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INTERPOPULATION STUDY OF MEDICAL ATTENDANCE ABOARD A CRUISE SHIP

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ABSTRACT

The study carried out aboard a cruise ship in the years 1993 – 1998 involved ship passengers of various nationalities including 3872 Germans aged 23 – 94 years and 1281 Americans aged 25 – 94 years.

Both nationality groups were divided into two age subgroups: till 64, and 65 – 94 years. The German younger age subgroup (mean age 53,2 years) consisted of 59% of the passengers, whereas the 65 – 94 years subgroup (mean age 72 years) was made up of 41% of the ship's passengers. On the other hand, 73% of the Americans belonged to the 65 – 94 years subgroup (mean age 73,4 years), whereas 27% to the younger one (mean age 52,8 years). The number of onboard consultations and their causes were determined. The occurrence of chronic illnesses in both 65 – 94 years subgroups was assessed by means of a questionnaire. A higher frequency of consultations was found in the Germans (24,38%) than in the Americans (14,05%) ($p = 0,001$). The difference was particularly striking in the people over 65 years of age (30,87% of the Germans as compared with 14,22% of the Americans, $p = 0,001$).

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The Germans were nearly 4-times more frequently seen than the Americans for cardio-vascular diseases and almost 3-times more often because of gastrointestinal disorders. The discrepancies in the consultation rates were mainly caused by the different insurance systems of both nations. Chronic illnesses as estimated by means of the questionnaire prevailed in the German passengers. The statistically significant differences (13,3% versus 20%, $p = 0,01$ and $0,001$) regarded the locomotor system, urinary tract diseases and a group of illnesses including neurological, ophthalmological, ear, skin, malignant diseases and diabetes.

INTRODUCTION

The results of epidemiological studies constitute an important guidance determining application of the appropriate preventive and therapeutic measures. They also help solve crucial structural problems. Most studies have been carried out under stationary conditions involving homogenous or barely differentiated population groups. The onboard investigations were mainly focused on diarrheal disease outbreaks (1, 2), although some other topics were occasionally approached (3, 4, 5). The ship is an excellent place for such a study, her main advantage being identity of the living conditions. Thus the population differences observed aboard are primarily caused by external factors.

During sea voyages differences in the medical consultation rates between Americans and Germans were noticed. Then a question arose of whether the reason consisted in the dissimilar states of health of people belonging to these two nations or in their different health insurance systems. Finding an answer was the purpose of this study.

MATERIAL AND METHODS

The study was performed on a passenger cruise ship sailing world-wide including the Antarctica. Out of a total of 161 cruises taken from 1993 through 1998, 45 were randomly selected. Thus the study population embraced 5153 passengers including 1281 Americans aged 25 – 94 years and 3872 Germans aged 23 – 94 years. The sex ratios of the nationality groups were comparable, a prevailing rate of the females being of about 10%.

Both nationality groups were divided into two age subgroups: till 64 and 65 – 94 years. As many as 935 Americans (mean age 73,4 years) – 73% belonged to the 65 – 94 years subgroup, whereas 346 Americans (mean age 52,8 years) – 27% to the younger one. The German younger age subgroup (mean age 53,2 years) consisted of 2285 passengers – 59%, whereas 1585 persons (mean age 72 years) – 41% were enrolled in the 65 – 94 years subgroup.

Ship's physician's records were used to determine the number of onboard consultations and their causes. Only the first consultation of every patient was considered, thus their total number correspond to the total number of onboard cases. To assess the occurrence of chronic illnesses in both 65 – 94 years subgroups a questionnaire was conducted involving 150 subjects of each nationality (altogether 300 persons). The sex ratios in the questionnaire cohorts were 1:1. Comparisons were made using the Student t test.

RESULTS

A total of 180 Americans (14,05%) and 944 Germans (24,38%) were seen in the ship's infirmary (Table 1). In the younger age subgroups (<64 years) 13,58% of the Americans and 19,86% of the Germans were attended. The difference in the consultation rates was particularly striking between the passengers who were over 65 years of age: as few as 133 Americans – 14,22% were seen compared with 490 Germans – 30,87%. All the differences were statistically significant (p = 0,01 – 0,001). Of note is that no diarrheal disease outbreak was recorded aboard.

