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Insights into needs of business travelers to China from calls to a medical assistance provider

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Abstract

Background: Although 17.5% of German travelers were business travelers in the years 2011–2013, little is known about their pathologies. Recent publications indicate that infections are the primary health issue in general travelers. Our aim was to investigate whether business travelers from Germany to China also primarily suffer from infections.

Methods: From 2011 to 2013, 587 calls for service of German business travelers to China were collected by a medical assistance provider. 482 of these calls were evaluated regarding demographics, reported diseases and conditions and the type of service provided by the medical assistance company.

Results: The most common reasons for calls for service were “factors influencing health status and contact with health service” (18.8%), “injury and poisoning” (16.0%) as well as “symptoms, signs, and ill-defined conditions” (13.7%). Most patients asked for “medical advice” (37.8%), referral to “outpatient care” (25.1%) or “inpatient care” (16.6%). “Evacuation and/or repatriation” was required mainly due to “injury and poisoning” (n = 12), “diseases of the circulatory system” (n = 5) or “mental disorders” (n = 3).

Conclusion: German business travelers to China are seeking primarily administrative support from a medical assistance provider and are mostly affected

by non-infectious diseases. Pre-travel preparation of such travelers need to place more emphasis on non-communicable health risks and prevention.

Keywords: Infectious disease, Public health

1. Introduction

Worldwide, tourism is a growing market. According to the World Tourism Organization (UNWTO) 1,186 million international arrivals were registered in 2015, indicating an increase of 52 million arrivals compared to the previous year [1]. It can be assumed that up to half of these travelers will develop a health problem abroad [2]. More than half of international tourist arrivals (53%) were motivated by holidays, recreation and leisure-related travel and 27% travelled for other reasons such as visiting friends and relatives, religious reasons and health treatments [1]. These subsequently called “general travelers” frequently reported gastrointestinal symptoms besides diarrhea, such as nausea, vomiting, constipation, or abdominal cramps. In addition, dermatological conditions were reported in many cases (75%) [3]. Other symptoms reported with moderate frequency included respiratory tract symptoms, skin problems, and fever. In comparison, business travelers contribute to about 14% of all international arrivals and suffer quite often from digestive and traumatic diseases. Especially expatriates in the Asia-Pacific region have a high proportional morbidity for strongyloidiasis, depression, and anxiety [1, 4, 5, 6].

Although using data on general travelers to make interferences about travel-related illness in occupational travelers is possible, there is evidence that business travelers (especially expatriates, i.e. occupational travelers with an assignment for a longer period abroad) may be confronted with higher rates of illness, injury and psychiatric disorders [7, 8, 9, 10, 11].

Our study focuses on German business travelers to China and aims to shed light on the disease spectrum found in these travelers, as well as to assess the types of medical services which were provided to them by the assistance medicine provider International SOS. Furthermore, we investigated whether this spectrum is comparable to the range of pathologies found in general travelers.

2. Methods

2.1. Procedures in assistance medicine

Employees covered by International SOS may call for service in case of illness or emergency abroad. Complying with the calls for service, the International SOS offers different types of service. Medical services include “medical advice”, for example if a patient feels uncertain about the intake or dosage of medication during his or her

stay abroad. Also included are medical services like “evacuation and/or repatriation” in severe cases or the transfer to “inpatient care” and “outpatient care”, for example in doubtful medical cases like acute abdominal pain. “Referrals” to any kind of physician or specialist were another kind of medical service as well as “returning of mortal remains” after death of a patient and “other medical services”. These “other medical services” include an unspecific range of medical services, like support to identify the next specialty hospital or close-by pharmacy. Non-medical types of service are also offered and included “inquiries”, “security” issues and “travel services”.

2.2. Data collection

We examined all calls for service of German business travelers to China in the period of 1st January 2011 to 31st December 2013, collected by the International SOS. The International SOS recorded age, gender, year of occurrence, ICD-9 code and a descriptive diagnosis applied by the coordinating doctor. A person with several separate episodes (and several calls) was counted more than once. Calls made for a death were also included in the sampling. ICD-9 codes were assigned according to the patient’s description of his or her problem. If the patient’s symptom was due to a definable disease, the disease was recorded. If the origin of a symptom was unclear, the symptom itself was recorded. Some patients only described a condition, of which the origin remained dubious. In these cases the condition itself was recorded.

