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Medical services provided on the '*Harmonious Mission—2017*' Peace Ark from China

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ABSTRACT

Introduction The Chinese Naval ship Peace Ark provided humanitarian medical services to people in eight low-income countries in Africa and Asia during the 2017 "*Harmonious Mission*'. The expedition lasted 155 days. Our study aimed to analyse the details of the medical services provided including outpatient care, medical patrol, operations, examinations and medications.

Method The patient demographic data and medical information were extracted from electronic medical records. The diagnoses and procedures aboard were coded by the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). The sociodemographic data of the medical staff aboard were collected via questionnaire. Descriptive statistics and statistical software (SAS, V.9.4) were used to analyse the data.

Results In total, 115 Chinese military medical personnel participated in the mission, completing a total of 50 758 outpatient visits, 10 232 medical patrols and 252 operations. The five most frequently used outpatient departments were ophthalmology, general surgery, general internal medicine, orthopaedics and traditional Chinese medicine. The five most common operations were lipoma excision, cataract extraction, skin tissue removal (such as warts and cysts), pterygium transposition and herniorrhaphy.

Conclusions Our study revealed the medical services in demand during the '*Harmonious Mission—2017*'. It is essential to report their experiences so that future ventures can provide medical services more effectively.

Key messages

⇒ The '*Harmonious Mission—2017*' was a travelling medical ship that visited eight low-income countries in Africa and Timor-Leste in Asia, the expedition lasted 155 days.
⇒ The mission provided a total of 50 758 outpatient visits, 10 232 medical patrols and 252 operations.
⇒ Popular departments included ophthalmology, general surgery and internal medicine.
⇒ Common operations consisted of lipoma excision, cataract extraction and skin tissue removal.

INTRODUCTION

A hospital ship is a ship designated with the primary function as a floating medical treatment facility or hospital. At present, only a few countries worldwide, such as the USA, Russia, the UK, Canada, Japan and China, have modern large hospital ships with the medical rescue capability at sea.[1] Among them, the US Navy has two active hospital ships, the T-AH-19 *Mercy* and the T-AH-20 *Comfort*, which physically are among the largest trauma hospitals globally. Both of them are equipped with 1000 hospital beds, of which 20 are postanaesthesia care beds and 80 are fully equipped intensive care unit (ICU) beds.[2] The Russian Navy has three hospital ships that were built in the 1970s, they have 80 crew members, 200 medical staff and 400–500 beds.[3] The UK has the Royal Fleet Auxiliary ARGUS, which in its largest configuration has 100 beds. The ARGUS is not a designated hospital ship, as she carries weapons systems and has other military roles. The UK also has a private medical ship, *The African Love*, which provides charitable medical services to low-income areas or war-torn areas.[4]

The Chinese People's Liberation Army Navy Peace Ark is a standard hospital ship designed and built by the Chinese Navy. The 178 m long ship has a maximum width of 24 m and a full load displacement of >14 000 tons. It has 10 departments and medical information centres, including a resuscitation room, X-ray imaging room, CT imaging room, inspection room, blood preparation room and others. The ship has a total bed capacity of 300 and can perform 8 operations simultaneously; its medical facilities are advanced and the nursing system is efficient.[1] The Peace Ark's primary mission, just like its United States Naval Ship counterparts (*Mercy* and *Comfort*) is to provide humanitarian assistance, disaster response and mobile medical capability for deployed military personnel.[2] Since its commission in October 2008, seven "*Harmonious Mission*' humanitarian medical assistant actions have been executed worldwide, providing various types of medical care for people in Africa, Latin America, Asia, the South Pacific islands and so on.

