Physical Medicine and Rehabilitation - International

Open Access

Austin Publishing Group

Special Article – Disability and Rehabilitation

Overview of Medical Rehabilitation in Natural Disasters in the Pacific Island Countries

Amatya B[1,4]* and Khan F[1,2,3,4]

[1]Department of Rehabilitation Medicine, Royal Melbourne Hospital, Parkville, Victoria, Australia
[2]Department of Medicine, Dentistry and Health Sciences, The University of Melbourne, Parkville, Australia
[3]School of Public Health and Preventive Medicine, Monash University, Victoria, Australia
[4]Committee for Rehabilitation Disaster Relief (CRDR), International Society of Physical and Rehabilitation Medicine (ISPRM), Geneva, Switzerland

***Corresponding author:** Dr Bhasker Amatya, Department of Rehabilitation Medicine, Royal Melbourne Hospital, 34-54 Poplar Road Parkville, Melbourne VIC 3052, Australia

Received: June 21, 2016; **Accepted:** July 05, 2016; **Published:** July 07, 2016

Abstract

Pacific Island Countries (PICs) are one of the most natural disaster-prone regions in the world. Natural disasters in Pacific region are mainly due to meteorological (storm, typhoons), hydrological (flood, wet mass movement); and/or climatological (extreme temperature, drought, wildfire/bushfire) causes. This article presents a regional overview of medical rehabilitation status, and strengths and challenges for medical rehabilitation in natural disaster settings. In most PICs, rehabilitation medicine is still in infancy stage. In disaster settings, acute response and care protocols focusing on saving lives and treating acute injuries get most attention, whilst, rehabilitative needs are not prioritized in many cases. Operational/managerial factors seem to most impact rehabilitative care of disaster victims in PICs, these include: lack of systems and care protocols; limited provision of effective rehabilitation inclusive education, training and awareness-raising programs, funding issues, poor leadership, planning and communication, infrastructure, human resources, and poor institutional arrangement. Rehabilitation-inclusive disaster management plan is needed for longer-term management of disaster victims.

Keywords: Natural disaster; Rehabilitation; Pacific Island Countries; Disability; Disaster response

Abbreviations

CRDR: Committee on Rehabilitation Disaster Relief; ESCAP: Economic and Social Commission for Asia and the Pacific; GDP: Gross Domestic Product; ISPRM: International Society of Physical and Rehabilitation Medicine; OCHA: Office for the Coordination of Humanitarian Affairs; ODA: Official Development Assistance; PICs: Pacific Island Countries; PHT: Pacific Humanitarian Team; SIDS: Small Island Developing States; ROP: Regional Office for the Pacific; SOPAC: Pacific Islands Applied Geoscience Commission; SNAP: Strategic National Action Plans; UN: United Nations; WHO: World Health Organisation.

Introduction

The Pacific Island Countries (PICs) consist of 14 countries, divided into three zones: Micronesia, Melanesia and Polynesia [1]. The region has a population of about 9 million people, majority (about 80%) living in rural areas [2]. Of these, it is estimated 800,000 people have some form of disability [2]. The PICs are among the most isolated countries geographically with about 1000 islands scattered over an area across 180 million square kilometres of ocean (Figure 1) [3,4]. Further, small land areas and economies with low diversification, limited natural resources, poor infrastructure and limited capacity, paucity of human and financial resources, and significant distances to major markets have affected development and often led to a high degree of economic volatility [3,4]. The region is unique and diverse biologically, socio-economically and culturally. Papua New Guinea (PNG) is the largest among the group (population of > 6.7 million), while Niue, with an estimated population of 1000 being a smallest member. Amongst the PICs, Kiribati is one of the most remote and geographically-dispersed countries in the world, with 33 coral atolls spread over 3.5 million km^2 of ocean (area larger than India), while Solomon Islands is scattered with almost 1,000 small islands and atolls [5]. Depending on their specific social, economic and environmental vulnerabilities, the United Nations (UN) have categorised all PICs as small island developing states (SIDS). In most PICs, agriculture and fisheries are the primary source of income. Many countries are heavily dependent on overseas support, with half receiving Official Development Assistance (ODA) exceeding 30% of their Gross Domestic Product (GDP) [5]. Five PICs (Kiribati, Samoa, Solomon Islands, Tuvalu and Vanuatu) are categorised amongst the UN's least developed countries, reflecting low incomes, weak human assets (nutrition, health, education) and economic vulnerability (Table 1) [5].

