REVIEW ARTICLES

MEDICAL SUPPORT IN EARTHQUAKE DISASTER – 2005

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INTRODUCTION

The military serves to defend and protect the nation, but in extensive natural disasters the military is invariably the first responder owing to its befitting field training and infrastructure. At about 08:43 AM on 8th Oct 2005, a massive Earth Quake measuring 7.6 on the Richter scale hit the Azad Jammu and Kashmir and northern parts of North West Frontier province causing colossal loss of life and property. The immediate impact of the earthquake was so severe, that it badly damaged the existing infrastructure especially roads/ communication and public services including health sector, to an extent which was beyond comprehension. The initial damage remained obscure due to communication disruption and once the enormity of devastation unfolded, government and in particular the army and other NGOs/ Volunteer Groups responded to the situation and started the relief operations. The earthquake was followed by forceful hailstorm and torrent rains in most of quake hit areas; adding up to the plight of effected populace which was seeking refuge in open.

The people of Pakistan, rose as one, their response was indeed overwhelming and heart warming for any country. They galvanized, they jelled into one and reached out from the length and breadth of the country for their brethren in distress in the affected areas of Azad Kashmir and NWFP. The army moved fast, the first and foremost priority in medical assistance of the army was in the form of evacuation of the casualties which came up as a mammoth task, challenging the preparedness and effectiveness of national medical resources. In that hour of panic and chaos, the Army Medical Corps took up the challenge with considerable courage and responded to the call of duty. By 5 O'clock in the evening of 8th October, there were helicopters hovering over every hospital in Islamabad and Rawalpindi waiting to land and unload the casualties. On the same evening the engineers of Pakistan army were moved to open the road access to Muzaffarabad and by about 12'O clock the next day, one of the road accesses via Abbottabad and Garhi Habibullah to Muzaffarabad was opened. This was the greatest achievement which led to faster supplies to the forward areas. By the morning on next day, army strength of about 3000 people had reached their locations and within three to four days forty-fifty thousand troops in the form of two divisions reached their locations. This is no mean achievement by any army of the world.

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The international community, the United Nations, the NGOs all moved fast as well. Without their help we would have lost many lives. Pakistan lacked the technical expertise of reaching out the casualties and saving people trapped under the rubble. It was these rescue teams that helped us. Tremendous support was available to the relief operation by the international community, by the people of Pakistan within Pakistan and by the expatriate Pakistanis. The international community, the Pakistan NGOs and the foreign NGOs, the UNO – all played an exceptional role in making the relief operation a success.

Army Medical Support

The Medical Directorate in General Headquarters being the parent directorate quickly took up the challenge of initiating relief and medical care mission. In the backdrop of experience gained in provision of disaster relief and medical support in Bam, Iran and Tsunami, an "Emergency Relief and Coordination Cell" was established in

Combined Military Hospital Rawalpindi where round the clock coordination of medical support operation was set off and monitored [10]. The key to survival is not more aid, but better information. It is beyond doubt that accurate and timely information can save lives and reduce suffering after disaster. After identifying the immediate gaps in response to the health and emergency needs of the people, coordination of the inputs from different agencies was initiated to harmonize a unified response to both the immediate and longer term needs of the affected population [1]. Anticipating the flow of casualties to hospitals in Rawalpindi and Abbottabad, a pool of specialists, medical officers, nurses and paramedics was created in Combined Military Hospital Rawalpindi by mobilizing the trained human resource in peripheral hospitals (table-1). Field medical resources were quickly mobilized and medical teams and field hospitals were moved from various garrisons to the quake affected areas.