2.3. Data analysis

First, diseases and conditions were grouped according to the list of codes for International Statistical Classification of Diseases and Related Health Problems, Ninth Revision (ICD9). This list of codes contains 18 different main groups of diseases and conditions (Table 1).

Factors influencing health status and contact with health services may include for example administrative purposes, vaccinations, general medical examinations, dental examinations or routine check-ups.

The categories “injury and poisoning” and “external causes of injury and supplemental classification of factors influencing health status and contact with health services” were fused in our analysis.

Firstly, we intended to provide a descriptive analysis of the spectrum of the encountered medical problems. Secondly, we wished to analyze the medical services provided by the International SOS.

The research ethics boards of the medical faculty of the University Hospital of Ludwig-Maximilians-University Munich reviewed and approved the study (reference number: 415-15).

Table 1. List of codes for International Statistical Classification of Diseases and Related Health Problems, Ninth Revision (ICD9).

ICD codes	
001–139:	Infectious and parasitic diseases
140–239:	Neoplasms
240–279:	Endocrine, nutritional and metabolic diseases, and immunity disorders
280–289:	Diseases of the blood and blood-forming organs
290–319:	Mental disorders
320–389:	Diseases of the nervous system and sense organs
390–459:	Diseases of the circulatory system
460–519:	Diseases of the respiratory system
520–579:	Diseases of the digestive system
580–629:	Diseases of the genitourinary system
630–679:	Complications of pregnancy, childbirth, and the puerperium
680–709:	Diseases of the skin and subcutaneous tissue
710–739:	Diseases of the musculoskeletal system and connective tissue
740–759:	Congenital anomalies
760–779:	Certain conditions originating in the perinatal period
780–799:	Symptoms, signs, and ill-defined conditions
800–999:	Injury and poisoning
E and V codes:	External causes of injury and supplemental classification of factors influencing health status and contact with health services

3. Results

3.1. Spectrum of medical problems

Altogether, 587 calls for service of German business travelers to China in the period of 1st January 2011 to 31st December 2013 were documented by the International SOS. Non-medical types of service were provided in $n = 58$ cases. ICD-codes were missing in $n = 47$ cases. Consequently, there was a total of $n = 482$ medical cases which could be classified using the ICD-9 coding.

Most patients called the International SOS because of “factors influencing health status and contact with health service” ($n = 91$; 18.8%) “injury and poisoning” ($n = 77$; 16.0%) or “symptoms, signs, and ill-defined conditions” ($n = 66$; 13.7%). This section includes symptoms, signs, abnormal results of laboratory or other investigative procedures, and ill-defined conditions regarding which no diagnosis classifiable elsewhere is recorded. “Diseases of the digestive system” ($n = 46$; 9.5%), “diseases of the circulatory system” ($n = 37$; 7.7%) and “diseases of the musculoskeletal system and connective tissue” ($n = 32$; 6.6%) were also reported very often. “Infectious

and parasitic diseases” were documented only in $n = 22$ cases (4.6%) and “mental disorders” were represented in $n = 13$ (2.7%) calls for service (Table 2).

The leading diagnoses were “fractures” ($n = 28$), as well “appendicitises” ($n = 7$) and “hernias” ($n = 6$).

3.2. Types of services provided

Of the 482 analyzed medical calls for service, 37.8% asked for "medical advice", 25.1% of the patients needed “outpatient care”, 16.6% received “inpatient care”,

Table 2. Diagnostic groups and gender in German business travelers in China requesting support from International SOS ($n = 482$). *: this section includes symptoms, signs, abnormal results of laboratory or other investigative procedures, and ill-defined conditions regarding which no diagnosis classifiable elsewhere is recorded. **: less than 1% of diagnoses; therefore summed up. Contains: "congenital anomalies", "diseases of the blood and blood-forming organs", "certain conditions originating in the perinatal period".