Natural Disaster in the PICs

Natural disasters are escalating worldwide, including in the PICs [6]. The PICs are classified amongst the world's top 30 most vulnerable nations to natural disasters [5,6]. High disaster-risk in the region is mainly due to seismically active fault lines, major ocean basins, major typhoon tracks and susceptibility to hydrological disasters due to climate change-related events (such as rising seas, increasing drought and rainfall etc.) [7,8]. The geographical conditions of small low lying island states in the region isolated by vast expanses of ocean, increase their vulnerability to climate-related hazards and different types of natural disasters, predominantly: meteorological (cyclones, tropical storm, typhoons); hydrological (flood, wet mass movement); climatological (increasing sea level rise, extreme temperature, drought, wildfire/bushfire). Of the total of 3,979 disasters that occurred globally between 2005 and 2014, almost half (over 1,625) occurred in the Asia-Pacific region [8]. This resulted in half a million

Citation: Amatya B and Khan F. Overview of Medical Rehabilitation in Natural Disasters in the Pacific Island Countries. Phys Med Rehabil Int. 2016; 3(4): 1090.

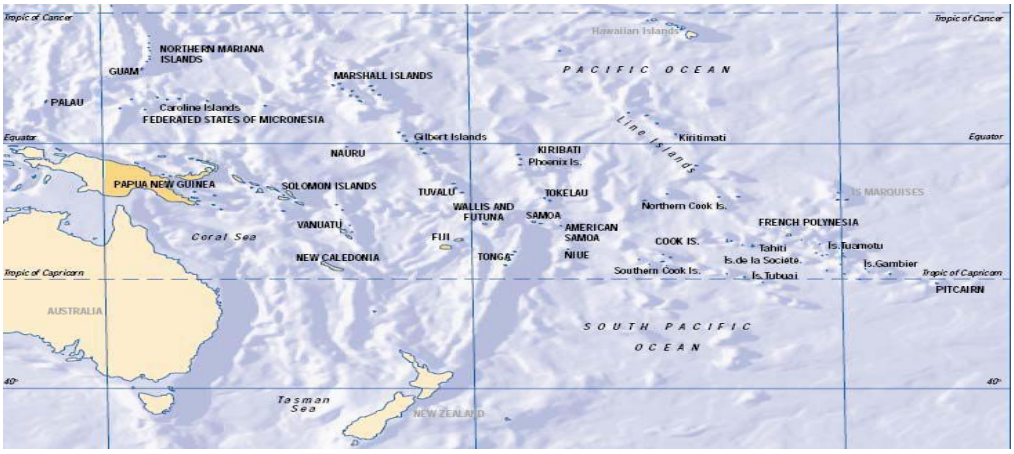

Figure 1: Pacific Island Nations and Territories. Source UNEP 2009, Russell 2009 [3,4].

Table 1: Pacific Island Countries (alphabetical) - geographical and socio-economic features.

Country	Sub-Region	Population ('000s)	Area (km^2)	GDP per capita (US$)	GDP growth	HCP* (per 1000 population)
Cook Islands	Polynesia	20	237 (15 islands)	10,875	-1.2%	11
Federated States of Micronesia	Micronesia	111	701 (59 islands)	2,183	-2.9%	3
Fiji	Melanesia	864	18,273 (322 islands)	3,499	0.2%	3
Kiribati	Micronesia	100	811 (36 islands)	1,490	3.8%	4
Marshall Islands	Micronesia	64	181 (34 islands)	2,851	1.2%	4
Nauru	Micronesia	10	21 (1 island)	2,071	-0.1%	11
Niue	Polynesia	1	259 (1 island)	9,618	5.6%	13
Palau	Micronesia	21	444 (31 islands)	8,423	2.0%	7
Papua New Guinea	Melanesia	6,745	462840 (151 islands)	897	7.0%	0.6
Samoa	Polynesia	179	2,785 (7 islands)	2,672	4.5%	2
Solomon Islands	Melanesia	550	30,407 (138 islands)	1,014	7.3%	2
Tonga	Polynesia	104	650 (67 islands)	2,629	1.2%	4
Tuvalu	Polynesia	10	26 (10 islands)	1,831	2.5%	6
Vanuatu	Melanesia	245	12,281 (81 islands)	2,218	6.6%	2

