

Knowledge, Attitudes and Practices of Army Soldiers on Prehospital Trauma Care in Matara District, Sri Lanka

H.L.S.Chathurika*, S.D.S.Weliange**, C.M.Abeyssekara***, I.S.Yaddehige****, H.L.Priyanka*****

* University of Colombo, Post Graduate Institute of Medicine

** University of Colombo, Faculty of Medicine, Department of Community Medicine

*** University of Colombo, Post Graduate Institute of Medicine

**** University of Colombo, Post Graduate Institute of Medicine

***** General Sir John Kotelawala Defence University, Faculty of Medicine

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Abstract- Injury is one of the leading causes of hospitalization in Sri Lanka. The prehospital trauma care is critical in reducing the morbidity and mortality following injury. Army soldiers are one of the first responder categories after a major disaster causing injury. This study was carried out with the objective of describing the knowledge, attitudes and practices on prehospital trauma care among army soldiers in Matara District. A descriptive cross sectional study was carried using a self-administered questionnaire among all army soldiers attached to the Matara army camp. Knowledge and practices were categorized as “Poor” and “Good” taking 50% as the cut off. Total of 266 participants was studied and the response rate was 97.79%. The overall level of knowledge on prehospital trauma care was poor (78.6%). The knowledge on golden hour of trauma, triage system and cardio pulmonary resuscitation was markedly poor. More than 80% of them had positive attitudes on most aspects of prehospital trauma care. Majority (62.8%) had a poor level of practice. They lack practice on first-aid, cardiopulmonary resuscitation and safe transportation of the patients. A significant association was observed between good knowledge and good practice on prehospital trauma care. A high proportion had poor knowledge and poor practice on prehospital trauma care while majority had positive attitudes. It is recommended to include training on prehospital trauma care in the basic military curriculum which will enhance the ability to act as first responders effectively.

Index Terms- Disasters, Prehospital Trauma Care, First Responders, Army Soldiers

I. INTRODUCTION

Disaster is “a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources” (UNISDR 2009). Both the natural and human induced disasters have become more common due to rapid developmental activities and climate change. Therefore, disaster risk management has become a more important topic globally. Disaster risk management is “the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of the disaster” (UNISDR 2009).

While addressing this issue, emergency services “the set of specialized agencies that have specific responsibilities and objectives in serving and protecting people and property in emergency situations” (UNISDR 2009) has become more important. It is well known that in a disaster situation the tri forces and emergency medical services provide prehospital trauma care (PHTC), as they play a major role in disaster risk management.

Injuries or the trauma has become one of the main causes which accounts for morbidity and mortality all over the world. It places much burden on countries where resources are limited and yet to be developed (WHO Geneva 2005). The best way to reduce the burden of injuries is by the primary prevention proactively. However once an injury happens the consequences can be minimized by delivering effective prehospital and hospital based trauma care to the patient.

Evidence based studies have shown that PHTC given by the trained lay first responders is life saving and can reduce the trauma mortality where it takes a long time to reach the definitive health care institutions (Murad et al. 2012). Therefore, if the PHTC is delivered appropriately the outcome of the hospital based trauma care will be better.

Although developed countries have well established PHTC systems, Sri Lanka doesn't have such a system. The Ministry of Healthcare and Nutrition has identified the need and formulated the National Policy on Injury Prevention and Management in 2009. Under the vision of “Injury free Sri Lanka” the ministry has introduced eight strategic objectives. The sixth strategic objective is to strengthen the organization capacity to improve prehospital and institutional care for emergency care and rehabilitation. One of the key results expected is to make available the appropriate prehospital care (Ministry of Health 2010).

In most instances the PHTC providers are the laypeople known as “first responders”. This group includes taxi drivers or truck drivers, soldiers, students or workers, etc. (WHO Geneva 2005). The quality of the PHTC system will be determined by the knowledge, attitudes and practices of these people.

All over the world there is a lack of evidence based studies which make it difficult to determine the importance of these people in PHTC setup.

In Sri Lanka military play a main role being the first responders in disaster events. They have involved in emergency response activities during the Elam war which ended in 2009; post tsunami era in 2004 December; major flood occurred in January and February in 2011 (Disaster Management Centre 2011); Badulla, Koslanda landslide in 2014 and etc. Sri Lankan army has agreed to give military assistance during disasters for evacuation and search rescue on request made by Disaster Management Centre (DMC) (Disaster Management Centre 2011).

