Original Article

Medical Services at the Asian Beach Games: A Report of the Phuket Asian Beach Games Organizing Committee [PABGOC]

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Objective: To assess the medical services, administration, and problems encountered during medical services in the 4th Asian Beach Games 2014.

Materials and Methods: All medical encounters occurring at Phuket Asian Beach Games medical service centers and nation team physicians between November 10, 2014 and November 23, 2014 were identified from the daily reports. Data were analyzed based on the function as athletes or non-athletes.

Results: There were 619 total medical encounters during the game. The average encounter was 48.9 per day. The main medical encounters were on competitive venues whereas the peak of medical utilization was around the mid-period of the tournament. Most of the injuries or illnesses were found among athletes (46.7%) and staffs (32.1%). Nearly half (44%) of medical services were internal medicine and nearly one third were orthopedics (31%). Among the athletes' encounters, 71.9% were sport injuries and 28.9% were medical issues. The most common injuries were from ju-jitsu whereas the most common illnesses involved gastro-intestinal system.

Conclusion: From an average encounter of 48.9 per day, most were on competitive venues. Athletes and staffs were most commonly affected. Majority of athletes' encounters were sport injuries. These data could be used as reference for medical service planning in the other games with similar settings.

Keywords: Beach games, Injuries, Illnesses, Medical service, Phuket

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The Olympic Council of Asia [OCA] is an organization which is responsible to organize and support all the games conducted in Asia including the Asian beach games. The first Inaugural Asian Beach Games was held in Bali, Indonesia from 18th to 26th October 2008. The games featured 19 types of sports competitions for 71 gold medals with participating athletes from over 45 countries.

In 2014, Thailand was gracefully appointed to host the 4th Asian Beach Games 2014 in Phuket province (Phuket Games 2014). The event took place during 14th to 23rd November 2014. More than 2,443 athletes from 43 countries took part in the games which featured 26 types of sports competitions. All of which took place on the beach.

The medical subcommittee of Phuket Asian Beach Games Organizing Committee [PABGOC] planned and prepared all related issues for efficient medical services to more than 2,500 athletes and officials. The services included the period of practice

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session prior to, during, and until the competitions were done.

Many studies reported several issues of medical services of major sporting events[1-6]. Concerning medical services at the Beijing Olympic Games 2008[7] and the Inaugural Youth Olympic Games Singapore 2010[1], data information involving medical services on injuries and illnesses were reported. A subsequent study of the Medical Services at Youth Olympic Games 2012 in Innsbruck, Austria[8] constructed a data collecting system which could provide useful information regarding medical services preparation for major sports events. To date, there had been no study undertaken this issue in beach sports.

Both the physical and biological characteristic features of beach sports are different from other types of sports. The beach sports athletes rehearse and compete under hot weather. Heat and humidity can easily result in dehydration and heat exhaustion[9].

During the 2nd Asian Beach Games[10], the incident rates were 156.4 injuries per 1,000 registered athletes and 104.2 illnesses per 1,000 athletes. However, the study did not assess the events only in the athletes but not in other participants.

Objective

This study aimed to assess medical services and administration provided in all different venues for athletes, staff and audiences during the Fourth Asian Beach Games 2014. Any problems occurred were also identified.

Materials and Methods

The present study was approved by the Ethical Committees, Faculty of Medicine Vajira Hospital with permission and supports from the PABGOC.

PABGOC medical staff and medical services organization

There were 6 venues for this competition around Phuket with doctors and nurses available at all venues during the sports competitions. In all, 30 ambulances were employed 24 hours a day to transport patients with emergency conditions to the hospitals. Each ambulance was staffed by a physician, a nurse and a driver.