Adapted from Duncan D 2011 (5) and Gero et al 2013 [35].
*HCP: Health Care Professional (doctors, nurses, midwives); GDP: Gross Domestic Product.

fatalities (equates to 60% of total global disaster –related deaths) and estimated over 1.4 billion people affected (constituting 80% of total affected globally due to disasters) [8]. The economic losses owing to these disasters were estimated > US $523 billion [8]. Hydrological disasters (such as floods and storms) are most common in the region, which cause higher economic damage relative to human toll. On average approx. 41 tropical cyclones occur each year in the Pacific region alone, making it the most destructive in terms of economic loss. According to the World Bank, the PICs suffer on average, combined disaster damages of more than US$280 million every year and cost some countries an average of up to 6.6% of GDP every year (global averages typically of 1.2%) [9]. Eight PICs (Vanuatu, Niue, Tonga, the Federated States of Micronesia, Solomon Islands, Fiji, Marshall Islands and Cook Islands) are amongst the 20 countries in the world with the highest average annual disaster losses scaled by GDP [9]. The economic impact in the region associated with natural disasters, are a significant barrier to growth of many countries [10]. A list of various kinds of natural disasters in the PICs between 1950–2004 is detailed in Table 2 and list of major disasters that occurred in the Pacific region between 2014 to 2015 are tabulated in Table 3.

Key Regional Initiatives in Disaster Management

Although PICs have achieved progress in terms of life expectancy, infant mortality rates, and infectious disease control etc., the economic growth, however, has been well below global average. Overall, the regional disaster management capacities and collaboration have improved in recent years and the PICs recognise the importance for

Table 2: Natural disasters in the Pacific Islands (1950–2004)*.

Natural disaster type	Number	Reported Fatalities	Population Affected**	Reported Losses (US$ Million)
Windstorms (Cyclones, tidal surges and storms)	157	1,380	2,496,808	$5,903.90
Droughts	10	0	629,580	$137.00
Floods	8	40	246,644	$94.80
Earthquakes	17	53	22,254	$330.60
Others (landslides, tsunamis, volcano eruptions, wild fires and epidemics)	15	274	21,520+	$60.00
Melanesia	110	1,130	2,115,332	$1,654.90
Polynesia	71	494	1,041,012	$1,797.40
Micronesia	26	123	260,662	$3,074.04
Total Pacific	207	1,747	3,417,006	$6,526.30

Adapted from Pacific Islands Applied Geoscience Commission (SOPAC) 2009 [11] [Source: World Bank 2006]
*All data excludes Papua New Guinea.
** Figures include both fatalities and total population affected.

Table 3: Major natural disaster in Pacific region (2014 - 2015).

Country	Year	Event	Number affected	Number displaced	Number killed
Kiribati	March, 2015	Cyclone Pam passed over as a category 2 story	2,000	-	-
Tuvalu	March, 2015	Cyclone Pam passed over as a category 2 story	4,600	350	-
Vanuatu	March 10-13, 2015	Cyclone Pam passed over as a Category 5 system	189,000	4,000	11
Vanuatu	March 10-13, 2014	Cyclone Lusi passed over as a Category 2 system	20,000	149	10
Federated States of Micronesia	March 29 and April 1, 2015	Typhoon Maysak made landfall at Chuuk on Ulithi and Yap	29,700	1,500	4
Palau	November 7, 2013	Super Typhoon Haiyan passed directly over the island of Kayangel	2,300	900	
Solomon Islands	April, 2014	Three days of heavy rain caused flash floods	52,000	10,000	22
Marshall Islands	March 3, 2014	King tides inundated Majuro Atoll and some outer islands	1,730	940	
Tonga	January 11, 2014	Cyclone Ian passed directly over the Ha'apai Group as a Category 5 system	5,000	2,335	1

Source: Office for the Coordination of Humanitarian Affairs (OCHA).