Civil Medical Support

Many national and international teams of clinical experts as well as volunteers started arriving, bringing a lot of medical and non medical supplies as well as food items. District Headquarters Hospital at Muzaffarabad, Manshera, Battagram and Tehsil Headquarter Hospital Balakot were badly damaged. A 500 bed facility was erected within first two days in District Headquarters Hospital Manshera inside the Nursing School and under the tents. Major referrals were carried out to Abbottabad District and Islamabad to the tertiary care hospitals. Ayub Teaching Hospital Abbottabad was also partially damaged; contingency plans were however instituted and most of the patients were kept and treated in the tents in the hospital premises. The tent based operation theaters and wards were later comprehensively organized due to after shocks and converted to a well planned treatment facility. Combined Military Hospital Abbottabad being intact also received a bulk of casualties. However with the arrival of more Medical Teams / hospitals the bed strength at Mansehra was increased from 500 to around 2500 in a space of one week [2]. The ultimate flow of casualties for definitive and long term rehabilitative treatment was towards Rawalpindi where large numbers of injured and sick were extended the best possible tertiary treatment and care. Pakistan Institute of Medical Sciences (PIMS), Holy Family Hospital, Al-Shifa Eye Trust Hospital, Shifa International Hospital Islamabad, Rawalpindi Government Hospital and Cantonment General Hospital were the main participants in provision of medical support to earthquake victims. National Institute for Handicapped stretched to its capabilities and was instrumental in treatment of cases of paraplegia.

The national medical organizations included Action Aid Pakistan, Children's Resources International, EDHI, Fatimid Foundation, Islamic Relief, Al-Rasheed Trust, Pakistan Red Crescent Society, Citizen Foundation and many others. Outreach Teams from various hospitals of Rawalpindi-Islamabad, Lahore and places as far as Karachi performed a phenomenal job.

Federal Relief Commissioner

Consequent to a presidential order the Federal Relief Commissioner was established in Prime Minister Secretariat Islamabad where a senior general officer from the Army Medical Corps was appointed as a member to coordinate the medical support in relief operation. The biggest challenge facing those involved in disaster relief is coordination. A number of coordinating teams were therefore assigned the tasks of coordinating the reception and deployment of foreign medical teams, receipt of medical consignments in the form of medicine and equipment, their safe storage accounting and speedy distribution on demand, and coordinate the services of NGOS and local / international volunteers. Initially medicines were provided immediately from own stocks, ex AFMSD Nowshera and subsequently donations were

stocked and distributed from Chaklala Air Base Complex and CMT & SD Chaklala.

Impact of Earthquake

The impact of earthquake was so massive that all medical resources fell short of meeting the need of early intervention to limit mortality and morbidity in the country (table–2). The selfless dedication and perseverance of doctors and nurses bridged the gap between supply and demand and the largest numbers of medical and surgical procedures were carried out in the history of the country in a short span of time. Military hospitals bared the main brunt of casualty flow (table–3).

The enormous volume of casualties was accommodated by expanding the reserve capacity of hospitals and establishing make-shift hospitals nearest to the effected area. Fast moving evacuation operation by air/road were undertaken whereby large number of causalities were being brought by helicopters from forward areas in initial acute phase and later in stabilized condition evacuation of causalities to available health facilities in the zone as well to tertiary care centers at Islamabad / Rawalpindi.

Health Sector Damage

The massive damage to health sector infrastructure in quake hit area paralyzed the health care system and even more gloominess to the situation was brought by the death of many health care workers or their immediate relatives which made their availability impracticable. The psychological impact of loss to life and property, made the task of motivating the healthcare workers to join their place of duty even more difficult. The struggle for survival in the wake of destroyed homes and onset of harsh winter season further overshadowed the revival of health sector infrastructure. The influx of individual and group volunteers from various parts of the country partly filled the gap of fulfilling healthcare needs. The arrival of national and foreign medical teams (table–4) made a visible impact in initiating the health care task.

Revival of Health Care System

A major effort was to revive the health system that existed prior to the disaster. To avoid a vacuum to be created with the withdrawal of the NGO's / Organization to the detriment of the disaster stricken population there was a need to plan effectively for revival of civil health facilities. The Ministry of Health AJK and NWFP constituted a Core Group to put an outline for the medium term strategy for the revival of health system. The Core Group constituted the EDO's Health, WHO, UNICEF, UNFPA, IRC, Mercy Corps International and the Army. The key element of strategy was revival of the Primary Health Care through delivery of universal package, outreach services, mobile services delivery, establishing a robust surveillance system to minimize the chances of epidemics and making an effective response, erecting alternative structures (tents, fabricated structures), delivering service in tents, using prefabricated containers, building temp structures with fiberglass or any other low cost material, using the existing buildings after assessing the safety and provision of residential facilities for staff.