Diagnoses according the ICD 9 classification	Calls for service		Gender	
	Number [n]	Percent [%]	Number male [n]	Percent male [%]
Factors influencing health status and contact with health service	91	18.8	61	67
Injury and poisoning	77	16.0	65	84.4
Symptoms, signs, and ill-defined conditions*	66	13.7	46	69.7
Diseases of the digestive system	46	9.5	38	82.6
Diseases of the circulatory system	37	7.7	31	83.8
Diseases of the musculoskeletal system and connective tissue	32	6.6	23	71.9
Diseases of the nervous system and sense organs	29	6.0	21	72.4
Diseases of the respiratory system	26	5.4	19	73.1
Infectious and parasitic diseases	22	4.6	15	68.2
Diseases of the genitourinary system	14	2.9	12	85.7
Mental disorders	13	2.7	10	76.9
Diseases of the skin and subcutaneous tissue	8	1.7	4	50.0
Endocrine, nutritional and metabolic diseases, and immunity disorders	7	1.5	6	85.7
Complications of pregnancy, childbirth, and the puerperium	6	1.2	0	0.0
Neoplasms	5	1.1	2	40.0
others**	3	0.6	3	100.0
total	482	100.0	356	73.9

and 11.0% of the documented patients were “medically referred” to a physician or specialist. 6.2% of the evaluated calls for service required “evacuations and/or repatriations” and 0.8% of the calls for service needed the organization of “return of mortal remains”.

“Outpatient care” was offered predominantly to patients, who called due to “diseases of the genitourinary system” (42.9%) or “diseases of the respiratory system” (38.5%), Patients who received “inpatient care” suffered mostly from “complications of pregnancy, childbirth and the puerperium” (33.3%) or “diseases of the digestive system” (31.7%) (Table 3).

Of the 30 patients requiring “evacuation and/or repatriation” males were disproportionately represented (86.7% of male patients vs. 13.3% of female patients requesting “evacuation and/or repatriation”; p -value = 0.03) and mostly due to “injury and poisoning” ($n = 12$), followed by “diagnoses of the circulatory system” ($n = 5$), mental disorders ($n = 3$) and “symptoms, signs and ill-defined conditions” ($n = 3$). Of note, almost a third (27.3%) of patients with a mental disorder required “evacuation and/or repatriation” (Table 4).

During our study period, the International SOS received 13 calls for service because of “return of mortal remains”. Just 4 of these calls were encoded with any diagnoses or description: “acute myocard infarct unspecified site [410.9]”, “intracerebral hemorrhage [431]”, “death occurring in less than 24 hours from onset of symptoms, not otherwise explained [798.2]” and “unspecified diseases of blood and blood-forming organs [289.9]”. All of these patients were male.

4. Discussion

Our data showed that business travelers to China, who were supported by the assistance medicine provider International SOS within the period 2011–2013, called mainly because of “factors influencing health status and contact with health service”. If the patients reported diseases or health problems, these were predominantly “injury and poisoning” or “symptoms, signs, and ill-defined conditions”.

The medical services provided were mainly “medical advices” or the referral of “outpatient care”. As many travelers experience adverse health events during their stay and the access to medical care may be complicated in foreign cultures, medical guidance might be helpful in different situations and conditions.

There is some evidence, that injuries and psychiatric diseases were more frequent in occupational travelers (especially expatriates) than in general travelers, who suffer mostly from diarrhea, respiratory tract infections, skin rashes or fever [7, 12, 13]. Our study revealed that many calls for medical services were due to “injury and

Table 3. Provided types of medical services according to reported diseases and conditions identified in German business travelers to China (n = 482). *: this section includes symptoms, signs, abnormal results of laboratory or other investigative procedures, and ill-defined conditions regarding which no diagnosis classifiable elsewhere is recorded. **: less than 1% of diagnoses; therefore summed up. Contains: "congenital anomalies", "diseases of the blood and blood-forming organs", "certain conditions originating in the perinatal period" ***: return of mortal remains.

Diseases and conditions [ICD 9]	Calls for service	Types of service						
	Number [n]	Medical advice [%]	Outpatient care [%]	Inpatient care [%]	Referral [%]	Evac./Repat. [%]	RMR *** [%]	Medical others [%]
Factors influencing health status and contact with health service	91	41.8	19.8	14.4	16.5	0	0	7.7
Injury and poisoning	77	32.5	24.7	16.9	5.2	15.6	0	5.2
Symptoms, signs, and ill-defined conditions*	66	42	28	12	14	2	2	0
Diseases of the digestive system	46	31.7	17.1	31.7	12.2	4.9	0	2.4
Diseases of the circulatory system	37	21.6	24.3	27	8.1	13.5	5.4	0
Diseases of the musculoskeletal system and connective tissue	32	34.4	31.3	15.6	12.5	3.1	0	3.1
Diseases of the nervous system and sense organs	29	48.3	27.6	13.8	6.9	3.5	0	0
Diseases of the respiratory system	26	34.6	38.5	15.4	7.7	3.9	0	0
Infectious and parasitic diseases	22	36.4	27.3	22.7	9.1	4.6	0	0
Diseases of the genitourinary system	14	35.7	42.9	7.1	14.3	0	0	0
Mental disorders	13	36.4	27.3	9.1	0	27.3	0	0
Diseases of the skin and subcutaneous tissue	8	62.5	12.5	0	25	0	0	0
Endocrine, nutritional and metabolic diseases, and immunity disorders	7	57.1	0	14.3	14.3	0	0	14.3
Complications of pregnancy, childbirth, and the puerperium	6	16.6	33.3	33.3	0	0	0	16.6
Neoplasms	5	20	60	0	0	20	0	0
Others**	3	0	33.3	33.3	0	0	33.3	0
Total	482	37.8	25.1	16.6	11	6.2	0.8	2.5