disaster planning and management initiatives [11]. In line with other countries in the Asia-Pacific, there is growing attention in the PICs on disaster prevention and preparedness, especially early warning systems, early evacuation and awareness. The United Nations (UN) regional arm the Economic and Social Commission for Asia and the Pacific (ESCAP) (1947) was established as an inter-governmental forum for all countries and territories of Asia and Pacific region, and currently has 53 members and 9 associate members covering more than 60% of the world's population (4.1 billion people). Early in 1994, all PIC governments agreed on a common strategy for disaster reduction at the World Conference on Natural Disaster Reduction held in Yokohama, Japan [12]. In 1999, UN Office for the Coordination of Humanitarian Affairs (OCHA) established a Regional Office for the Pacific (ROP), with aim to mobilize and coordinate effective and principled humanitarian action in the region in partnership with national and international actors. In 2008, the OCHA ROP established the Pacific Humanitarian Team (PHT) to improve the timeliness, effectiveness and predictability of humanitarian response and coordination of humanitarian action using a regional cluster approach in the region, by bringing together humanitarian actors in the region to support governments. Currently, the OCHA ROP supports all 14 Pacific Island countries. Australia is the key funder of disability initiatives in the PICs under its "Development for All" strategy [2].

At the regional level, Pacific Forum Islands Leaders in 2005 approved the Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005 – 2015 (Madang Framework) [11]. The key activities under this framework to date include: Pacific Catastrophe Risk Financing Mechanism (under development); Regional Tsunami Exercise and Pacific Disaster Net (online virtual Center of Excellence) [13]. In 2006, to support capacity-building in disaster-risk management in the PICs, Pacific Disaster Risk Management (DRM) Partnership Network was established comprising more than 30 regional and international organizations [11,13]. This Partnership Network is assisting and supporting the PICs to develop and implement Strategic National Action Plans (SNAP) for disaster risk management with funding from major donors such as European Islands and Australian Aid (AusAID) [11]. Other key objective of this network is to sustain a regional network of development partners that work in the different areas of disaster management to improve regional cooperation, coordination and collaboration; strengthen thematic areas identified in the 2005-15 Pacific Framework for Action; monitor and evaluate national progress; reduce duplication of efforts and ensure assistance is built on the efforts and experiences of each other [13]. Many PICs currently have the SNAP, while in some countries processes are underway to develop this action plan.

In August 2010, the Pacific Platform for Disaster Risk Management (PPDRM) Framework for Action 2010–2015 was adopted, to enhance disaster risk management in the PICs. Currently, most counties in the region have some form of legal and regulatory frameworks for managing disaster risk [14]. Regional cooperation mechanisms developed include a range of activities, such as Pacific Risk Exposure Database, Regional Specialized Meteorological Center for Tropical Cyclone in Nadi, Pacific Tsunami Warning Center, Melanesian Volcanological Network and others [13]. Unfortunately, major disparities and gaps amongst the PICs exist, and those with high disaster risk tend to have low coping capacity [8,15]. People in these region are vulnerable to the future natural calamities as they live in more exposed areas and have weak livelihoods and few resources [8,15]. In recent international forum, at the third UN World Conference in Sendai, Japan (March 18, 2015), leaders and decision-makers across the region adopted a new global framework for disaster risk reduction - the 'Sendai Framework for Disaster Risk Reduction 2015-2030' [16]. The Sendai Framework is successor instrument to the 'UN Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters' and was developed on elements which ensure continuity with the work done by States and other stakeholders under the 'Hyogo Framework' [16]. This new framework introduces innovations and emphasises on disaster risk management as opposed to disaster-management. Further, the Sendai Framework broadened disaster risk reduction significantly to focus on both natural and man-made hazards and related environmental, technological and biological hazards and risks; and provides a strong foundation for governments to take on a greater role at all levels [16]. Similar to the 'Hyogo Framework', the 'Sendai Framework' is also based on voluntary commitment of the member states. As many argue that the 'Hyogo Framework' was limited in its capacity to move certain actions forward [14], it is still unclear whether the 'Sendai Framework' will have similar difficulty.

Medical Rehabilitation in Disaster Settings

With advances in rescue and field management in disasters, survival rates have improved significantly worldwide [17]. However, rates of long-term physical disabilities, and mental and psychological disorders related to disasters are on the rise, requiring integrated interdisciplinary longer-term collaborative care from the acute phase of disaster to community reintegration [18,19]. There is a strong consensus amongst the disaster management authorities, that long-term rehabilitation planning is critical [19-21] and integral part of the comprehensive disaster management of victims [22]. The main aims of medical rehabilitation in disaster settings include: collaboration in the management of acute injury, optimization of functional capabilities (including cognitive, neuropsychological function) post-acute care, and social re-integration [18,23]. The role of rehabilitation physician/team in disaster settings is extensive and has an array of activities such as: coordination and assessment of injury patterns and post-disaster rehabilitation needs; valuation of resource requirements (including long-term); establishment of patient triage, discharge, referral, and tracking systems; collaboration with other healthcare service providers (local and international); coordination with emergency response systems, host health system and government managers; data collection, management and analysis and others [17,18].