Establishment of Tent Villages

For the care of an estimated 100,000 IDPs population tent villages were raised in various places, the response had to be emergent. Certain key actions undertaken were:-

- Mass vaccination was done by EDO / WHO / UNICEF / Agha Khan Foundation against Measles, OPV, DPT, TT (Injured) along with Vitamin A distribution. Necessary fresh campaigns were initiated on required basis for which local EPI program was mobilized.
- An effective referral facility and nearest referral points were identified.
- Social and psychological rehabilitation through Psychological Teams detailed by Ministry of Health.

- Hygiene, water and sanitation was monitored

Logistics

Large scale logistic operation was undertaken to collect, store and segregate medicine and equipment donated by international community. Medical supplies initially stored in CMT & SD Golra along with other foreign supplies were subsequently stored in the warehouse of Armed Forces Institute of Rehabilitation Medicine. An efficient team of doctors and pharmacists pooled from various hospitals undertook the mammoth task of inventory management and distribution to various organizations operating in quake affected area according to the demands received (fig. 1). Supplies were moved both by road and air as permitted by the weather conditions. Medical supplies invariably remained surplus in the earthquake area and no deficiency was ever reported.

Table-1: Medical skilled personnel mobilized in initial phase

Surgeons	19
Anaesthetists	13
Medical Officers	96
Paramedics	433
Nursing Officers	33

Table-2: Patients attended, treated, deaths, amputation and spinal injuries in the country

Patients Attended	1846744
Patients Evacuated	17150
Surgeries Performed	130588
Presently Admitted	2264
Deaths in Hospital	643
Amputations	707
Spinal Injuries	721

Table-3: Details of casualties – in three major Armed Forces hospitals

Details of Causalities	CMH Rwp	MH Rwp	CMH Atd
Causalities Received	3363	1789	2384
Discharged/Transferred/Outdoor	3219	1681	2321
No of Deaths in Hospitals	47	34	42
No of Brought in Dead	182	76	6
No of Major Operations	2442	531	1356
No of Minor Operations	3086	1941	546
No of Still Admitted	97	74	21
a. Army	18	12	0
b. Civil	79	62	21
Total unattended Patients	27	12	10
No of unattended Patients Remaining	0	0	0
Total No of Amputations	56	24	56
a. Army	12	7	1
b. Civil	44	17	55
Total No of Paraplegics	11	20	15
a. Army	2	3	0
b. Civil	9	17	15

Table-4: Details of field hospitals / teams

Medical Teams	281
Field Hospitals National	44
Field Hospitals Foreign	64

Table-5: Air relief operations

Type of Mission	Number
Casualty evacuation	17155
Dead bodies transported	130
Personnel transportation	43785
Relief goods transported	32799 tons
Ration and food items transported	99410 tons
Total flying	19957 Hours

Air Transportation

The terrain of quake hit areas and the widespread disruption of communication infrastructure left the relief agencies with the only option of airlifting relief goods and aero medical evacuation of casualties. Post earthquake period of about six months witnessed the largest air relief mission in living history that too with helicopters being the only machine available for such a massive

Table-6: Vaccination programme by Army in AJ&K

Station	TT	ATG	Measles	Hepatitis A	Meningitis	Others
FTC Mzd	7938		6421	532	235	
FTC Bagh	1197		603			
FTC Rehra	365		245			
CMH Mzd	172	138				
Total	**9672**	**138**	**7269**	**532**	**235**	

Table-7: EPI vaccination programme in collaboration with WHO/MOH and support of Army in NWFP

Station	TT	Measles	OPV	DPT	VIT A (Blue)	VIT A (Red)
Abbottabad	2756	41349	191966	213233	13322	9879
Mansehra	6562	89438				
Batgram	1475	32000				
Shangla	316	4160				
Total	**11109**	**166947**	**191966**	**213233**	**13322**	**9879**

operation. Consequent to the request of Pakistan government to international community for provision of helicopters, a huge fleet of helicopters was pooled up which operated in the most difficult terrain under extreme weather conditions. Brief account of air relief operation is shown in (table-5).

Foreign Medical Missions

The most significant segment of the earthquake relief was the sizeable medical support from international agencies. Establishment of ICRC hospital, deployment of MASH and other hospitals from Cuba, Mercy International, MSF, Oxfam and International Rescue Committee were a perceptible element of medical relief operation. Enormous national and international response was manifested in the form of trained human resources, equipment and supplies enabling the government to respond effectively to the situation. Arrival of UNHCR, UNICEF, WHO and WFP teams added a substantial support to the medical relief activities. Medical hospitals and teams from at least fifteen countries and several international organizations worked tirelessly in the quake affected areas from the start of relief activities all through the winter season.