There were 3 medical teams providing services: onsite medical team, emergency medical service team, and hospital medical team. The onsite medical team was responsible for basic treatment at each venue. The emergency medical service teams were responsible for transporting the patient from the venue to the dedicated clinics or the hospitals under the supervision of the medical manager of the venue. The hospital medical team included 3 public and 4 private hospitals in Phuket. The main hospital was a 534-bed Vachira Phuket Hospital which is well equipped with medical instruments and specialists in each area of specialty who would be responsible for further treatment after initial care by the onsite medical team.

National team physician

The national team physicians were responsible for medical care of their own athletes in cooperation with PABGOC medical staff.

Data collection and analysis

One month in advance before the opening of the games, the researchers solicited the study to all PABGOC and the national medical staffs through electronic mails. One day before the competitions started, a meeting among all medical staff was set up for a work-plan. All staff received a booklet about the research and verbal instruction how to fill in information of injuries and illnesses during the 4th Asian Beach Games in data sheet. The 'Daily Reports on Injuries and Illnesses' form was taken from the International Olympic Committee [IOC] surveillance system from the London Summer Olympic Games 2012[11] (Appendix 1, 2). The filled-up forms would be collected from all medical staff by the researchers during daily medical staff meeting. The records were made for injuries and illnesses experienced in all participants: athletes, referees, staff, volunteers, team officials, media personnel, and spectators.

Data collected were: accreditation status of the participants, sport type (of the athlete), number of injuries or illnesses, location of events, primary diagnosis, type of medical services, transferring utilization, and hospital admission rate. Data were analyzed by Microsoft excel 2013 and presented as number and percentage.

Results

PABGOC medical staffs had collected 619 reports of medical encounters during the game. The average encounter was 48.9 per day. Most of the medical encounters were seen during the actual competition period, average of 66.42 encounters per day. The prevalence slowly increased from the beginning of the game, peaked during midpoint, and declined afterwards until closing (Figure 1).

Most services were at the competition venues (462, 74.6%). The other locations were: 98 (15.8%) at the designated hotels and 59 (9.6%) at the hospitals. Most of the injuries or illnesses were found among athletes (289, 46.7%) and staffs (199, 32.1%) and least with the referees (4, 0.6%). The other accreditation status of the individuals who were treated in order of frequency were: volunteers (50, 8.0%), VIPs/OCA family (34, 5.5%), team officials (25, 4.0%), media personnel (12, 2.0%), and spectators (6, 1.0%) (Figure 2).

Most of subspecialties which were in services were internal medicine (272, 44%) and orthopedics (192, 31%), followed by surgery (130, 21%), ophthalmology (19, 3%), and gynecology (6, 1%) (Figure 3).

Out of 2,443 total athletes, 356 athletes were treated in this game (15.8%). The treatment was more for sports injuries (256, 71.91% or 104.8/1,000 athletes) than for medical illnesses (100, 28.9% or 40.9/1,000 athletes). Most of sports injuries were caused by sprain (63, 24.6%) followed by strain (48, 18.8%), and wound (42, 16.4%). The sports which had most injury rate was jujitsu (27 injuries from 93 athletes, 29%) followed by air sports (24 injuries from 104 athletes, 23%), beach kabaddi (23 injuries from 103 athletes, 22%), beach soccer (25 injuries from 146 athletes, 17%) and Muay Thai (22 injuries from 130 athletes, 16.9%) (Figure 4). On the other hand, the 2 most common systems affected by illnesses were gastro-intestinal (29, 29.0%) and respiratory (26, 26.0%). The other systems of illnesses in order of frequency were skin (15, 15%), cardiovascular (6, 6%), and neurological/psychiatric (5, 5%) (Figure 5). These illnesses were found in foot volley, aquatics and beach volleyball athletes (Figure 6).