The medical rehabilitation process should be initiated immediately (early) during the emergency response phase, and should continue in the community over a longer-term [19,24]. There is strong evidence that early involvement of rehabilitation programs can reduce disability, improve participation and quality of life of disaster victims [17,18,21]. Further, studies conducted in previous disasters have demonstrated that involvement of rehabilitation physician in the disaster management, results in positive and improved disaster victims' clinical outcomes, reduced length of hospital stay and fewer complications [25,26]. Despite the evidence, regrettably, often emergency responses and disaster management do not extend to include rehabilitation services [17]. In many disasters, the acute response and care protocols focusing on saving lives and treating acute injuries get utmost attention, and rehabilitative needs are often ignored [18,21,27].

Rehabilitation approach for disaster victims should include a wide spectrum of treatments and interventions [17,18]. The importance of rehabilitation services and need for inclusion of rehabilitation in response and planning for humanitarian catastrophes are well documented [24,28]. This review did not find any evidence of inclusion of rehabilitation professionals in emergency-response staffing configuration in any of disasters in the Pacific region. Similar to previous disasters worldwide, there are immense challenges for rehabilitation personnel, particularly, during the disaster settings in the PICs. These may include (but not limited to) [18,21,25,29]:

- Rehabilitation services do not exist and/or are in infancy stage in many PICs, and in many PICs these services are usually integrated within other health services in public hospitals (mainly in urban areas)
- Limited number of services specific for complex disaster-related disabilities
- During disasters, existing host-healthcare infrastructure (including rehabilitation services) may be damaged and/or disrupted or overwhelmed by the influx of disaster victims
- Discharge from healthcare facilities/community re-integration can be challenging due to lack of appropriate, accessible housing
- Poor coordination amongst disaster management organisations (national and international)
- Limited number of skilled human resources locally-few or no rehabilitation professionals
- Inadequate community rehabilitation resources and facilities
- Limited provision of psychological support and cognitive rehabilitation
- Lack of reporting, assessment, measurement and data collection tools
- Deployment to the affected areas can be complicated by damaged and/or disrupted infrastructure, such as roads, transport, communications etc.
- Cultural beliefs and practice of the people affected about

disability and the disaster itself

- Challenges posed by distance, diverse languages, cultural differences and geographic barriers

- Cost of access to rehabilitation services can be a barrier for victims due to lack or limited provision of disability support and government health plans

Identified Gaps for Action

Natural disasters potentially have significant consequences and serious economic implication for the PICs [11,14]. The challenges in disaster management are common for most developing countries, including PICs. Despite progress in surveillance and early warning systems and evacuations, overall Asia and Pacific region is still largely unprepared in disaster management [14]. Most importantly, some of the Pacific countries at greatest risk for natural disasters are those that are the least developed to manage these disaster-related risks [4,11]. The PICs recognise the immense challenges ahead for effective disaster risk management [11]. There is urgent need for investments in disaster risk reduction and disaster management in the Pacific region. This will not only improve physical and psychosocial disabilities of the disaster victims, but also result in significant economic benefit to the governments and community. For example, it is estimated that investment in reduction of coastal erosion in Kiribati can achieve net economic returns of a minimum of A$1.1 million [11,30]. The PICs seems to be heading in the right direction and are considering improving prospects for national development, through supporting investment in disaster risk reduction, climate change adaptation and disaster management [11]. Improved regional information exchange, strengthened regional cooperation for effective post-disaster management and joint coordination to address cross-border disasters are critical for disaster management [6,14,31].