The authors participated in one recent overseas humanitarian medical assistance mission—the '*Harmonious Mission—2017*'. This was the sixth time the Peace Ark performed a "*Harmonious Mission*'. Previously, the Chinese People's Liberation Army Navy Peace Ark visited various countries for medical service missions, including five Asian and African countries in 2010, four Latin American countries in 2011, eight Asian countries in 2013, four South Pacific countries in 2014 and eight Pacific Rim countries in 2015. The mission started on 26 July 2017 and finished on 28 December 2017, with a duration of 155 days. It had the largest number of participating institutions, the smallest

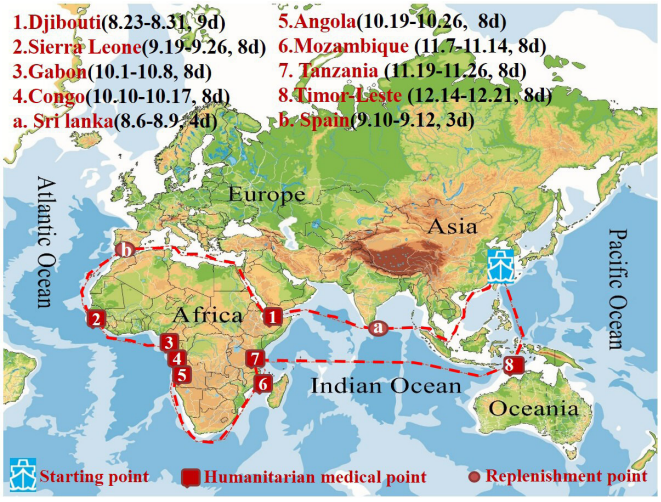

Figure 1 Route of the '*Harmonious Mission—2017*' Peace Ark. The Hospital Ship Peace Ark began its '*Harmonious Mission—2017*' from Zhoushan, China and provided medical service to people in Djibouti, Sierra Leone, Gabon, Congo, Angola, Mozambique, Tanzania and Timor-Leste and replenished in Spain and Sri lanka.

number of personnel and the longest mission length among all previous harmonious missions. It began in Zhoushan, China, and provided medical service to people in Djibouti, Sierra Leone, Gabon, Congo, Angola, Mozambique, Tanzania and Timor-Leste (see Figure 1). The mission had two objectives: (1) provide humanitarian medical services to people in eight host countries and (2) provide medical services to Chinese escort fleets in the Gulf of Aden and Chinese officers and soldiers at the Djibouti Guarantee Base. The Peace Ark stopped in each country for an average of 7 days; of those days, six and a half were spent providing medical assistance to residents, Chinese nationals living overseas and deployed military personnel. Additionally, medical outreach tasks were performed by small teams.

The eight host countries are all low-income countries, with scarce medical resources according to the WHO's official website. At present, only a few articles have focused on the burden of medical demands among these eight low-income countries.[5–11] More information about their profiles and medical demands are needed. To the best of our knowledge, this paper is the first to retrospectively review the disease profiles in patients treated during the Chinese Peace Ark's '*Harmonious Mission—2017*', with a special focus on disease patterns, outpatient and inpatient surgical procedures. This paper will help formulate recommendations for future medical resource preparation and humanitarian assistance on similar missions.

METHODS

Data collection

This was an observational, descriptive study of the medical demands and the characteristics of injuries and illnesses treated aboard the Peace Ark during the '*Harmonious Mission—2017*'. Patient demographic data and variables, including country, name, gender, age, complaints, diagnoses, disposition (including admission and discharge), surgery date, surgical specialty and surgical procedure were extracted from electronic medical records. All diagnoses for patients with injuries or diseases were based on the report by the attending physician. The sociodemographic data of the medical staff aboard were collected via a questionnaire which asked for gender, age, marital status, educational attainment and occupation type. Voyage experience was collected by asking the following question: "*Have you taken part in a long voyage (navigation for 3 months or more) in the last 3 years?*" Response options were: 0=no or 1=yes.

Diagnoses and procedures coding

The coding of diagnoses and procedures aboard followed the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM), which is based on the WHO's International Classification of Diseases, Ninth Revision (ICD-9). The ICD-9-CM is the official system of assigning codes to diagnoses and procedures associated with hospital utilisation worldwide.[12]

Statistical analysis

For statistical analysis, descriptive statistics were used. Categorical variables were presented as frequencies and percentages, and continuous variables were presented as means and SD. All data were analysed using standard statistical software (SAS, V.9.4).