Table 4. Reported diseases and conditions identified in German business travelers to China that caused evacuation and/or repatriation (n = 30). *: this section includes symptoms, signs, abnormal results of laboratory or other investigative procedures, and ill-defined conditions regarding which no diagnosis classifiable elsewhere is recorded. **: less than 1% of diagnoses; therefore summed up. Contains: "congenital anomalies", "diseases of the blood and blood-forming organs", "certain conditions originating in the perinatal period".

Diseases and conditions [ICD 9]	Number of evacuated/repatriated patients
Factors influencing health status and contact with health service	n = 0
Injury and poisoning	n = 12 [15.6%]
Symptoms, signs, and ill-defined conditions*	n = 3 [5.9%]
Diseases of the digestive system	n = 2 [4.9%]
Diseases of the circulatory system	n = 5 [13.5%]
Diseases of the musculoskeletal system and connective tissue	n = 1 [3.2%]
Diseases of the nervous system and sense organs	n = 1 [3.5%]
Diseases of the respiratory system	n = 1 [3.9%]
Infectious and parasitic diseases	n = 1 [4.5%]
Diseases of the genitourinary system	n = 0
Mental disorders	n = 3 [27.3%]
Diseases of the skin and subcutaneous tissue	n = 0
Endocrine, nutritional and metabolic diseases, and immunity disorders	n = 0
Complications of pregnancy, childbirth, and the puerperium	n = 0
Neoplasms	n = 1 [20.0%]
Others**	n = 0
Total	n = 30

poisoning” (16.0%) if patients suffered from a disease or health problem, but “mental disorders” were reported just in 2.7% of these cases.

The patients of our study who called for medical service were mainly male (73.9%). Most of these male patients called due to “injuries or poisoning” (n = 63), “factors influencing health status and contact with health services” (n = 58) or “symptoms, signs, and ill-defined conditions (n = 45). Previous studies have also found that travelers with fatal injuries are most often male [14, 15, 16, 17, 18]. Our data support these results as 100% of the travelers who died abroad were male and injured or poisoned patients were more often males than females (84.4% males). Other evidence suggests that male gender might be linked

with lower general morbidity while travelling and women are proportionately more likely than men to suffer from acute diarrhea, chronic diarrhea, irritable bowel syndrome, upper respiratory tract infection, urinary tract infection, psychological stressors, oral and dental conditions, or adverse reactions to medication [18, 19, 20]. Nonetheless, we could not find evidence that women suffer from specific pathologies more often than male travelers.

As the values for age are missing in 26.8% of all calls for medical service in our study, it is hardly possible to state anything reliable on age and observed diagnoses.

Fatal injuries while traveling are mostly caused by accidents, drowning and homicide, whereas no deadly injuries are often due to traffic accidents, falls and leisure activities [16, 21, 22, 23]. Data on Finnish travelers (leisure and business travelers) with health problems abroad during 2010–2012 supported by another assistance medicine provider could show, that infections were the most common health problem accounting for 60% of all cases, whereas injuries accounted for 14.0% of all calls for service, 17.1% of these injuries were fractures [24]. While our data confirmed the relevance of “injury and poisoning”, “fractures” contributed considerably to this number of calls for service accounting for 36.4% of all “injury and poisoning”. These findings may be due to the high rates of traffic accidents in China [25].