With escalation of natural disasters, there is greater focus on the role of medical rehabilitation in disaster management worldwide. Many disaster survivors, mainly with severe injuries such as those with traumatic brain injuries (TBI), spinal cord injuries (SCI), and musculoskeletal injuries necessitate long-term planning for service delivery and rehabilitation [26]. Therefore, rehabilitation services and community care need to be prioritised in regional disaster management programs. Some issues and perspectives for consideration by the PICs for future disaster planning, include [29,32,33]:

- Leadership role of the central national healthcare ministry/organisation to coordinate and provide cooperative effort in disaster management to enhance capacity (national and international health care organisations, NGOs and Emergency Medical Teams)

- Robust inter-disciplinary and inter-sectoral partnerships need to be stimulated for disaster management, preparedness, emergency response and long-term planning

- All national and international representative organisations (including NGOs, disability-related society) should be recognised as important stakeholder group and included in disaster management agenda and processes, especially rehabilitation

- Develop comprehensive disaster management system

- Building capacity in rehabilitation (including regional capacity) and improving collaboration between all health care services

- Person-centred interdisciplinary care which includes rehabilitation of all survivors

- Service provision (including funding) of assistive devices such as crutches, prostheses, wheelchairs etc., when appropriate

- Treatment goals must be non-discriminatory and require alignment with key international Human Rights and principles of the UN Convention of the Rights of Persons with Disabilities

- Improve communication (information gathering, sharing and disseminating), cost-effectiveness and proactive technologies

- Information needs to disseminate to relevant authorities for longer-term management

- Fostering knowledge exchange and greater access to information/data for future capacity building

- Increase public awareness and active participation/inclusion of disaster survivors/family/community

- Leadership guidance from the governmental and other relevant authorities for training and empowerment and educational programs for healthcare professionals in regards to disasters and disability

- Rehabilitation capacity building at national health level and other relevant institutions for development of skilled workforces

- Access to information to enable active participation and contribution from treating teams

- Bilateral assistance for disaster victims: health security, financial, job creation, resources tailored to country characteristics

- Strengthen evidence-based information, data and knowledge

- Build grass root capacity for disasters preparedness

- Strengthen community-based rehabilitation

Discussion

Natural disasters (and related human-suffering) are escalating worldwide due to many factors, including: emerging effects of climate change, population growth, rapid urbanization, development patterns and poverty. Pacific region remains one of the most susceptible and exposed to natural disasters. The region is diverse geographically, economically, culturally and politically, which impede disaster risk reduction and effective management. Sustained disaster management progress in the region will require long-term cooperation by international partners and donors to provide lifesaving response and recovery assistance to victims when disasters strike. More broadly, greater economic integration, public awareness and education, more equitable resource, more innovative methods and adaptation to climate change will be needed for long-term management of future disasters in the PICs.

Long-term health consequences and disability affect many disasters victims, their family/carers, society and the overall health system. The National Action Plan for disaster management for PICs should include comprehensive long-term rehabilitation inclusive

management approach. The 'Sendai Framework for Disaster Risk Reduction 2015-2030', sets up an agenda for all government and sectors of society for collaborative effort for successful future disaster planning and management. The PICs are formulating their National Action Plans and other initiatives for disaster management and risk reduction. At national level, the capacity building approach needs to include the development of integrated disaster risk management and emergency response management plan, with inter-sectoral and interdisciplinary partnership amongst governmental, private, national and international sectors. The disaster management plan should consist long-term care and rehabilitation of the victims, which will require strengthening of community based organizations and more involvement of disaster victims and their families in planning.

Natural disaster management is acquiring a global attention. A futuristic perspective would have to look into the outlines of previous disaster experiences and come up with a systematic disaster rehabilitation strategy. The UN and WHO are key global actors with relevance to shaping disaster vulnerability and management in the PICs. Explicitly, the WHO Disability and Rehabilitation (DAR) Team works to support Member States to develop appropriate, effective and sustainable rehabilitation programs for persons with disabilities arising from all causes and has a number of collaborating partners and networks of rehabilitation experts [34]. The role of the WHO Liaison Sub-Committee on Rehabilitation Disaster Relief (CRDR) of the International Society of Physical and Rehabilitation Medicine (ISPRM) is vital in future disasters to facilitate coordination among major rehabilitation providers responding to the many needs in disasters, to minimize delay and duplication in the deployment and to deliver timely and effective rehabilitative care to the victims [19]. Many recent developments and initiatives could be regarded as the much needed steps, this includes the drafting of the 'Emergency Medical Teams: Minimum Standards for Rehabilitation' (in Print-personal communication), which define standards for rehabilitation in emergencies acknowledging that variations in type and patterns of injury, disease and subsequent long-term disability that arise in different scenarios. In consonance with the new perspective, coordination and collaboration with other organisations (both national and international) in the field of disaster relief, rehabilitation and recovery, is crucial for future. Further, in post-natural disaster recovery phase, is important that the government ensures that investments in healthcare and health infrastructure are designed for long-term sustainability and is innovative. The government planning should also emphasise successful community reintegration of disaster victims, revitalizing the culture of community resiliency.