RESULTS

Profile of medical staff

The crew selection criteria were as follows: (1) passed the physical fitness assessment of Chinese servicemen and adapted well to the sea; (2) rich working experience in medical management, clinical medicine and nursing; (3) at or under 55 years old, except nurses who were 45 years old or younger and (4) preference for those with sea experience. Finally, 115 associated Chinese military medical personnel were selected to take part in this mission. The baseline characteristics of medical staff are shown in Table 1.

Profile of medical service

A total of 50 758 outpatient visits were made, with an average of 6345 visits per country. During the mission, 10 232 medical patrol and 252 operations were completed (Table 2). The top three countries requiring outpatient visits were Mozambique, Gabon and Angola. Sierra Leone, Congo and Mozambique ranked in the top three for medical patrols. For operations, Sierra Leone, Congo and Mozambique ranked in the top three. The three most common examination methods during the entire mission were laboratory examinations, B-mode ultrasonography and digital radiography.

Details of outpatient service

In 50 758 outpatient visitors, the mean age was 40 years (SD 16.84), and 55.28% were men. The five most frequented outpatient departments were ophthalmology, general surgery, general internal medicine, orthopaedics and traditional Chinese medicine (Table 3). The top five departments in terms of outpatient visits were relatively consistent among different countries, with only slight differences. In terms of sex subgroups, the top five outpatient departments among men remained constant, while those for women changed slightly. The five most sought after outpatient departments for women were gynaecology and obstetrics, ophthalmology, general surgery, general internal medicine and traditional Chinese medicine, respectively (online supplemental table S1).

Details of operations

Out of 252 operations, the patient mean age was 42.50 years (SD 16.63), and 70.59% were male. An overall mean of 4.85 surgical procedures were performed per working day in port; that mean varied from a low of 2.15 in Angola, the fifth port

Table 1 Baseline characteristics of medical staff

Variable	*N*	Per cent (%)
Age (years)		
27–30	12	10.43
31–40	59	51.30
41–50	34	29.57
≥51	10	8.70
Sex		
Male	57	49.57
Female	58	50.43
Married		
Yes	107	93.04
No	8	6.96
Education level		
Undergraduate	56	48.70
Postgraduate	25	21.74
Doctorate	34	29.57
Occupation		
Nurse	25	21.74
Doctor	68	59.13
Other	22	19.13
Voyage experience		
Yes	47	40.87
No	68	59.13

of call, to a high of 8.15 in Timor-Leste, the eighth port of call. Among 252 operations, 169 (67.06%) were inpatient operations, of which 34 required general anaesthesia, and the longest operation time was 6 hours. Table 4 shows the five most popular operation procedures as coded with the ICD-9-CM3: lipoma excision (ICD 86.83, 22.22%), cataract extraction (ICD 13.72, 20.24%), skin tissue removal (such as warts and cysts) (ICD 86.30, 15.87%), pterygium transposition (ICD 11.31, 5.95%), herniorrhaphy (ICD 83.87, 5.56%). By sex, the common operations for men and women did not differ greatly from those in the general population. Notably, breast fibroadenoma resection was the fifth most common operations among females (online supplemental table S2).

Details of medication consumptions

The most common medications distributed are displayed in Table 5. Overall, the top 10 included dermatology drugs, ophthalmology and otorhinolaryngology drugs, Chinese patent medicine, electrolyte balance medicine, antibacterial drugs, antipyretic and analgesic drugs, vitamins, gastric drugs, anaesthetics and auxiliary drugs and paediatric medication. The medication types in demand for each country were similar.

DISCUSSION

As peacekeeping, humanitarian and disaster relief needs increase worldwide, the Chinese military has committed more resources to assist underserved populations. The '*Harmonious Mission—2017*' provided humanitarian medical services to local people in the eight low-income countries, each with a low Human Development Index in health, education and income.[13] This was the first manuscript to retrospectively review the Chinese Peace Ark's medical and humanitarian assistance. The paper can inform medical resource preparation in future missions.