A more detailed investigation of the mentioned dataset published in 2017 found that gastroenteritis was the most common diagnosis (38%) followed by respiratory tract infections (34%) [26]. In our analysis, 1.5% of all calls for service were due to infections of the digestive system ($n = 7$) and 4.7% because of respiratory tract infections ($n = 23$). Other studies identified diarrhea as the most frequent infection among travelers originating in high income areas of the world with destinations in lower- and middle-income countries. However, in the past decade decreasing incidence rates have been observed in countries with improving economies, particularly in East Asia [12, 27, 28, 29, 30, 31]. In our study, we just identified 3 cases of diarrhea (13.6% of all calls due to “infectious and parasitic diseases”). This might be due to the type of data collection. Whereas most studies used self-administered questionnaires to study health problems, we evaluated calls for medical support [32, 33]. It can be assumed that people will contact their assistance medicine provider just in severe cases of diarrhea, whereas mild courses of the disease are documented in self-administered questionnaires as well.

Furthermore, respiratory diseases were diagnosed more frequently than diarrhea among international general travelers to China [34]. This finding correlates strongly with our observations. We conclude that “infections and parasitic diseases” may occur less frequently amongst business travelers because of high standard accommodation and altered behavior on business travels. Air pollution problems in China can

hardly be avoided by individual behavior and may put travelers (leisure and business) at an increased risk of occurrence of respiratory problems.

Our findings show that “injury and poisonings” often lead to “evacuations and/or repatriations”, as well as they underline the correlation between “mental disorders” and the risk of “evacuations and/or repatriations”.

Current literature identifies different reasons for repatriations, like infectious diseases or non-infectious diseases (predominantly injuries and mental disorders as well) [6, 15, 35]. Further studies corroborate findings on the predominance of neurologic diseases in repatriated patients, and additionally highlight the importance of cardiovascular diseases [35, 36].

Psychiatric disorders may be an underestimated cause of repatriations, which is especially interesting as expatriates seem to be particularly prone to mental disorders. Expatriates have been shown to have a consistently high incidence of affective and adjustment disorders [5]. Depression is the most common reason for psychiatric assessment, with psychosomatic disorders, anxiety states, alcohol dependence and acute psychosis occurring less frequently [33, 37].

It has been suggested to exclude employees with a medical and family history of severe psychiatric disorders from expatriate programs [37]. Although this measure could be effective we consider it hard to implement. On-site psychiatric and psychological support and so called counselling may be a more practical approach.

This study is primarily descriptive and some of the observed associations are unadjusted. Hence more analytical studies would be needed to clarify associations. Furthermore, the total number of all business travels supported by International SOS was not disclosed. This study focused on German business travelers to China and may not be representative for business travelers from other industrialized countries traveling to destinations other than China. Only calls for service were documented by International SOS. It was therefore not possible to calculate the cumulative incidence of all diseases and conditions in business travelers to China in general.

Also, ICD-9 coding was not always accurate: in some cases symptoms were coded instead of diseases. Consequently, the symptom’s origin remained unclear. Despite these limitations the large sample size of this study allows insight into the medical needs of business travelers in China.

5. Conclusions

Most contacts with the analyzed medical assistance provider were due to contacts with health services without acute need for medical aid followed by “injury and poisonings”. Non-communicable diseases like “diseases of the circulatory system”

played an important role, too. “Evacuation and/or repatriation” was frequently needed in patients with injuries and poisoning or those with “mental disorders”. A strategy to decrease repatriations should aim at reducing injuries and psychiatric diseases and could for example involve strict driving policies as well as pre-travel psychiatric assessment. Pre-travel arrangements, such as travel insurance contracts and provision of on-site medical support by assistance medical providers or corporate medical teams might address the employee’s needs. Not a comparison of occupational vs leisure travelers is needed but prospective network studies of business travelers that allow for a comprehensive analysis of health risk in business travelers and of relevant risk factors. Based on such insights, travel medicine may take a new direction not only to address the many unanswered questions regarding traveller’s health, but also addressing the health needs of the world’s migrants on firm evidence [2, 38].

Declarations

Author contribution statement

Linda Sanftenberg: Analyzed and interpreted the data; Wrote the paper.

Michaela Kramer: Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.

Stefan Esser: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data.

Jörg Schelling: Conceived and designed the experiments.

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Competing interest statement

The authors declare the following conflict of interests: Dr. med. Stefan Esser is working with the assistance medicine provider “International SOS GmbH” and provided the analyzed dataset. The other authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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