Cuban Medical Mission

The Cuban Medical Mission; largest of all the foreign contingents, left its strong impact amongst the local masses due to their devotion and voluntary services in remotest areas where basic human facilities were almost non existent. The first surgical team from Cuba arrived on 14th Oct 2005 and subsequently a sequence of thirty field medical teams and three major hospitals established a wide network of health care facilities in cities and remote areas. The mission as a whole attended to 1.7 million patients, including 10,687 admissions. They undertook about 6673 major operations and carried out approximately 146000 diagnostic tests [6].

Table-8: No. of persons vaccinated in AJ&K areas

Station	Persons
Mzd	319144
Neelum Valley	111568
Jhelum Valley	327658
Total	**758370**

Table-9: Psychological trauma relief services

Armed Forces Mental Health Relief Centers (MHRC)	Activities
• Department of Psychiatry, MH Rwp • CMH Atd • CMH Lhr • POF Hosp Wah	• Training workshops • Workshop for Psychologists • Counseling and Psychosocial Care • Collection of Data • Preparation of Educational Material/ Training Manuals • Research Projects • Collaboration with Other Agencies and Departments

Table-10: Armed Forces Mental Health Relief Units (MHRU)

Outdoor/Counseling				
	MHRC	**CMH Lahore**	**MHRU Bagh**	**MHRU Rawalakot**
Individual	1559	179	680	544
Bedside	882	8	24	36
Group	-		94	83
OPD				
Male	-	-	215	164
Female	-	-	91	268
Children	-	-	37	44
Indoor				
Male	12		-	-
Female	6		-	-
Children	-		-	-
Outreach Visits				
Camps	-		93	102
Outreaches	-		1146	2008
Liaison Visits				
Hospital	4		28	24
Outside	4		16	17
Public Education				
General Public	-		71	53
Community Elders	-		8	13
Teachers	-		55	55
Attendants	-		406	210
Social Workers	-		28	26

