

A Study on Assessment of Knowledge and Practice Regarding First Aid Measures Among Mine Workers in Kassala State

Mysara Osman Alfakey*

Community Health Nursing Department, Faculty of Nursing, the National Ribat University, Khartoum, Sudan

Abstract

Introduction: A landmine is an actual public health problem which affects mainly the developing countries like Sudan. Sudan has suffered a number of long-lasting conflicts that have contaminated the country with anti-personnel and anti-tank mines as well as other Explosive Remnants of War (ERW). *Method:* This is a Quasi-experimental design based study. Aimed to assess mine workers knowledge and practice regarding first aid measures in Kassala mine field– Sudan. The study population included all adult deminers between 2nd April 2012 and 20th September 2013. The sample size consist of 90 workers from the National Mine Action Center Kassala sub-office were selected as total converge, the data was collected by used modified tools from literature review and from the National Mine Action Center Kassala sub office it contains main three tools Structured questionnaire sheet, Observational checklist to assess mines worker's performance regarding first aids measures in the field of demining and Reporting Sheet for injury this tool was developed by the researcher to record the incidence of any accident or injury occurs during the period of the study. Descriptive statistics was used to present the data. Quantitative data was analyzed by using descriptive and inferential statistics, P value for F test, (ANOVA) for comparing between the different studied groups. For all tests, the significance level was set at $p < 0.05$. *Result:* The study findings revealed that majority of the samples (43.3%) were in the age group of 20-29 years, (100%) were male, (34%) of them have secondary school level and (67.8%) occupied as deminer and about (50%) have 2-6 years of experience. The results showed that majority of the samples (70%) had good knowledge and (27%) had average knowledge only (3%) had excellent knowledge about the first aid practice. Among eight areas of the knowledge and practice assessment on first aid measures the main percentage score of the samples were highest (73%) in the area of bleeding and lowest score (28.6%) in the area of inhaled poison. There was no significant association between knowledge and years of experience, on other hand there is significant association between knowledge and workers age. *Conclusion:* this study suggests that mine workers need proper and regular educational program toward first aid and practice.

Keywords

Knowledge Practice, Mine Workers, First Aid

Received: October 3, 2016 / Accepted: October 13, 2016 / Published online: November 2, 2016

© 2016 The Authors. Published by American Institute of Science. This Open Access article is under the CC BY license.

<http://creativecommons.org/licenses/by/4.0/>

1. Introduction

A landmine is an actual public health problem which affects mainly the developing countries like Sudan. Since its independence in 1956, Sudan has suffered a number of long-lasting conflicts that have contaminated the country with anti-

personnel and anti-tank mines as well as other Explosive Remnants of War (ERW). Landmines and unexploded ordnance (UXO) – the bombs, rockets, missiles, mortars and grenades that did not explode when they were used and still

* Corresponding author

E-mail address: mysara31@hotmail.com

pose a risk of detonation – kill and injure thousands of men, women and children every year [1] People injured by mines (most of injuries result from the use of small anti personal mines) irregular or poorly disciplined armies in the developing world often require immediate and extensive medical care which includes evacuation, first aid, transport, surgical treatment and rehabilitation [2] [3]. Mines and unexploded ordnance (UXO) are indiscriminate killers. They don't obey peace accords or ceasefire agreements. They can lie in the ground for decades after a conflict is over, killing or maiming those trying to re-establish their lives and livelihoods. [4]

First aid is the immediate treatment or care given to a person suffering from an injury or illness until more advanced care is provided or the person recovers [5]. Aim of all medical care including first aid is to save lives, Prevent further harm and prevent the condition from worsening or danger of further injury [6]. The training of first aid personnel is the single most important factor determining the effectiveness of organized. First aid training program will depend on the circumstances within the enterprise, especially the type of work and the risks involved [7]. First aid covers both external factors, such as moving a patient away from any cause of harm and applying first aid techniques to prevent worsening of the condition, such as applying pressure to stop a bleed becoming dangerous [8]. Condition that often require first aid altitude sickness, which can begin in susceptible at altitudes as low as 5000 feet, can cause potentially fatal swelling of the brain or lung [9]. this condition also include Anaphylaxis, Bone fracture, Cardiac Arrest, Choking, Cramps Heart attack, Heat syncope, Hyperglycemia, Hypothermia, Poisoning, Seizures, Muscle strains and Sprains, and Stroke [10] [11] [12] [13]. The studies related to the first aid showed that consciously and timely first aid applications lowered mortality rates significantly. Fifteen to eighteen percent of deaths as a result of injures can be prevented by consciously applied first aid practices. For instance it was reported that giving the patient right position could lower mortality rate as much as 10%. In addition to life saving results of first aid, effective and timely first aid practices also prevent the disabilities. For this reasons whole community should be trained in a way that everybody can practice first aid [14].