Large high-income nations provide similar humanitarian missions, the PACIFIC PARTNERSHIP series mission (PP) is the largest Humanitarian Assistance and Disaster Relief and Capacity Building mission in the Indo-Asia-Pacific region.[14] Its crew included military personnel from many other nations. For example, PP 18 included 13 nations: the USA (lead), the UK, Japan, Australia, Canada, France, Thailand, Chile, Singapore, Sri Lanka, South Korea, the Philippines and Peru.[15] The PP focused on the Indo-Asia-Pacific region while the Chinese '*Harmonious-series Mission*' have no fixed assistance object area and each mission has a different route.

The study participants needed medication and medical treatment. Although the patients aboard were screened preliminarily by their respective local governments, the number of patients still greatly exceeded the ship's normal outpatient reception capacity. There were long queues outside each department, and it was hard for local police and the military to maintain order. There were on average >1000 daily visits by patients, with a high of 1796 visits in 1 hour. As a result, the medical staff aboard could hardly finish working on time; they had to work overtime and carried out the majority of operations late at night. This information indicates that research into the expected quantity of patients must be conducted, and fast and accurate prior screening should be conducted at the dock in future missions, which would help control patient numbers and avoid chaos. Because the hospital ship docked in port for a limited time and medical resources were limited, effective prior screening would be imperative to exclude patients with unnecessary treatments and identify potentially successful surgical cases with limited follow-up requirements.

In terms of outpatient department demand, the ophthalmic clinic received the highest number of outpatient visitors. In particular, those in Gabon accounted for 20.08% of outpatient visits, with an average of 157 visits per day. This was followed by the general surgery, general internal medicine, orthopaedics

Table 2 Profile of medical services provided on the '*Harmonious Mission—2017*' Peace Ark

Item	Djibouti	Sierra Leone	Gabon	Congo	Angola	Mozambique	Tanzania	Timor-Leste	Others	Total
Outpatient visit	5860	6098	6254	5217	6148	8207	5061	5861	2052	50 758
Medical patrol	406	2310	364	2288	354	1657	1380	1473	0	10 232
Operation	18	48	42	44	14	44	39	0	3	252
Laboratory examination	877	1421	1150	1009	1292	1277	1176	1306	360	9868
B-mode ultrasonography	796	1039	1170	787	1095	1303	1182	1234	312	8918
Digital radiography	489	753	555	505	569	697	654	744	163	5129
ECG	290	471	428	342	497	484	531	446	143	3632
CT	104	189	220	242	304	292	345	435	66	2197
Pathology	5	30	25	31	3	26	22	34	0	176
Gastrointestinal endoscopy	3	6	6	5	8	8	7	9	4	56