During the Nepal earthquake in 2015 May, most of the military subunits were mobilized and deployed among the affected districts to support the on-going relief missions (OCHA 2015).

These facts point out the necessity of a research to study the existing knowledge, attitudes and practices of army soldiers, being the first responders in disasters. Based on the research findings we can identify the lapses and suggest enhancements to the current management programmes and thus improve them to face the future disasters, effectively.

1.2 Justification

Injury has become a much popular public health issue globally. As the traumatic injuries have become the most commonest cause of hospitalization in Sri Lanka, it has become an economic burden to the government, which usually spends more for the development of health sector in comparison to the other South Asian countries (Ministry of Healthcare and Nutrition 2008).

The Department of Injuries and Violence Prevention at the World Health Organization (WHO) has stated that implementation system would mitigate of PHTC would mitigate the consequences caused by trauma (WHO Geneva 2005). WHO has identified PHTC as a priority and has issued guidelines on it.

In Sri Lanka, PHTC system started to develop after the tsunami in 2004. The Ministry of Healthcare and Nutrition of Sri Lanka established the trauma secretariat for the development of trauma response system. They were able to develop eight prehospital care systems in Sri Lanka. Those are established in Anuradhapura, Badulla, Colombo, Galle, Jaffna, Kandy, Mannar and Kurunegala. They had also carried out a review project to audit the PHTC systems in Sri Lanka from 2005 – 2011 (Ekanayaka 2011).

Matara district in Sri Lanka has experienced major disasters such as severe floods in December 2009, January and May 2010 (Disaster Management Centre 2009), tsunami in December 2004 and etc. The total population of Matara district is eight hundred and nine thousand three hundred according to the census carried out in 2012 (District Secretariat 2012), and it is situated in the southern coastal belt. Matara city has become a popular commercial centre with the rapid development. The Nilwala river flows through the city and is responsible for the floods which occur more often (Asian Disaster Preparedness Centre 2010). However, still there is no well-established PHTC system to be identified in the city.

The main army camp of Matara District is situated in close proximity to the city and is readily accessible in a disaster situation. Therefore they are usually the first responders in a disaster situation.

To implement a good PHTC system it is important to evaluate the existing knowledge, attitudes and practices of its providers. However, in the absence of previous studies this research intends to identify the existing knowledge, attitudes and practices on PHTC among army soldiers in Matara District. The outcome can be used as a source to identify the gaps and establish a PHTC system which suits the area. This will help to reduce the burden on the family, community and achieve the development goals of the country.

II. LITERATURE REVIEW

Prehospital care can be simply explained as any initial medical care / first-aid given to a patient by a paramedic or other person until the patient reaches a definitive health care institution.

Different countries have established different prehospital care systems. Some of the common models are given below.

- National systems - This is developed and controlled by the central government of the country.
- Local or regional systems – Local or regional governments with the help of other agencies will administer this system.
- Private systems – Private emergency medical service companies will operate this.
- Hospital-based systems – This is the simplest system to establish and maintain. Consist of the resources and the infrastructure of the central or referral hospital.
- Volunteer systems – Depend on the prehospital care providers in the community.
- Hybrid systems – Combination of many systems.

Prehospital trauma care systems cannot function alone and they should be incorporated in to the health care system which exists within the country. Volunteer systems are usually seen in rural and remote areas where as it depends on the prehospital care providers known as “first responders” (WHO Geneva 2005).

There are two concepts which influenced the development of PHTC. The first concept is “Golden hour” of trauma. Following a disaster or a trauma most of the time the first hour is spent at the scene or on the way to the hospital. This is the most valuable time where urgent medical / surgical interventions should be done. Basic first-aid given during this time may save a life.

The second concept is the “Trimodal distribution of trauma deaths” developed in 1983 by Trunkey (Lockey 2001). He states that death following an injury can occur in one of the three phases and is shown in figure 1.