Conclusion

Natural disasters result in significant numbers of severely injured who require comprehensive and protracted rehabilitation. Management of survivors in future disasters will require diverse forms of multi-stakeholder partnerships, including partnership with governmental bodies, local health care institutions, NGOs and INGOs, civil society organizations related to persons with disabilities, EMTs, community organisations and private sector. The successful and effective future disaster management will depend on the capacity and willingness of the PICs to embrace and disseminate effective methods of disaster risk governance and preparedness, and develop appropriate policies, regulations and legislations. The challenges ahead are developing a comprehensive, targeted and integrated approach to disaster risk management. Furthermore, there is a need for long-term rehabilitation inclusive post-disaster management strategies, stretching across all government and non-governmental sectors and jurisdictions, and vulnerable communities.

Acknowledgement

We thank the Committee on Rehabilitation Disaster Relief (CRDR) of the International Society of Physical and Rehabilitation Medicine (ISPRM) for their support.

References

1. WHO/SOPAC. Sanitation, hygiene and drinking water in the Pacific island countries: converting commitment into action (ISN 978-92-9061-401-2). Geneva: World Health Organization; 2008.
2. Pacific Islands Forum Secretariat. Pacific Disability Rights Framework 2016-2025 (Draft). Box Hill, Australia: Australian Disability and Development Consortium (ADDC); 2016.
3. United Nations Environment Programme (UNEP). Pacific Islands environment outlook. SPREP 2000. 2000.
4. Russell L. Poverty, climate change and health in Pacific Island Countries. Sydney: University of Sydney; April 2009.
5. Duncan D. Freshwater under threat: Pacific Islands. Bangkok: Regional Office for Asia and the Pacific, United Nations Environment Programme (UNEP); November 2011.
6. Economic and Social Commission for Asia and the Pacific (ESCAP). Economic and Social Survey of Asia and the Pacific. Bangkok: United Nations; 2015.
7. International Council for Science. Science plan on hazards and disasters: earthquakes, floods and landslides. Kuala Lumpur, Malaysia: ICSU Regional Office for Asia and Pacific; June 2008.
8. Economic and Social Commission for Asia and the Pacific (ESCAP). Disasters Without Boarders: Regional Resilience for Sustainable Development. Asia-Pacific Disaster Report Bangkok: United Nations; 2015.
9. Okuyama Y, Sahin S. Impact estimation of disasters: a global aggregate for 1960 to 2007. Washington, D.C.: World Bank; 2009.
10. Bettencourt S, Croad R, Freeman P, Hay J, Jones R, King P, et al. Not if but When, Adapting to natural hazards in the Pacific Islands Region. A policy note. Pacific Islands Country Management Unit: World Bank; 2006).
11. Pacific Islands Applied Geoscience Commission (SOPAC). Economic costs of natural disasters in the Pacific Islands region and measures to address them. Rarotonga, Cook Islands: Forum Economic Ministers' Meeting October 2009.
12. Hamnett MP. Natural disaster mitigation in Pacific Island Countries: a policy guide for planners and decision-makers: South Pacific Disaster Reduction Programme; 1995.
13. United nations office for Disaster Risk Reduction. Progress and Challenges in Disaster Risk Reduction: A contribution towards the development of policy indicators for the Post-2015 Framework on Disaster Risk Reduction Geneva, Switzerland: UNISDR; 2014.
14. Brassard C, Giles DW, Howitt AM. Natural Disaster Management in the Asia-Pacific: Policy and Governance. In: Shaw R, editor. Disaster Risk Reduction: Methods, Approaches and Practices. Kyoto: Springer Japan 2015.
15. Simpson A, Cummins P, Dhu T, Griffin J, Schneider J. Assessing natural disaster risk in the Asia-Pacific region. Aus Geo News 90. 2008.
16. United Nations Office for Disaster Risk Reduction. Sendai Framework for Disaster Risk Reduction 2015-2030. Geneva: UNISDR; 2015.
17. Reinhardt JD, Li J, Gosney J, Rathore FA, Haig AJ, Marx M, International

Society of Physical and Rehabilitation Medicine's Sub-Committee on Rehabilitation Disaster Relief. Disability and health-related rehabilitation in international disaster relief. Glob Health Action. 2011; 4: 7191.