Table 3 Number of visits in outpatient departments by country

Department	Djibouti	Sierra Leone	Gabon	Congo	Angola	Mozambique	Tanzania	Timor-Leste	Other*	Total
Ophthalmology	**785 (13.40)**	**744 (12.20)**	**1256 (20.08)**	**836 (16.02)**	**824 (13.40)**	**1104 (13.45)**	406 (8.02)	407 (6.94)	126 (6.14)	**6488 (12.78)**
General surgery	**573 (9.78)**	**978 (16.04)**	**584 (9.34)**	**630 (12.08)**	477 (7.76)	**791 (9.64)**	**616 (12.17)**	**593 (10.12)**	158 (7.70)	**5400 (10.64)**
General internal medicine	**531 (9.06)**	429 (7.04)	**590 (9.43)**	**496 (9.51)**	**732 (11.91)**	**822 (10.02)**	**589 (11.64)**	**574 (9.79)**	172 (8.38)	**4935 (9.72)**
Orthopaedics	**526 (8.98)**	**667 (10.94)**	451 (7.21)	**519 (9.95)**	**516 (8.39)**	**670 (8.16)**	**477 (9.43)**	**503 (8.58)**	227 (11.06)	**4556 (8.98)**
Traditional Chinese medicine	**650 (11.09)**	**480 (7.87)**	**557 (8.91)**	**543 (10.41)**	**621 (10.10)**	573 (6.98)	**516 (10.20)**	434 (7.40)	178 (8.67)	**4552 (8.97)**
Gynaecology and Obstetrics	251 (4.28)	395 (6.48)	**575 (9.19)**	331 (6.34)	397 (6.46)	**728 (8.87)**	**444 (8.77)**	385 (6.57)	130 (6.34)	3636 (7.16)
Gastroenterology	368 (6.28)	**552 (9.05)**	204 (3.26)	362 (6.94)	395 (6.42)	489 (5.96)	377 (7.45)	**517 (8.82)**	88 (4.29)	3352 (6.60)
Stomatology	521 (8.89)	228 (3.74)	503 (8.04)	326 (6.25)	267 (4.34)	459 (5.59)	140 (2.77)	192 (3.28)	171 (8.33)	2807 (5.53)
Cardiology	224 (3.82)	250 (4.10)	210 (3.36)	271 (5.19)	496 (8.07)	444 (5.41)	378 (7.47)	312 (5.32)	211 (10.28)	2796 (5.51)
Urology	236 (4.03)	368 (6.03)	241 (3.85)	264 (5.06)	**620 (10.08)**	450 (5.48)	260 (5.14)	259 (4.42)	54 (2.63)	2752 (5.42)
Otorhinolaryngology	323 (5.51)	210 (3.44)	342 (5.47)	203 (3.89)	246 (4.00)	380 (4.63)	274 (5.41)	301 (5.14)	153 (7.46)	2432 (4.79)
Dermatology	231 (3.94)	213 (3.49)	365 (5.84)	122 (2.34)	204 (3.32)	492 (5.99)	186 (3.68)	**446 (7.61)**	157 (7.65)	2416 (4.76)
Respiratory medicine	303 (5.17)	295 (4.84)	155 (2.48)	142 (2.72)	215 (3.50)	281 (3.42)	183 (3.62)	441 (7.52)	59 (2.88)	2074 (4.09)
Paediatrics	148 (2.53)	130 (2.13)	82 (1.31)	103 (1.97)	7 (0.11)	353 (4.30)	122 (2.41)	383 (6.53)	79 (3.85)	1407 (2.77)
Neurology	169 (2.88)	140 (2.30)	128 (2.05)	63 (1.21)	124 (2.02)	155 (1.89)	86 (1.70)	105 (1.79)	69 (3.36)	1039 (2.05)
Nephrology	6 (0.10)	14 (0.23)	7 (0.11)	2 (0.04)	3 (0.05)	5 (0.06)	6 (0.12)	7 (0.12)	13 (0.63)	63 (0.12)
Cardiothoracic surgery	14 (0.24)	5 (0.08)	2 (0.03)	2 (0.04)	4 (0.07)	6 (0.07)	1 (0.02)	2 (0.03)	4 (0.19)	40 (0.08)
Infectious diseases	1 (0.02)	0 (0.00)	2 (0.03)	2 (0.04)	0 (0.00)	5 (0.06)	0 (0.00)	0 (0.00)	3 (0.15)	13 (0.03)
Total	5860 (100.00)	6098 (100.00)	6254 (100.00)	5217 (100.00)	6148 (100.00)	8207 (100.00)	5061 (100.00)	5861 (100.00)	2052 (100.00)	50 758 (100.00)

Top five departments in each country were in bold
*Other included starting point and replenishment point.