1. 50% of deaths can occur in the immediate phase. (Due to overwhelming injury)
2. 30% of deaths may occur within the first four hours of injury - Intermediate or subacute phase.
3. 20% of deaths may occur after four hours of injury – Delayed phase.(WHO Geneva 2005)

The PHTC mainly benefits the second phase. Most of the deaths in this phase occur due to compromised airway, respiratory failure or uncontrolled haemorrhage. Those can be readily corrected by the first responders with the use of basic first-aid measures (WHO Geneva 2005). The laypeople from the community or specific groups such as truck drivers, army soldiers, the workers at the fire brigade act as the so called first responders.

Even in the developing countries, where the resources are limited, many lives can be saved by the first responders by training what is to be done at the scene and giving the basic supplies and the equipment they need (WHO Geneva 2005). Each country should identify the most suitable PHTC system for them and should improve on it.

Knowledge, attitudes and practices on prehospital trauma care

The quality of PHTC depends on the level of knowledge and skills of the people who deliver it. Although we expect the knowledge level and skills on PHTC to be higher among healthcare workers, a study done in India with 200 resident doctors, 104 hospital consultants and 108 private practitioners found that median scores of knowledge was 52%, attitude was 82% and practice was 54%. They had less than adequate knowledge and practices but positive attitudes on PHTC (Kumar et al. 2008). A similar study carried out in Iran among relief workers regarding first-aid measures said that they demonstrated a moderate level of knowledge, attitudes and practices regarding first-aid (Delavar et al. 2012).

Although studies done among army soldiers regarding knowledge, attitudes and practices are rare, similar studies have been conducted among the taxi drivers. A study conducted in Nigeria to find the first-aid knowledge and application among commercial inter-city drivers with 229 participants said that only minority (37.6%) identified basic resuscitation priorities correctly. Most (79.9%) believed that they could be trained and would be willing to apply first-aid (Olugbenga-Bello et al. 2012). Another study was conducted in Ethiopia to assess knowledge, attitude and practices of first-aid service provision associated with road traffic accidents (RTA) among 400 taxi drivers. Majority (86.3%) were not trained on first-aid before the study. Only 46.3% had a good knowledge on giving first-aid during RTA. 88.24% of them believed that it is necessary to provide first-aid immediately for the victims at the scene and 81.8% were willing to provide first-aid (Getahun 2015).

Training on prehospital trauma care

A study done on current patterns of PHTC in Kampala, Uganda and the feasibility of a lay-first-responder training program identified scene management, immediate care and transportation as the main areas. Furthermore, the training program should include universal precautions, scene management, primary survey, airway control, bleeding control, recovery position, splinting fractures, safe lifting and transport of the injured patient to the hospital. Triage will also help to minimize the overwhelming the hospitals with the minor injuries. They have selected 309 laypeople as the study population. Fifty two percent of them had first-aid training previously. Before training, they answered 45% of the questions correctly and after the training it was 86%. Therefore, they have come to the conclusion that a PHTC course can improve laypeople’s knowledge on basic trauma care (Jayaraman et al. 2009 a).

Although PHTC has an important role in disaster management, lack of evidence based studies has limited the improvement. A study done in Iraq has shown that where prehospital time is longer and the first responders are trained to deliver the basic life support the mortality rates are reduced. The triage training was identified by them as an important area and should be included in the training program. (Murad et al. 2012)

A study done in Ethiopia to assess the knowledge, attitudes and practices of military personnel regarding first-aid measures stated that a higher percentage (94.4%) of participants thought first-aid training was important to all military personnel (Mebrahtu 2014).

Where the literature is concerned, there were few studies done to assess the effectiveness of basic PHTC program done for lay first responders. A study done in Uganda says the lay first responders were able to retain the knowledge given on PHTC effectively and were able to use the first-aid skills and supplies confidently for at least 6 months following the training. The participants were asked to fill a pictographic record following each emergency they experienced during the study period (Jayaraman et al. 2009 b) which is illustrated in figure 2.

Similar type of pictographic records can be used for the evaluation of the military personnel in our country with necessary modifications done following the pre-test.