2. Methods

This is a Quasi-experimental design based study. Aimed to assess mine workers knowledge and practice regarding first aid measures in Kassala mine field– Sudan. The study population included all adult deminers between 2nd April 2012 and 20th September 2013. The sample size consist of 90 workers from the national mine action Kassala sub-office were selected as total converge, the data was collected by used modified tools from literature review and from the National Mine Action

Center Kassala sub office it contains main four tools as follows: Tool I: Structured questionnaire sheet, It includes two main parts, Demographic characteristics of the study subjects and 57 Questions related to mine worker's knowledge towards application of first aids measures in the field of demining in Kassala State. Tool II Observational checklist to assess mines worker's performance regarding first aids measures in the field of demining and It was developed based on National Technical Standers Guidelines (NTSG) and quality assurance check list of National Mine Action Centre (NMAC) it was included 7 forms of first aids for (Burn, Bleeding, Wound, Bites, CPR, Poisoning and Bone Fractures). Tool III Reporting Sheet for injury this tool was developed by the researcher to record the incidence of any accident or injury occurs during the period of the study. Workers who met the selection criteria were asked to participate in the study. Each worker was informed about the purpose of the study. An official letters from the faculty of high science and Scientific research, National Al-Ribat University to the directors of national mine action center, Kassala sub office after explained The aim of the present study to the director of the study setting to taken his permission to carry out the study. Tool was developed and was tested for content validity by experts in the field and reliability was done. An agreement to participate was taken from mine action operation involved in the study, after explanation of the purpose of the study, after obtaining his consent for participation in the study and informed that all the collected information was confidential and was used only for the purpose of the study. Each operational deminer was individually interviewed to assess his knowledge about and first aids measures. Each operational deminer was observed for his practice towards first aids measures. Collected data was coded, organized, tabulated and analyzed. Descriptive statistics was used to present the data. Quantitative data was analyzed by using descriptive and inferential statistics, P value for F test (ANOVA) for comparing between the different studied groups. For all tests, the significance level was set at $p < 0.05$.

3. Result

This study was conducted in Kassala mine filed which having the highest concentration of landmines and ERW in coordination with National mine action office Kassala sub office and main findings are discussed under the following.

All of the samples in this study were male, and the majority of them were in the age group of 20-29 years old most of them were occupied as deminer (miners) and have secondary school level and about (50%) have 2-6 years of experience. These 90 workers were divided into four mining teams each tem consist of 20 miners, one team leader, one medic, three driver and one Mine Risk Education (MRE) personnel (table 1).

Table 1. Description of sample according to demographic characteristics (N=90).

SL. NO	Sample characteristics	No
1.	Age (years)	
	1 20-29	39
	2 30-39	37
2.	Gender	
	1 Male	00
3.	Educational status	
	1 illiterate	10
	2 primary	23
	3 prep	9
	4 secondary	31
	5 university	15
4.	6 postgraduate	2
	Marital status	
	1 Single	45
	2 Widowed	1
5.	3 Divorced	4
	4 Married	40
	Occupation	
	1 team leader	14
	2 Deminer	61
6.	3 Medic	3
	4 Driver	9
	5 Mine Risk Education personnel	3
	Experience (years)	
7.	1 <2	21
	2 2-6	44
	3 7-10	16
	4 >10	9
	Workshops (years)	

SL. NO	Sample characteristics	No
1	<2	24
2	2-4	38
3	5-10	13
4	>10	15

Compared to the workers knowledge score majority of the samples had a good knowledge and quarter of them had average knowledge and only (3%) had excellent knowledge regarding first aid measures (table 2).

Table 2. Assessment of knowledge of mine workers regarding First Aid Practice (N=90).