Table 4 Profile of operation procedures by country

Country	Variables	Rank 1	2	3	4	5	Total, *N* (%)
Djibouti	ICD	13.72	49.12	86.83	08.93	30.01	
	Name	Cataract extraction	Anal fistulectomy	Excision of llipoma	Epilation of eyelid	Excision of laryngopharyngeal cyst excision	
	N (%)	4 (22.22)	3 (16.67)	3 (16.67)	1 (5.56)	1 (5.56)	18 (7.14)
Sierra Leone	ICD	86.30	13.72	86.83	83.87	11.31	
	Name	Removal of skin tissue	Cataract extraction	Excision of lipoma	Herniorrhaphy	Transposition of pterygium	
	N (%)	11 (22.92)	10 (20.83)	8 (16.67)	5 (10.42)	3 (6.25)	48 (19.05)
Gabon	ICD	86.83	13.72	86.30	11.31	83.87	
	Name	Excision of lipoma	Cataract extraction	Removal of skin tissue	Transposition of pterygium	Herniorrhaphy	
	N (%)	13 (30.95)	8 (19.05)	6 (14.29)	2 (4.76)	2 (4.76)	42 (16.67)
Congo	ICD	86.83	86.30	13.72	51.22	06.7	
	Name	Excision of lipoma	Removal of skin tissue	Cataract extraction	Cholecystectomy	Thyroglossal duct cyst resection	
	N (%)	15 (34.09)	10 (22.73)	9 (20.45)	3 (6.82)	1 (2.27)	44 (17.46)
Angola	ICD	11.31	13.72	28.92	47.00	56.00	
	Name	Transposition of pterygium	Cataract extraction	Tonsillectomy	Appendectomy	Ureter lithotomy	
	N (%)	5 (35.71)	4 (28.57)	1 (7.14)	1 (7.14)	1 (7.14)	14 (5.56)
Mozambique	ICD	86.83	13.72	83.31	86.30	85.21	
	Name	Excision of lipoma	Cataract extraction	Excision of lesion of tendon sheath	Removal of skin tissue	Removal of breast fibrosis	
	N (%)	10 (22.73)	7 (15.91)	4 (9.09)	4 (9.09)	3 (6.82)	44 (17.46)
Tanzania	ICD	13.72	86.83	86.30	83.87	08.93	
	Name	Cataract extraction	Excision of lipoma	Removal of skin tissue	Herniorrhaphy	Epilation of eyelid	
	N (%)	9 (23.08)	7 (17.95)	6 (15.38)	5 (12.82)	2 (5.13)	39 (15.48)
Timor-Leste	ICD	–	–	–	–	–	
	Name	–	–	–	–	–	
	N (%)	–	–	–	–	–	0 (0.00)
Other*	ICD	8.81	82.45	86.30	–	–	
	Name	Repair of eyelid laceration	Suture of hand tendon	Removal of skin tissue	–	–	
	N (%)	1 (33.33)	1 (33.33)	1 (33.33)	–	–	3 (1.19)
Total	ICD	86.83	13.72	86.30	11.31	83.87	
	Name	Excision of lipoma	Cataract extraction	Removal of skin tissue	Transposition of pterygium	Herniorrhaphy	
	N (%)	56 (22.22)	51 (20.24)	40 (15.87)	15 (5.95)	14 (5.56)	252 (100.00)

ICD, International Classification of Diseases.

Table 5 Details of medication consumption

Drug types	Djibouti	Sierra Leone	Gabon	Congo	Angola	Mozambique	Tanzania	Timor-Leste	Others	Total
Dermatology	1283	1286	1365	1210	1420	1865	1002	1009	233	10 673
Ophthalmology and otorhinolaryngology	832	842	879	798	895	1256	702	831	171	7206
Chinese patent medicine	601	605	633	576	645	842	534	601	11	5048
Liquid and electrolyte balance	578	598	604	523	614	824	506	579	109	4935
Antibacterial	390	424	425	365	438	545	400	447	94	3528
Antipyretic and analgesic	358	357	359	345	360	389	323	401	77	2969
Vitamins	279	299	301	245	312	469	234	264	54	2457
Gastric	281	283	291	245	291	324	241	279	63	2298
Anaesthetics and auxiliary	198	189	199	178	201	234	165	178	37	1579
Paediatric	167	168	170	157	178	201	141	169	32	1383

The different drugs units are the smallest measurable unit, such as '*tablet*', '*pill*', '*vial*' and '*bag*'. Drugs are classified according to the General List of Commonly used Drugs Prescribed by the Ministry of Health of the People's Republic of China.

and traditional Chinese medicine departments with around 72 visits per day to each department. The department of obstetrics and gynaecology had the greatest medical care demands from female patients. Considering the workload of outpatient visits, medical patrols and operations, departments in greater demand need to be equipped with at least five professional doctors and the same number of nurses. These results provide insight as to what specialties will be needed, what types of training will be most valuable and what kinds of medications and medical instruments will be in demand. This, in turn, will allow future patients aboard to receive higher quality medical care.