Overall, 19 game attendants were transferred to the hospitals: 14 athletes (73.7%), 2 VIPs/OCA family (10.4%), each one of staff, team official, and volunteer (5.3% each). Among these, 610 were treated as outpatients and 9 as inpatients. The 9 inpatients comprised 4 athletes, 2 VIPs, 2 team officials, and 1 OCA member. The principal cause of admission among the 4 athletes were fracture L2 and sacrum, muscle

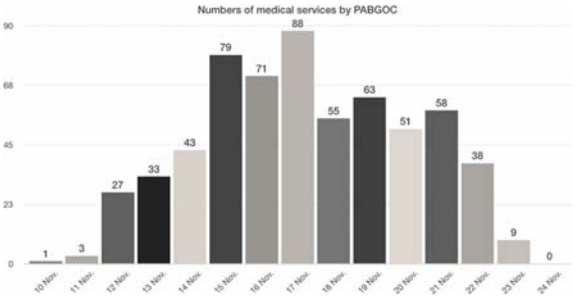

Figure 1. Numbers of medical services by PABGOC medical staff.

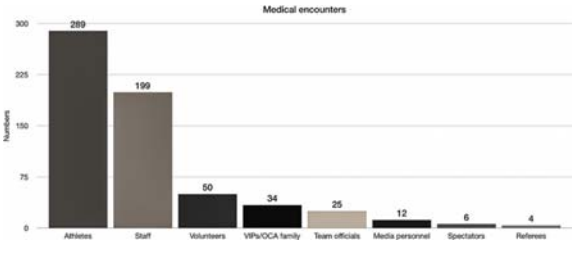

Figure 2. Numbers of total Medical encounters.

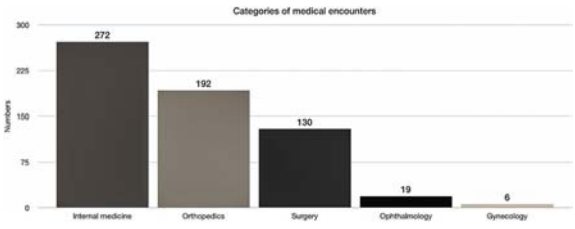

Figure 3. Numbers of categories of medical encounters.

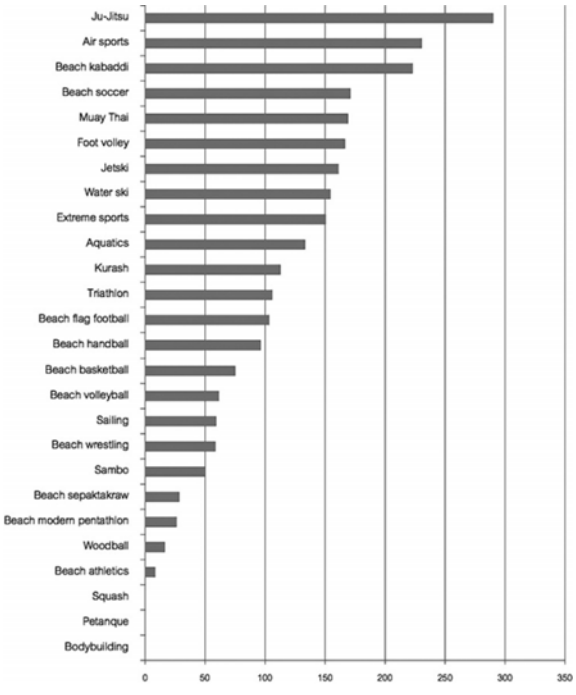

Figure 4. Rate of injuries by sport per 1,000 athletes.

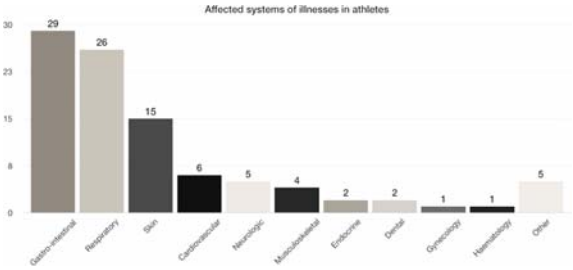

Figure 5. Affected systems of illnesses in athletes.