An effective communication system is required for the function of PHTC system (WHO Geneva 2005). Few more things should be done to improve the quality of the PHTC system. Listening in, on radio or other communications is useful to identify the knowledge, attitudes and practices of the people who provide the PHTC. Direct observation, report review, critical incident review, outcome studies, continuing education and discipline are the other key facts which can be used for the quality improvement (WHO Geneva 2005). A fully functioning and established PHTC system not only increases the capacity to respond the disaster situations, but also helps the patients in medical/surgical emergency situations daily. And it is the best method to face the mass casualty incidents successfully (WHO Geneva 2005).

III. METHODOLOGY

This descriptive cross sectional study was carried out in 2015 among all (266) recruited in Martara district. A self-administered Questionnaire was used as the study instrument which was modified, validated and pretested. It assessed socio- demographic information of army soldiers, their attitudes and practices on prehospital trauma care. Principal investigator collected the data following the ethical and administrative clearance.

Statistical Package for the Social science (SPSS) was used to analyze the data. Cross tabulations were done to identify the possible associations using chi square statistics. Knowledge and practices were categorized in to two groups as “Poor” and “Good” taking 50% as the cut off.

IV. RESULTS

The study population consist of 266 participants (response rate 97.79%) lodged at army camp Matara fort and its two detachments located in Matara district. All were male and majority (47%) was in the age group of 28 to 37 years. Most (43.6%) had a monthly income of 30,000 rupees to 39,999 rupees and not qualified General Certificate of Education (Ordinary Level) – 65.8%. Nearly two third (68.8%) of them had worked for more than 05 years as army soldiers.

The overall level of knowledge on prehospital trauma care is poor (78.6%) while knowledge on golden hour of trauma (77.1%), triage system (74.4%), cardio pulmonary resuscitation (92.5%) and transportation of patients with spinal cord injury (69.2%) was markedly poor. The description of knowledge of army soldiers on Prehospital trauma care is given in Table 1. Good knowledge is significantly associated with advance age (p=0.001), higher income (p=0.001) and higher level of education (p=0.001), whereas it has no significant association with work duration.

Table 1: Description of knowledge of army soldiers on prehospital trauma care

Question	Correct		Incorrect	
	n	%	n	%
a. Have you ever heard of prehospital trauma care?	067	25.2	199	74.8
b. Have you ever heard of first responders of a disaster?	126	47.4	140	52.6
c. Do you know that you belong to first responders of a disaster?	142	53.4	124	46.6
d. Do you know about the first golden hour of trauma?	061	22.9	205	77.1
e. Have you ever heard about the triage system?	068	25.6	198	74.4
f. When evaluating an injured patient, what is the first thing you should do?	145	54.5	121	45.5
g. The best and safest way to stop bleeding is,	126	47.4	140	52.6
h. Do you know how to assess airway, breathing and circulation of an injured patient?	109	41.0	157	59.0
i. Do you know how to give mouth to mouth breathing?	142	53.4	124	46.6
j. Do you know how to perform CPR- Cardio Pulmonary Resuscitation?	020	07.5	246	92.5
k. Do you know that transport of the patient to a health care facility is a part of prehospital trauma care?	110	41.4	156	58.6
l. Do you know how to transport a patient with suspected spinal cord injury, without making any secondary damage?	082	30.8	184	69.2

More than 80% of them had positive attitudes on most aspects of prehospital trauma care while majority thinks it is good to have knowledge on this topic and they would have performed better in disaster situations if they were trained on pre hospital trauma care. This is illustrated in Table 2.

Table 2: Description of attitudes of army soldiers on prehospital trauma care

Question	Positive		Negative	
	n	%	n	%
a. Prehospital trauma care is an important part in disaster management	242	91.0	024	09.0
b. By improving prehospital trauma care we cannot reduce morbidity and mortality caused by disasters.	090	33.8	176	66.1
c. As army soldiers we play an important role in prehospital trauma care system as the first responders.	218	82.0	048	18.1
d. It is good to have the knowledge about prehospital trauma care.	216	81.2	050	18.8
e. We would have performed better in disaster situations if we were trained on prehospital trauma care.	225	84.6	041	15.4

With regard to the practice, majority (62.8%) is included in the group of poor level of practice. They lack practice on first-aid, cardiopulmonary resuscitation and safe transportation of the patients. Moreover, they had less opportunity to participate in drills/simulation programs done on disaster events.

Good practice is significantly associated with advance age ($p=0.001$) and higher level of education ($p=0.001$) but not associated with level of income and working duration of army soldiers.