The number and surgeon types required will depend on the length of stay at each site, the number of operating rooms open, surgeries expected and available supplies.[13] Because of the short berthing time and limited hardware conditions of hospital ships, it was not suitable to accept critically ill patients who require difficult and complex operations. Most operations were categorised as those with concrete effects and quick recovery times, such as lipoma excision, cataract resections, skin tissue removal, pterygium transpositions and herniorrhaphy. Many cases involved rare medical conditions like an enormous umbilical hernia, a submental mass and a large mass in a child's right breast.

With regard to medical equipment, some resources and equipment were quite limited, which hindered the efficiency of diagnosis and treatment. For instance, a total of 8918 patients were checked by a B-mode ultrasonography, with an average of nearly 1000 people at each stop. This indicated a huge diagnosis and treatment workload. As auxiliary examinations took a long time, a bottleneck appeared in auxiliary examinations, which affected the overall efficiency of diagnosis and treatment. We recommend increasing the number of auxiliary diagnostic equipment and the number of doctors on future missions. As for drugs, dermatology, ophthalmology and chronic disease-related drugs were in high demand. On this mission, the consumption of seven drug categories reached 100% of the ship's supply, including anti-allergy drugs, anti-anaemia drugs, antispasmodics, lipid-regulating drugs, vasodilators, drugs for treating cardiac insufficiency and anthelmintics, with a total consumption of 558, 54, 90, 180, 45, 54 and 45, respectively (the unit refers to the smallest measurable unit such as '*tablet*', '*pill*' or '*vial*'). The common drugs and those short supply should be allocated with priority in the future.

It is useful to consider the appropriate composition of the medical team. Among the medical staff in this mission, 42.61% were females and the male-to-female ratio was relatively balanced. The female medical staff were particularly valuable because cultural taboos make it almost impossible for male medical staff to examine patients.[16] In addition, it is necessary to increase the number of patient-guiding personnel and nurses to cope with a large number of preliminary screening problems. Notably, triage is usually carried out at the dock. The triage doctors and nurses must be able to accurately understand patients' main complaints, the departments needed and record the main complaints on the triage sheets. Thus, the error rate in triage will be significantly reduced, which can shorten the time for outpatient visits and improve doctors' work efficiency. In terms of the medical staff's age, the middle and younger age groups continued to be the mainstay. As the service countries were close to each other, the tasks were intensive and the workload at each stop was very high. Medical staff were required to have sufficient physical strength to provide medical services.

The current study had some limitations. Because of the chaotic conditions aboard, some patient medical records were incomplete. As a result, we lacked information such as accurate documentation of anaesthesia and surgical procedure costs, which also have essential roles in helping future mission planning. We also did not record patients who wanted care but were turned away because of service limitations. Future missions should collect their data and the basis for rejection. This information could influence planning decisions for subsequent harmonious missions.

CONCLUSION

Our study presented the medical staffing and medical service during the '*Harmonious Mission—2017*' by the Chinese People's Liberation Army Navy Peace Ark. Taking part in this mission were 115 Chinese military medical personnel, who received an average of over 1000 patients aboard daily. The five most popular outpatient departments were ophthalmology, general surgery, general internal medicine, orthopaedics and traditional Chinese medicine. Of the surgical patients, 60.87% fell into one of three ICD-9-CM3 categories: lipoma excision, cataract resection and skin tissue removal. More attention should be paid to staffing and medication planning to enhance the efficiency of future humanitarian assistance. It is essential to share these experiences with our medical aids so that future similar tasks can be dealt with more effectively.

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