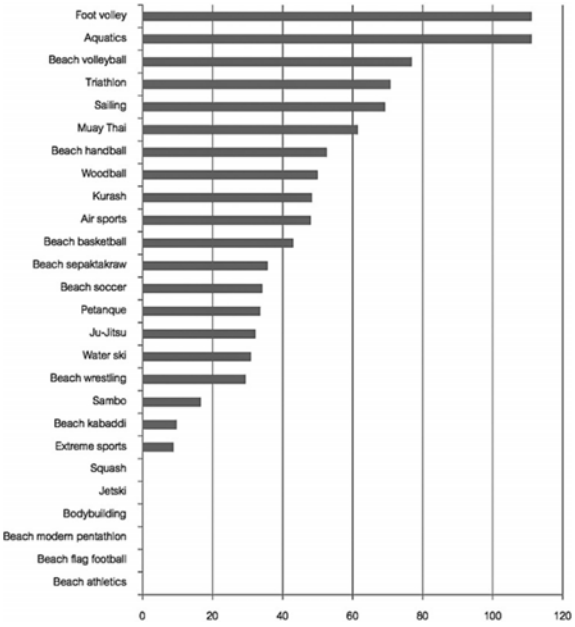

Figure 6. Rate of illness by sport per 1,000 athletes.

cramping, chicken pox, and hypoglycemia.

Discussion

The present study found the highest proportion of attendants who required medical treatment according to the accreditation status was athletes, followed by staffs and volunteers. We found higher numbers of medical encounters among non-athletes than athletes (53% vs. 47%). This finding was similar to previous reports of various games levels, such as, the World University Games 2007, the Winter Youth Olympics Games 2012, the Winter Olympic Games 1988, or the Olympic Games 1996, and 2008[4,6-8]. This information should help the future game organizer be cautious of the medical services coverage for non-athletes.

The locations of medical services in the Beach Game were different from the Game which only provided services only in polyclinics in the athlete's village. The majority of medical services in this game occurred at the competitive venues (75%) which was different from that found in the Olympic Game which found higher services in the village medical clinics (38%) and less at the venues (35%)[7]. The reason was that the athlete's accommodation in the Phuket Beach Game was the hotels along the beaches not gathering in the same village. Thus, it was more convenience for utilization the medical services at the competitive venues and the clinics in the hotels.

The most common sports inciting injuries was jujitsu (290 per 1,000). Jujitsu is a modern combat martial art that uses joint locks during competition to submit an opponent and to achieve match victory. Hence, there was a high chance of injury than other sports due to the nature of the sport itself[12,13]. The second common injured sport was air sports including paragliding and power paragliding. However, this event may be multifactorial. Few studies reported that most of the accidents in this sport were related to a mistake of the pilot and weather condition[14,15]. The third common injured sport was kabaddi. Kabaddi is a team contact sport and as the players try to catch the forwards or to run away from the defenders[16]. Due to the contact nature of this sport, injury was relatively common. Unfortunately data on injury risk in kabaddi were limited.

From previous reports, the most common affected system in major sports events in athletes was respiratory tract system followed by gastrointestinal system[10,11,17-20]. However, the present study reported gastrointestinal condition being the most common (29% of all illnesses). This can be attributed to Thailand and Phuket being the endemic area of travelers' diarrhea[21-23] because of a wide variety of street food especially seafood and spicy food which are popular in the areas. Also, the close contact of athletes to sand and sea water or having unintentionally swallowed contaminated water.

All the hospitals, especially the dedicated Asian Beach Games hospitals, were alert during the Phuket 2014 Asian Beach Games period. This started from the periods of arrival to departure of the participating delegations and terms. There were 9 patients registered and were hospitalized in the hospitals: Patong Hospital (5 patients), Vachira Phuket Hospital (3 patients), and Bangkok Phuket Hospital (1 patient). The hospitalization rate in this game was 1.5% of total medical encounters. This finding was

similar to those found in previous report (0.3 to 1.7%)[1,6,8]. These hospitals are located in different areas of Phuket. We had no reports whether there were any problems or difficulties. Only one remark from our administration team was that the dedicated or assigned hospitals should be located near the main competition venue.