Knowledge score	No	%
Poor	0	0
Average	24	27
Good	63	70
Excellent	3	3

Illustrate that among the eight areas of the knowledge assessment on first aid measures the mean percentage score of the samples were highest in the area of bleeding and burns, and average mean percentage score in the area of Knowledge and right action, Bone fracture and Insect & animal bite & sting, in the other hand the mean percentage lowest score in the area of wound, Heat stroke and inhaled poison (table 3).

Table 3. Assessment of mean percentage knowledge of mine workers regarding First aid practice (Area wise) (N=90).

Area	Max. possible score	mean	S.D	Percentage mean
Knowledge and right action	6	4.52	3.02	64.2
bleeding	7	5.09	1.92	73
wound	3	2.69	1.27	39.5
Heat stroke	5	2.24	0.99	38.7
Bone fracture	4	3.60	1.51	49.2
burns	6	4.16	1.38	71.4
Insect & animal bite & sting	4	3.43	1.04	59.65
Inhaled poison	5	2.38	0.89	28.6
Overall knowledge	49	33.24	14.16	56.1

Positioning, opening the victim air ways and removing foreign bodies were applied correctly by mine workers, while mine workers were not applied Beating on the back, Checked for response, Getting an verbal response, Open air way (head tilt chin left), Checked breathing (look-listen-feel), Took deep breath closed victim nose, Repeat procedure, they weren't

checked if there was no breathing started CPR by giving tow effective breath and started chest compression according to international standers (table 4).

The Cardiopulmonary resuscitation (CPR) scores Mean \pm SD 5.13 \pm 2.14 Min. – Max. 1.0 – 9.0 (table 4).

Table 4. Assessment of mine workers regarding cardio pulmonary resuscitation first aid Practice. (N=90).

Cardiopulmonary resuscitation	Not done		done	
	No	%	No	%
Lying victim on his back	4	4.4	86	95.6
Air way open	3	3.3	87	96.7
Removed foreign body	18	20.0	72	80.0
Beating on the back	71	78.9	19	21.1
Checked response	66	73.3	24	26.7
Getting an verbal response	67	74.4	23	25.6

Cardiopulmonary resuscitation	Not done		done	
	No	%	No	%
Open air way (head tilt chin left)	72	80.0	18	20.0
Checked breathing (look-listen-feel)	72	80.0	18	20.0
Took deep breath closed victim nose	54	60.0	36	40.0
Repeat procedure	53	58.9	37	41.1
No breathing started CPR	81	90.0	9	10.0
Started chest compression	57	63.3	33	36.7
Cardiopulmonary resuscitation score				
Min. – Max.	1.0 – 9.0			
Mean ± SD	5.13 ± 2.14			

There was no statistically significant associations could be revealed between changes mine demining staff knowledge, knowledge right action and practice scores and their years of experience, ($p > 0.05$ for all Freidman ANOVAs). Meanwhile, the most, prominent, improvements were mostly in the scores

of deminers having experience 2 to less than 10 years of experience (table 5).

However practice score was more than knowledge and Knowledge right action score in all deference kinds of experience (years) and Knowledge right action score was less score (table 2).

Table 5. Percent change in the scores of mine workers regarding knowledge, knowledge and right action and practice of First Aid according to their experience. (N=90).

Characteristics	Experience (years)				P
	<2	2 – 6	7 – 10	>10	
Knowledge score					
Min. – Max.	1.0 – 15.0	9.0 – 17.0	10.0 – 15.0	9.0 – 15.0	0.375
Mean ± SD	12.57 ± 1.75	12.66 ± 1.84	12.81 ± 1.76	11.56 ± 2.07	
Knowledge right action score					
Min. – Max.	2.0 – 5.0	1.0 – 5.0	1.0 – 4.0	2.0 – 4.0	0.622
Mean ± SD	3.0 ± 0.84	0.84 ± 0.13	3.0 ± 1.03	3.22 ± 0.67	
Practice score					
Min. – Max.	39.0 – 64.0	31.0 – 73.0	21.0 – 64.0	31.0 – 64.0	0.687
Mean ± SD	53.24 ± 5.22	51.70 ± 6.36	50.31 ± 10.66	51.67 ± 8.77	

P value for F test (ANOVA) for comparing between the different studied groups

There was statistically significant associations could be revealed between changes in mine demining staff knowledge, knowledge right action and their age (years), ($p > 0.05$ for all Freidman ANOVAs) (Table 6).

score and Practice score with mine demining staff age Practice score was more than Knowledge and Knowledge right action score however improvements were mostly in the scores of deminers having 30 -39 and 50+ years old (table 6).