Highly significant association ($p=0.001$) was observed between the level of knowledge and level of practice on prehospital trauma care of army soldiers. It is observed that higher the knowledge practices become better.

V. DISCUSSION

This is a descriptive cross sectional study designed to assess the knowledge, attitudes and practices of army soldiers on prehospital trauma care in Matara district. As far as literature is concerned, this is one of the first studies carried out in Sri Lanka to assess the knowledge, attitudes and practices on prehospital trauma care related to army soldiers who act as the first responders in disaster situations.

Out of 266 army soldiers who participated in the study, 78.6% of soldiers had a poor level of knowledge and only 21.4% had a good level of knowledge on PHTC. Among the study participants more than 70% haven't heard about PHTC or the triage system, and stated that they didn't know about the first golden hour of trauma. The first golden hour is the time which lasts for an hour following a trauma. Most of the time the golden hour is over once the patient reaches the health care facility. Either, patient has spent the golden hour at the site or during the transport. Necessary interventions done during this time may enhance the survival rate of the patient (Lockey 2001). This may not be the expert medical interventions, but simple first-aid measures done by the first responders which is included in PHTC might be able to reduce the morbidity and mortality (Murad et al. 2012). Therefore these are very important concepts to be discussed during training programs on PHTC.

It is remarkable that 92.5% of the study population said that they don't know how to perform CPR. Therefore most of the soldiers have very poor knowledge on CPR and this aspect should be critically addressed during the training programs.

Another common injury type seen during the disasters is spinal cord injury. It is shown that 69.2% of the soldiers don't know how to transport a patient with suspected spinal cord injury, without making any secondary damage while 30.8% of them said they had known how to do so. The first responders should be trained on safe transportation of patients although most don't know that it belongs to PHTC.

A study carried out among commercial inter-city drivers in Nigeria, who may act as first responders show that the first-aid knowledge and application revealed that basic first-aid knowledge was poor within the cohort, as less than 50% had correctly identified the appropriate first-aid concepts. The study sample had less knowledge on application of appropriate air way, haemostasis and fracture management (Olugbenga-Bello et al. 2012).

Out of five questions asked about attitudes four of the questions were answered positively by more than 80% of the soldiers. However 66.1% of the study population thinks that we cannot reduce morbidity and mortality by improving PHTC. The findings of the study done to assess knowledge, attitudes and practices of military personnel regarding first-aid measures in Northern Command 21st division in Ethiopia stated that out of 375 participants 97.3% thought first-aid was important to military personnel's and 2.7% thought

it is not important as it should be done by health workers. It further says 94.4% of the participants thought first-aid training was important to military personnel (Mebrahtu 2014). Similarly 84.6% of the army soldiers participated in this study said they would have performed better in disaster situations if they were trained on PHTC.

Out of 266 army soldiers who participated in the study, 62.8% of soldiers had a poor level of practice and only 37.2% had a good level of practice. Mean total practice on PHTC was 3.94 and standard deviation was 2.033 and the range was 08 being the minimum mark 00 and the maximum mark 08. Practice was assessed by using 08 questions which included the very basics used in PHTC.

Nearly three quarter (77.4%) of the study sample said that they haven't ever performed CPR on an injured patient while 22.6% of them had given CPR to the injured people. A similar study conducted among relief workers in Iran stated that 83% knew how to perform CPR correctly (Delavar et al. 2012).

Our study showed that, almost half (53.4%) had attended first-aid training programs, while 46.6% had not trained on first-aid skills. As the basic military training of an army soldier doesn't contain a training session on first-aid at least during the first working year of their life, should undergo basic first-aid training. They should be given an opportunity for this.

A more or less similar study carried out in rescue and relief bases of the Red Crescent society of Mazandaran province of Iran among the relief workers regarding first-aid measures has shown an average knowledge score of 56.5% and attitude score of 52.9%. Therefore it demonstrated moderate level of knowledge, attitudes and practices towards first aid (Delavar et al. 2012) thus our study showed poor level of knowledge and practices towards PHTC. This discrepancy may be due to the training sessions conducted for the relief workers and PHTC is containing much broader area than first-aid.