18. Rathore FA, Gosney JE, Reinhardt JD, Haig AJ, Li J, DeLisa JA. Medical rehabilitation after natural disasters: why, when, and how? Arch Phys Med Rehabil. 2012; 93: 1875-1881.

19. Gosney J, Reinhardt JD, Haig AJ, Li J. Developing post-disaster physical rehabilitation: role of the World Health Organization Liaison Sub-Committee on Rehabilitation Disaster Relief of the International Society of Physical and Rehabilitation Medicine. J Rehabil Med. 2011; 43: 965-968.

20. Dhameja A. Disaster rehabilitation: towards a new perspective. In: Pinkowski J, editor. Disaster management handbook. FL, USA: CRC Press, 2008.

21. Khan F, Amatya B, Gosney J, Rathore FA, Burkle FM Jr. Medical Rehabilitation in Natural Disasters: A Review. Arch Phys Med Rehabil. 2015; 96: 1709-1727.

22. Thomas-Crusells J, McElhaney JE, Aguado MT. Report of the ad-hoc consultation on aging and immunization for a future WHO research agenda on life-course immunization. Vaccine. 2012; 30: 6007-6012.

23. Khan F, Amatya B, Hoffman K. Systematic review of multidisciplinary rehabilitation in patients with multiple trauma. Br J Surg. 2012; 99 Suppl 1: 88-96.

24. Landry MD, McGlynn M, Ng E, Andreoli A, Devji T, Bower C, et al. Humanitarian response following the earthquake in Haiti: reflections on unprecedented need for rehabilitation. World Health Population. 2010; 12: 18-22.

25. Gosney JE Jr. Physical medicine and rehabilitation: critical role in disaster response. Disaster Med Public Health Prep. 2010; 4: 110-112.

26. Rathore MF, Rashid P, Butt AW, Malik AA, Gill ZA, Haig AJ. Epidemiology of spinal cord injuries in the 2005 Pakistan earthquake. Spinal Cord. 2007; 45: 658-663.

27. Khan F, Amatya B, Mannan H, Burkle FM Jr, Galea MP. Rehabilitation in Madagascar: Challenges in implementing the World Health Organization Disability Action Plan. J Rehabil Med. 2015; 47: 688-696.

28. Landry MD, O'Connell C, Tardif G, Burns A. Post-earthquake Haiti: the critical role for rehabilitation services following a humanitarian crisis. Disabil Rehabil. 2010; 32: 1616-1618.

29. Khan F, Amatya B, Rathore FA, Galea MP. Medical rehabilitation in natural disasters in the Asia-Pacific region: the way forward. Int J Natural Disaster Health Secur. 2015; 2: 6-12.

30. Greer Consulting Services. Kiribati Technical Report, Economic Analysis of Aggregate Mining on Tarawa (EU EDF 8 – SOPAC Project Report). Suva, Fiji: Pacific Islands Applied Geoscience Commission (SOPAC) March 2007.

31. Economic and Social Commission for Asia and the Pacific (ESCAP). Disasters in Asia Pacific: 2104 year in review. Bangkok: United Nations; 2015.

32. Khan F, Amatya B, Mannan H, Rathore FA. Neurorehabilitation in developing countries: a way forward. Phys Med Rehabil Int. 2015; 2: 1070.

33. Butt S, Hitoshi N, Nottage L. Asia-Pacific Disaster Management. Comparative and Socio-legal Perspectives. Heidelberg: Springer, 2014.

34. World Health Organization. Disasters, disability and rehabilitation. Geneva, Switzerland: WHO, Department of Injuries and Violence Prevention; 2005.

35. Gero A, Fletcher SM, Rumsey M, Thiessen J, Kuruppu N, Buchan J, et al. Disaster response and climate change in the Pacific. Gold Coast, Australia: National Climate Change Adaptation Research Facility; 2013.

Phys Med Rehabil Int - Volume 3 Issue 4 - 2016
ISSN : 2471-0377 | www.austinpublishinggroup.com

Citation: Amatya B and Khan F. Overview of Medical Rehabilitation in Natural Disasters in the Pacific Island Countries. Phys Med Rehabil Int. 2016; 3(4): 1090.