Compared to the Knowledge score, Knowledge right action

Table 6. Percent change in the scores of mine workers regarding knowledge, knowledge and right action, attitude and practice of First Aid according to their age. (N=90).

Characteristics	Age			P
	20 – 29	30 – 39	50+	
Knowledge score				
Min. – Max.	10.0 – 16.0	9.0 – 15.0	9.0 – 17.0	0.873
Mean ± SD	12.54 ± 1.67	12.49 ± 1.76	12.79 ± 2.49	
Knowledge right action score				
Min. – Max.	1.0 – 4.0	2.0 – 5.0	2.0 – 4.0	0.021*
Mean ± SD	2.90 ± 0.91	3.43 ± 0.77	3.07 ± 0.73	
Practice score				
Min. – Max.	21.0 – 64.0	31.0 – 73.0	50.0 – 64.0	0.316
Mean ± SD	51.0 ± 8.12	51.68 ± 7.19	54.43 ± 3.86	

P value for F test (ANOVA) for comparing between the different studied groups

Reporting sheet for injuries (Victim Data) for years 2011 and 2012, this data includes only injuries that occurred during study period. A total of sixteen victims was injured five of them was killed and eleven was survived, Age Frequency Distribution

showed that people with ages 20 years are the most vulnerable to injury by mines with, On the other hand males were more prone to mines injuries than females (table 7).

Victims were injured by unknown device Type more than

Anti-tank mine (AT) and Explosive Remnants of War (ERW). Hospital was the most first Medical Facility Reached to treat the injured victims, and most of Injuries were affecting upper and lower part of the victim body together (Table 7).

The activity of Travelling and collecting wood at time of Incident were more than Farming, Collecting Food Water and Tending Animals (table 7).

Table 7. Reporting sheet for injuries (Victim Data) data includes only injuries that occurred during study period for years 2012 and 2013.

Accident and Casualties			
Year	Accident	Injured	Killed
2012	2	4	4
2013	3	7	1

Table 7. Continued.

Age Frequency Distribution		
Age	NO	%
0	5	13.25
13	2	12.5
20	3	18.75
23	1	6.25
27	2	12.5
30	1	6.25
35	1	6.25
50	1	6.25
Total	16	100
Gender Frequency Distribution		
Female	1	6.25
Male	15	93.75
Total	16	100
First Medical Facility Reached Frequency Distribution		
First Medical Facility Reached	1	6.25
Hospital	15	93.75
Total	16	100
Device Type Frequency Distribution		
AT	5	31.25
Other UXO	5	31.25
Unknown	6	37.5
Total	16	100
Injury by Part of Body Frequency Distribution		
U/L	5	45.4
U	2	18.2
L	3	27.3
Not Specified	1	9.1
Total	11	100
Type of Disability Frequency Distribution		
D/A (Feet or Hand)	1	10
S/A (Feet or Hand)	0	0
D/A (Arm or Leg)	1	10
S/A (Arm or Leg)	0	0
L of Sight/Hearing	0	0
Other Injuries	10	100
Total	10	100
Activity At Time of Incident Frequency Distribution		
Collecting Food Water	1	6.25
Collecting Wood	5	31.25
Farming	3	18.75
Tending Animals	2	12.5
Traveling	5	31.25
Total	16	100

Criteria: State: Eastern, Province: Kassala, Incident Date From: 1/6/2011 to: 1/6/2013, Owned By: UNMAS SUDAN

4. Discussion

The findings from this study suggest that mine workers were able to Positioning, opening the victim air ways and removing foreign bodies, and this is could lower the mortality rates studies related to the first aid showed giving the patient right position could lower mortality rate as much as 10%. In addition to life saving results of first aid, effective and timely first aid practices also prevent the disabilities. For this reasons whole community should be trained in a way that everybody can practice first aid [15].