Another study carried out in India on knowledge, attitudes and practices of hospital consultants, resident doctors and private practitioners with regard to prehospital and emergency care in Lucknow revealed that knowledge (52%) and practices (54%) was less than adequate among the three groups of the respondents while the score achieved on attitudes (82%) was high (Kumar et al. 2008).

This study showed that, among those who were less than 37 years 14.8% had good knowledge while among those who were 37 years or more had 36.1% of good knowledge. This association between age and knowledge is statistically significant at $p < 0.001$. This shows that advance age is positively associated with good knowledge. However, it can be seen that within each age group more than 60% had poor knowledge. With aging most of the soldiers are exposed to different training sessions and get more experienced than the younger crowd. That may be the reason to have good knowledge with the advance age.

Considering the soldiers who received a salary of less than Rs.30000, 7.8% had good knowledge while among those who received a salary of Rs.30000 or more had 28.4% of good knowledge. This association between income and knowledge is statistically significant at $p < 0.001$. This shows that higher income is positively associated with good knowledge. Moreover, more than 70% had poor knowledge within each group of income. Higher the income the soldiers can spend more to gain knowledge. They may do self-learning by reading books or participating paid programs on the above topic may lead to have good knowledge with higher income.

In our study, among those who were educated up to grade 11, 14.3% had good knowledge while those who were qualified O/L and above had 35.2% of good knowledge. This association between level of education and knowledge is statistically significant at $p < 0.001$. This shows that higher level of education is positively associated with good knowledge. However, it can be seen that within each group of education more than 60% had poor knowledge. Whereas a study conducted in Iran among relief workers has shown a significant difference between knowledge and educational level ($p < 0.0001$) (Delavar et al. 2012).

The association between working duration and level of knowledge of army soldiers on PHTC is not statistically significant in the present study.

In this study, among those who were less than 37 years 29.0% had good practice while among those who were equivalent or over 37 years had 55.4% of good practice. This association between age and practice is statistically significant at $p < 0.001$. This shows that advance age is positively associated with good practice. With aging the experience they gathered may have contributed for the good practice. Among those who were educated up to grade 11, 29.1% had good practice, while those who were qualified O/L and above had 52.7% of good practice. This association between level of education and practice is statistically significant at $p < 0.001$. This shows that higher level of education is positively associated with good practice.

Among those who had poor knowledge 74.2% had poor practice. Among good knowledge only 21.1% had poor practice. It shows that having good knowledge is positively associated with good practices. Therefore, in the event of planning training programs for the army soldiers on PHTC, the objectives should be formulated to improve their knowledge on PHTC. With the improvement of knowledge the level of practices will get improved due to significant association between the two variables.

VI. CONCLUSION

Study concluded that higher proportion of army soldiers had poor knowledge and practice on prehospital trauma care while majority had positive attitudes regarding it. Majority lacks knowledge and practice in first-aid and cardiopulmonary resuscitation. Due to significant association observed between knowledge and practice it can be recommended to include a training session on prehospital trauma care in the basic military curriculum which will enhance the ability to act as first responders effectively. Further research is needed in this area of prehospital trauma care to enhance the qualitative outcome.

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AUTHORS

First Author – H.L.S.Chathurika, MBBS, MSc (Medical Administration), PG Diploma in Health Sector Disaster Management, Post Graduate Institute of Medicine, University of Colombo, saneethachathurika@Ymail.com

Second Author – S.D.S.Weliange, MBBS, MSc (Community Medicine), MD (Community Medicine), University of Colombo, Faculty of Medicine, Department of Community Medicine, shreenika73@yahoo.co.uk

Third Author – C.M.Abeysekara, MBBS, MSc (Medical Administration), Post Graduate Institute of Medicine, University of Colombo, chandanaabeysekara@gmail.com

Fourth Author – I.S.Yaddehige, MBBS, MSc (Medical Administration), Post Graduate Institute of Medicine, University of Colombo, irangal@yahoo.com

Fifth Author – H.L.Priyanka, MBBS-Undergraduate, General Sir John Kotelawala Defence University, Faculty of Medicine, wlspriyankanj@yahoo.com

Correspondence Author – H.L.S.Chathurika, saneethachathurika@Ymail.com, saneethachathurika@gmail.com, +94712588833