The present study had strength that the PABGOC agreed that data of medical encounters in the medical services department should be assessed for an improvement, hence, provided a full support for the research project. Data were collected and verified daily, so the results were accurate and reliable. The PABGOC recognized the importance of a high-quality of medical team which certainly contributed to the success of the medical service. Hence, the medical managers and volunteers were selectively recruited from the dedicated hospitals in the proximity. They were trained and drilled for all types of medical care. These were to ascertain a successful medical care.

However, we were aware of some limitations in our report. A number of people may not seek medical services at the venues or designated hospitals. Furthermore, many national teams traveled along with their own medical staff and the medical services were also not reported. Thus the actual number of cases of medical services for athletes may not fully be represented in the present study. This issue was similarly reported in other studies[10]. In addition, drug abuse or doping control was not part of the general medical services, so these data were lacking in this study. One unique issue which was found during the game was the level of foreign language skills. This language proficiency should be recognized and well prepared by language training for volunteers and all medical staffs for the achievement.

Conclusion

Despite many challenges in an event of this magnitude, medical services at the Fourth Asian Beach Games 2014 were well organized. An average encounter was nearly 50 encounters per day. Most of the medical encounters were seen during the actual competition period. Future organizing committees could use these data for appropriate planning for future events.

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What is already known on this topic?

Numberous studies on medical services of major sporting events provided useful information for medical services preparation. Medical services on beach game has never been reported. Anectodal reports found respiratory tract system as most common illness among the athletes.

What this study adds?

Beach games are unique in terms of location, sport activities, weather conditions and environment. We found internal medicine and orthopedics problems as the most common medical services. In contrast to other games, we found that gastro-intestinal system was most commonly affected during the beach game. The organizing committees and medical teams should provide this information to public and all potential participants. Caution to prevent and manage the possible encounters in beach games should be emphasized.

Potential conflicts of interest

The authors declare no conflict of interest.

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Appendix. 1

Daily report on Injuries and Illness

NOC | Report by (name) | Date of report /2014

Contact details (e-mail/tel.)

Please report: **(1) All injuries (traumatic and overuse) and (2) all illnesses newly incurred in competition or training during the Asian Beach Games regardless of the consequences with respect to absence from competition or training.** The information provided is for medical and research purposes and will be treated confidentially

1. Injury – Example

Definitions and codes of ❶ to ❻ see reverse

athlete's accreditation no.	bw / ht	sport and event ❷		round, heat or training ❸		date and time of injury
1234569587979	55/175	athletics – 100m (women)		quarterfinal – 1st heat		15.11.2014, 14:55
injured body part, side	code	type of injury	code	cause of injury	Code	absence in days
wrestle, left ❹	15	sprain ❺	1.11.16	slipped and fell ❻	21	10 ❶
athlete's accreditation no.	bw / ht	sport and event		round, heat or training		date and time of injury
injured body part, side	code	type of injury	code	cause of injury	Code	absence in days
athlete's accreditation no.	bw / ht	sport and event		round, heat or training		date and time of injury
injured body part, side	code	type of injury	code	cause of injury	Code	absence in days

2. Illness –Example

Definitions and codes of ❶ ❷ ❼ ❽ and ❾ see reverse

athlete's accreditation no.	bw / ht	sport and event ❷		Diagnosis		occurred on(date)
1234569587979	75/172	football (men)		Cystitis		13.11.2014
affected system	code	main symptom(s)	code	cause of illness	Code	absence in days
uro-genital ❼	3	pain ❽	2	infection ❾	2	0 ❶
athlete's accreditation no.	bw / ht	sport and event		Diagnosis		occurred on(date)
affected system	code	main symptom(s)	code	cause of illness	Code	absence in days
athlete's accreditation no.	bw / ht	sport and event		Diagnosis		occurred on(date)
affected system	code	main symptom(s)	code	cause of illness	Code	absence in days

◯ No injury or illness in any athlete of our team today

Please use additional forms if needed.