There was no statistically significant associations could be revealed between changes mine demining staff knowledge, knowledge right action and practice scores and their years of experience, ($p>0.05$ for all Freidman ANOVAs). Meanwhile, the most, prominent, improvements were mostly in the scores of deminers having experience 2 to less than 10 years of experience but There was statistically significant associations could be revealed between changes in mine demining staff knowledge, knowledge right action and their age (years), ($p>0.05$ for all Freidman ANOVAs)

The current study appear that A total of sixteen victims was injured five of them was killed and eleven was survived, Age Frequency Distribution showed that people with ages 20 years are the most vulnerable to injury by mines. Since 2002, more than 2,019 mine/ERW victims have been registered in the Information Management System for Mine Action (IMSMA). Over the last three years, the number of mine/ERW victims has been considerably rising. Compared to 2013, the number of victims has increased by 20 per cent in 2014 with 36 casualties reported and by 77 per cent in 2015 with 53 casualties being reported. More than 23 per cent of the mine/ERW victims are children. Recently, on 17 April 2016, a UXO caused injuries to two children in Dindiro water collection point in Kurmuk Locality at Blue Nile state while they are looking after their cattle [1].

The present study revealed that 81 mine workers they heard about the term First Aid, A study done on rapid assessment of first aid knowledge in 156 people of rural field practice area in Department of Community Medicine, HIHT University, Dehradun showed that only 25.6% persons were familiar with the term first aid and people also lacked knowledge and awareness about first aid skills [16]. conducted a study in a total of 134 university students to find out their knowledge about first aid which determined that 65.7% students didn't get first aid knowledge before and most (98.5%) of the students feel it is necessary to have first aid [17]. In a study of 573 school nurses, Olympia et al reported that 68% had managed life threatening incidence requiring emergency medical attention during the previous school years [18]. A study on 125 trained and 125 untrained medical students, it

was found that the knowledge of trained students was found to be better than those of untrained yet the mean of trained students was less than 50% which is not satisfactory [19]. A study conducted in UAE on the efficacy of first aid training programme for the first year medical students showed that the programme provides students with sound first aid knowledge and practical basic life saving skills [20].

Since its independence in 1956, Sudan has suffered a number of long-lasting conflicts that have contaminated the country with anti-personnel and anti-tank mines as well as other Explosive Remnants of War (ERW). Mines and ERW were used by all parties during the conflicts, contaminating tens of millions of square metres of land and causing hundreds of civilian casualties. Today, 9 of 18 states of Sudan are reported to be affected by landmines and ERW, with South Kordofan, Kassala and Blue Nile States having the highest concentration of landmines and ERW. On 3 May 2016, Gadaref state was announced free of known land mines and ERWs [4].

The above study result (70%) of the samples had good knowledge, and (27%) average knowledge and only (3%) had excellent knowledge about the first aid and practice, were supported by a study conducted by [14] among the self help groups which study result had revealed that majority of the sample (62%) had good knowledge and (38%) average knowledge about the first aid practice.

As of June 2010, of the total 1,559 recorded dangerous areas identified in Sudan's nine affected northern states, 1,164 were cleared or verified while 395 dangerous areas remain to be addressed. During clearance/verification operations, a total of 2,625 anti-personnel mines, 686 anti-tank mines, 347,472 small-arms ammunition and 35,736 items of unexploded ordnance were identified and destroyed [1] Considering the percentages obtained for knowledge part, it can be stated that the knowledge of first aid was not wide spread among mine workers. Similar outcome was found in a Turkish study which highlighted that first aid knowledge among university students were insufficient as they were only exposed to theoretical first aid training. [24] Knowledge and attitudes found to be moderate in a study carried out among relief workers about first aid procedure but they have poor knowledge on CPR [21]

Somewhat surprisingly Overall knowledge score of mine workers was (56.1%) According to national technical standers guidelines Sudan all operational personnel shall complete a BLS course and a minimum undergo refresher training biannually (every 6 month) some of the practice drill should be conducted after the theoretical lecture that applies to the drill it should be noted that the focus of medical training be practical scenario based training where the deminer is called on to treat a casualty in systemic approach. [22]

Current study appeared slightly less workers knowledge in which only (3%) had excellent knowledge score and majority of the samples had a good knowledge and quarter of them had average knowledge score regarding first aid measures, There is a shortage of trained occupational health professionals in much of the mining industry, particularly in developing and transition countries. Even those that are available sometimes have problems in applying their knowledge. Getting access to current occupational health information is still a problem in many areas, but there is growing international cooperation. One example is the ILO/WHO International Programme on the Global Elimination of Silicosis [23]. Further research is needed to improve knowledge and practice of mine workers regarding first aid measures.

