, logistical and financial resources, etc.

The lack of support and the excessive delay before the start of psychological support from a mental health professional in our study are alarming. This situation could be explained by a lack of mental health professionals in the region. In 2009, insecurity and limited population mobility continued to make access to services difficult and this was only partially resolved by a slight increase in mobile outreach services [18]. It could also be explained by the lack of patient referrals to specialized mental health structures from other health professionals.

With regard to social support, 88.7% (n = 47) of the victims had declared having received it during the period of hospitalization, of which 59.6% (n = 28) of the cases, this support was provided by the family. Senegal, through many actions, has contributed to the improvement of living conditions and the social reintegration of victims: the ratification of the international convention on the rights of persons with disabilities by law n° 2009-30 of December 2, 2009, the vote of the law on the promotion and protection of the rights of people with disabilities (Social Orientation Law) on May 26, 2010 and victim assistance by the CNAMS. [18,20] following the example of Senegal, the victims of mines had been supported in order to ensure a good rehabilitation (reintegration), in several African countries heavily affected by landmines according to the Report of the Meeting of February 10, 2004 of the Permanent Committee on the assistance to victims and their socio-economic reintegration [21]. Moreover, in Europe as in Asia, mine victims had also benefited from assistance for their reintegration. For example, in Bosnia and Herzegovina (Europe), since 1997, various victim assistance programs and projects had been implemented in Asia in the Middle East. Yemen had set up an Executive Mine Action Center, which helped survivors reintegrate into the productive sector and in Sri Lanka in Jaffna, local organizations

had focused on re-employment opportunities and helped victims to have an income-generating activity. [5,21]

These studies show that social support is a determining factor in the rehabilitation of mine victims. Indeed, a study of 68 amputees following landmine injury in six landmine-affected countries, allowed identifying social support, medical care and economic self-sufficiency as key factors in acceptance of the loss of a limb and the psychological recovery. A study carried out by Nicolas and Wendy [14] on the rehabilitation of landmine victims had shown that the success of individual rehabilitation strongly depended on the way in which the person reintegrated into society.

## Conclusion

The results of our study show that there are many more victims among populations living in rural areas, with little or no education and with a low standard of living. The medico-psychosocial care of mine victims is a real problem in our regions; it is far from meeting the satisfaction of the victims. To provide answers to this problem, education on the risks of mine accidents and holistic and coordinated care for victims are necessary.

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