Appendix. 2

Codes and classifications

1 Estimated duration of absence from training or competition (in days)

Please provide an estimate of the number of days that the athlete will not be able to undertake his/her normal training programme or will not be able to compete.

0 = 0 days
1 = 1 day
2 = 2 days
7 = 1 week
14 = 2 weeks
21 = 3 weeks
28 = 4 weeks
> 30 = more than 4 weeks
> 180 = 6 months or more

2 Sport and event

Please state the event. For example: swimming – 4x100m freestyle relay (women); track – 110m hurdles (men); taekwondo – under 58kg (men); cycling – team sprint (women)

For Injuries

3 Round, heat or training

If the injury occurred during competition, please state the round (e.g. heats, qualification B, final).
If the injury occurred on another occasion, please specify whether it was training, warm-up or other.

4 Injured body part (location of injury)

Head and trunk	**Upper extremity**	**Lower extremity**
1 face (incl. eye, ear, nose)	**11** shoulder / clavicle	**21** hip
2 head	**12** upper arm	**22** groin
3 neck / cervical spine	**13** elbow	**23** thigh (a: anterior / p: posterior)
4 thoracic spine / upper back	**14** forearm	**24** knee (m: medial / l: lateral)
5 sternum / ribs	**15** wrist	**25** lower leg (a: anterior / p: posterior)
6 lumbar spine / lower back	**16** hand	**26** Achilles tendon
7 abdomen	**17** finger	**27** ankle (m: medial / l: lateral)
8 pelvis / sacrum / buttock	**18** thumb	**28** foot / toe

5 Type of injury (diagnosis)

1 concussion (regardless of loss of consciousness)	**8** sprain (injury of joint and / or ligaments)	**15** impingement
2 fracture (traumatic)	**9** lesion of meniscus or cartilage	**16** laceration / abrasion / skin lesion
3 stress fracture (overuse)	**10** strain / muscle rupture / tear	**17** dental injury / broken tooth
4 other bone injuries	**11** contusion / haematoma / bruise	**18** nerve injury / spinal cord injury
5 dislocation, subluxation	**12** tendinosis / tendinopathy	**19** muscle cramps or spasm
6 tendon rupture	**13** arthritis / synovitis / bursitis	**20** other
7 ligamentous rupture	**14** fasciitis / aponeurosis injury	

6 Cause of injury

1 overuse (gradual onset)	**11** contact with another athlete	**21** field of play conditions
2 overuse (sudden onset)	**12** contact: moving object (e.g. puck)	**22** weather condition
3 non-contact trauma	**13** contact: stagnant object (e.g. pole)	**23** equipment failure
4 recurrence of previous injury	**14** violation of rules (obstruction, pushing)	**24** other

For Illnesses

7 Affected system

1 respiratory / ear, nose, throat	**5** allergic / immunological	**9** dermatologic
2 gastro-intestinal	**6** metabolic / endocrinological	**10** musculo-skeletal
3 uro-genital / gynaecological	**7** haematological	**11** dental
4 cardio-vascular	**8** neurological / psychiatric	**12** other

8 Main symptom(s)

1 fever	**5** palpitations	**9** syncope, collapse
2 pain	**6** hyper-thermia	**10** anaphylaxis
3 diarrhoea, vomiting	**7** hypo-thermia	**11** lethargy, dizziness
4 dyspnoea, cough	**8** dehydration	**12** other

9 Cause of illness / symptom(s)

1 pre-existing (e.g. asthma, allergy)	**3** exercise-induced	**5** reaction to medication
2 infection	**4** environmental	**6** other