5. Conclusion

Overall, this study suggests that mine workers need proper and regular educational program toward first aid and practice. This study was only conducted on a small group of mine workers over a short period of time. Further research is hence needed to determine the long term affects education and practice training on a large number of great groups of workers before generalized conclusions can be drawn.

References

- [1] United Nation Mine Action Standards (UNIMAS), (2016) <http://www.mineaction.org/programmes/sudan>
- [2] Mei, X. D. (2011): Study on Causation Model and Prevention Countermeasure of Mine Water Inrush Accident, published master thesis, Wuhan University of Science and Technology.
- [3] Ashtakala, T. (2004). Landmine Monitor Report. International Campaign to Ban Landmines.
- [4] Mine Advisory Group (MAG), (2016) Landmine and unexploded ordnance. <http://www.maginternational.org/the-problems/the-issues/>
- [5] Safe work Australia SWA, (2012). First aid in the work place. Code of practice. ISBN 978-0-642-33347-6.
- [6] "Accidents and first aid." NHS Direct. Archived from the original on 2008-05-03. Retrieved 2008-10-04.
- [7] Baby Elizabeth (2002). Effectiveness of planned teaching programme on First Aid for students in a selected high school in Mangalore. Published Dissertation.
- [8] Nebraska health and human services, (2004). Provision of nursing care chapter 99. P. 3, 4. Nebraska University.
- [9] Cymerman, A; Rock, PB. *Medical Problems in High Mountain Environments. A Handbook for Medical Officers.* USARIEM-TN94-2. US Army Research Inst. of Environmental Medicine Thermal and Mountain Medicine Division Technical Report. Retrieved 2009-03-05.

- [10] *British Red Cross (2010) Everyday First Aid - Hypothermia."*
- [11] *Sterba, JA (1990). Field Management of Accidental Hypothermia during Diving." US Naval Experimental Diving Unit Technical Report. NEDU-1-90. Retrieved 2013-03-15.*
- [12] Audrey Sisman. (2011). MBCHB. ABC first aid guide. ABC publications.
- [13] Longphre, et al (2011). Stander operational procedure. MAG, Mine Advisory Group.
- [14] Deepak M& Sabitha Nayak (2012). Assessment of knowledge on practice regarding first aid measures among the self help group, NUJHS V2 No 3 September 2012 ISSN2249-7110.
- [15] KGG Pryangika (2015). Knowledge, attitudes and practice on first aid measures among senior school perfects in Galle Education Division, Sri Lanka.
- [16] Semwal, J, Juyal, R., Singh, M. and Candpal, S. D. (2013). Rapid assessment of first aid awareness amongst the rural community of Doiwala block, Dehradun. *Indian Journal of Community Health*, 25 (3): 262-264.
- [17] Metin, C. and Mutlu (2010). Level of knowledge about first aid of the University students. *Trakia Journal of Sciences*, 8 (2): 262-265.
- [18] Olympia, R. P., Wan, E. and Avner, J. R. (2005). The preparedness of schools to respond to emergencies in children: National Survey of School Nurses. *Pediatrics*, 116: 738-745.
- [19] Abbas, A., Bukhari, S. I. and Ahmad, F (2011). Knowledge of first aid and basic life support amongst medical students: comparison between trained and untrained students. *J. Pak. Med Assos.*, 61 (6): 613-616.
- [20] Das, M. and Elzubeir, M (2001). First aid and basic life support skills training early in the medical curriculum: curriculum issues, outcomes, and confidence of students. *Teach Learn Med.*, 13: 240-246.
- [21] Delavar, M. A, (2012). Knowledge attitudes and practices of relief workers about first aid measures, *journal of Pakistan Medical Association*, 62, pp. 218.
- [22] National technical standers and guidelines sudan (NTSG), (2008) demining edition 9 version 1.
- [23] Norman S. Jennings (2001), *Improving Safety and Health in mines: A Long and Winding Road?* No 54 pp 4-5.
- [24] Ozelikay, G, et al, (1996) A study on the level knowledge about first aid of the university students. *JFac farm Ankara*. 25, pp. 43-48.