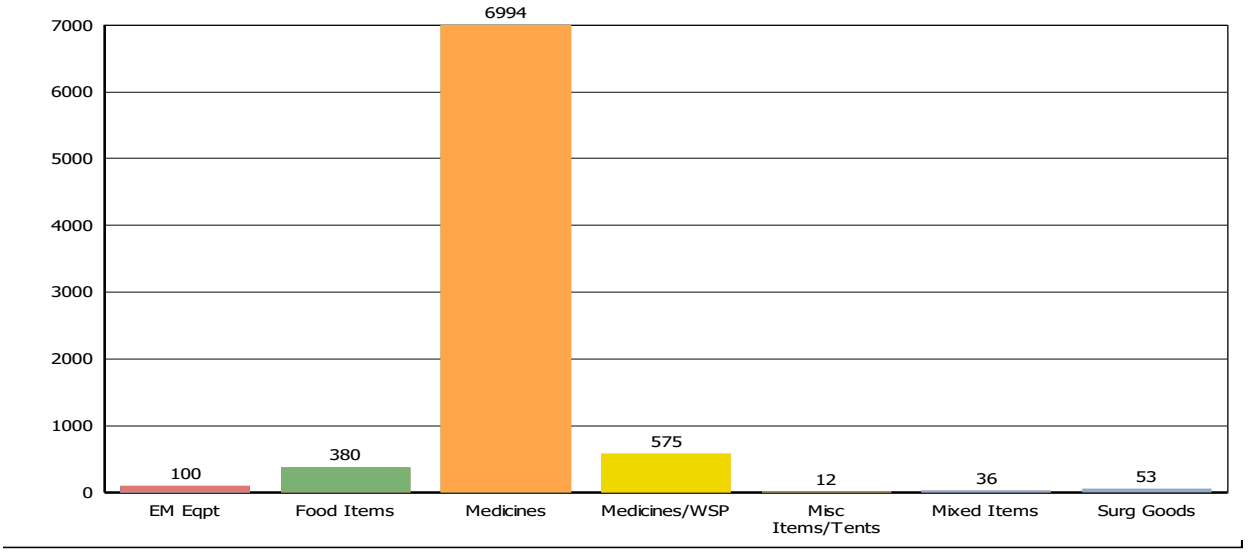

Fig. 1: Pellets (packets) dispatched to quake affected areas

Mash

The US contingent was conspicuously represented by their surgical hospital (MASH). The 212th Mobile Army Surgical Hospital, established in Muzaffarabad on 24th Oct 2005, played a key role in provision of advanced surgical care to the quake affected population and as a major referral facility for the entire Neelum and Jhelum Valleys. The hospital treated over 20,000 patients including about 500 indoor patients. It carried out over 4000 X-Ray tests and about 18,000 vaccinations. Towards the end of their tour of duty the US delegation handed over this expensive and useful facility to the government of Pakistan for continuation of medical support to quake affected population and for use in future eventualities [7].

ICRC

The Norwegian International Committee of Red Cross established a 100 bed state of the art hospital in Muzaffarabad along with a number of small medical teams. The field hospital in Muzaffarabad rendered outpatient as well as inpatient treatment to thousands of victims of earthquake. Its noticeable aspect was the orthopedic care especially to children with fractures of limbs. The rehabilitative care won the hearts of local population. The Norwegian Red Cross made its ultimate impression by donating this modern field hospital to the government of Azad Kashmir for continued medical care and utility in case of future eventualities.

Community Health

Teams of expert community health professionals were dispatched in the operational area and in close liaison with WHO/ UNICEF and local health authorities an effective disease surveillance system was put in place to prevent any out break of epidemics by continuous monitoring and taking prompt action accordingly in the effected area as well in tent villages and temporary shelters. As dictated by the various threats highlighted by these experts an all inclusive work of waste disposal, fumigation and spray and availability of potable water were executed seeking help of foreign experts as well. Immunization and vaccination services were introduced in coordination with WHO/ UNICEF, local and army health resources to achieve 90 – 100 % vaccination of target population in tent villages etc (table-6,7,8). As expected in any such major disaster a second phase of rising mortality was fortunately avoided by institution of effective disease surveillance and preventive measures. The expected high morbidity and mortality in the high mountainous quake affected area, due to harsh winter season, was also seen away uneventful. Systematic and well planned sanitation of the camps and provision of potable water by various local and international agencies played a key role in this regard.

Armed Forces Mental Health Relief Services

Psychological trauma ensuing massive disasters is a common entity and the October 2005 earthquake brought with it massive sufferings and trauma to the effected victims [8]. Teams of psychiatric and psychologists were emplaced within a week which carried out enormous job in providing solace and support to the victims (table-9,10).

From Relief to Reconstruction

Harsh winter season followed the earthquake and the relief activities had to be continued to protect the effectees from the adverse effects of extreme weather in mountains. Revival of health care infrastructure also required fair weather to reconstruct the health facilities. Most of the foreign medical teams also continued to deliver their services in such deprived areas and gradually folded up their facilities as the weather improved. A field hospital each was donated by the ICRC and USA, while the biggest consignment came from the Cuban medical mission who donated three field hospitals and thirty mobile medical teams with complete equipment and medicines. The office of Federal Relief Commissioner was closed on 31st of Mar 2006 the health care activities in the quake affected area were gradually taken over by Earthquake Reconstruction and Rehabilitation Authority (ERRA) under new administrative setup has assumed the responsibility of bringing back the area to normalization.

CONCLUSION

In Pakistan disaster management is viewed in isolation from the process of mainstream development. Within the disaster management organizations there is lack of knowledge and information on hazard identification, risk assessment and management. The linkages between various organizations and bodies are faulty. Disaster management policies are generally not influenced by methods and tools for cost effective and sustainable interventions. It is

imperative to develop a national disaster management strategy in which the roles of all key players should be identified and ensured. During the Oct 2005 earthquake, there was no clear organizational structure at different levels. There is a need that the two key players in such eventualities; Civil Government/ Army, should formulate an organization for a Quick Response Force / Regulatory Body for disaster management / crises management, taking into consideration the experience of the recent earth quake. Such organization should formulate a strategy, outlining definitive roles for the federal, provisional and district level authorities. The armed forces need to formulate and practice their own protocols for disaster management.

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