Table 1.-Frequency of onboard medical consultations of ship passengers in the nationality and age groups

Consultations	Americans		Germans		p
	No	%	No	%	
Total	<u>180</u> 1281	14,05	<u>994</u> 3872	24,38	0,001
Persons<64 years	<u>47</u> 346	13,58	<u>454</u> 2285	19,86	0,01
Persons>65 years	<u>133</u> 935	14,22	<u>490</u> 1587	30,87	0,001

Table 2.-Frequency of consultations of ship passengers aged less than 64 years

Diseases	Americans		Germans		p
	No	%	No	%	
Cardiovascular diseases	3	0,86	17	0,74	si
Respiratory diseases x	21	6,06	110	4,81	si
(Lower respiratory tract)	(3)	(0,86)	(29)	(1,27)	si
Gastrointestinal diseases	0	-	43	1,88	-
Locomotor system diseases	5	1,44	29	1,27	si
Trauma-related conditions	3	0,86	26	1,13	si
Urinary tract diseases	0	-	8	2,31	-
Seasickness	8	2,31	165	7,22	0,001
Other diseases xx	7	2,02	56	2,45	si

x Respiratory diseases – illnesses of both upper and lower respiratory tracts

xx Other diseases – neurological, ophthalmological, ear, skin, malignant diseases and diabetes

si – statistically insignificant

As can be seen in Table 2 the consultation rates in the younger age subgroups for many conditions were similar. Respiratory diseases (both upper and lower respiratory tract illnesses) accounted for 6,06% of consultations in the Americans and 4,81% in the Germans. The latter ones, however were more frequently attended for lower respiratory tract disorders (1,27% as compared with 0,86%). Consultations due to gastrointestinal and urinary tract diseases were provided to the Germans only. A statistically significant difference ($p = 0,001$) in the attendance rate was noted due to seasickness.

Table 3.-Frequency of consultations in ship passengers aged over 65 years

Diseases	Americans		Germans		p
	No	%	No	%	
Cardiovascular diseases	7	0,73	45	2,83	0,001
Respiratory diseases x (Lower respiratory tract)	58 (21)	6,20 (2,24)	111 (53)	6,99 (3,33)	si
Gastrointestinal diseases	13	1,39	61	3,84	0,001
Locomotor system diseases	5	0,53	39	2,45	0,001
Trauma-related conditions	15	1,60	41	2,58	si
Urinary tract diseases	3	0,32	8	0,50	si
Seasickness	21	2,24	100	6,30	0,001
Other diseases xx	11	1,17	85	5,35	0,001

x Respiratory diseases – illnesses of both upper and lower respiratory tracts

xx Other diseases – neurological, ophthalmological, ear, skin, malignant diseases and diabetes

si – statistically insignificant

Table 4.-Results of the questionnaire in subjects aged over 65 years

Chronic illnesses	Americans		Germans		p
	No	%	No	%	
Cardiovascular diseases	48	32	61	40,7	si
Respiratory diseases	10	6,7	12	8	si
Gastrointestinal diseases	10	6,7	15	10	si
Locomotor system diseases	41	27,3	71	47,3	0,001
Urinary tract diseases	19	12,7	39	26	0,01
Other diseases x	32	21,3	59	39,3	0,001

x Other diseases – neurological, ophthalmological, ear, skin, malignant diseases and diabetes

si – statistically insignificant

Table 3 shows that the Germans aged over 65 were much more frequently treated than the Americans. Manifold differences in the consultation rates were found regarding cardiovascular, gastrointestinal, locomotor system disorders, seasickness and a group of other diseases as neurological, ophthalmological, ear, skin, malignant diseases and diabetes. All the differences were statistically significant ($p = 0,001$). Trauma-related conditions were also more frequently seen in the Germans.

Results of the questionnaire about the prevalence of chronic illnesses in the subjects over 65 years of age are indicated in Table 4. All kinds of diseases were more frequently found among the Germans. Statistically significant differences ($p = 0,01 - 0,001$) in the incidence rates regarded locomotor system, urinary disorders and the group of other diseases.

DISCUSSION

The observed differences in the consultation rates between Americans and Germans and especially in people over 65 years of age deserve attention. Two causes could have contributed to this effect: 1) dissimilar states of health of these nations, 2) different health insurance systems. In order to tackle the first possibility a questionnaire was conducted in both 65 – 94 years subgroups involving 150 subjects of each nationality. Its aim was to determine the incidence rate of chronic illnesses as a morbidity difference index. A higher prevalence of all conditions was found in the Germans. The biggest differences (13,3% versus 20%, $p = 0,01$ and $0,001$) regarded locomotor system and urinary tract disorders as well as the group of other diseases (neurological, ophthalmological, ear, skin, malignant diseases and diabetes).

The differences in the incidence rates of respiratory, gastrointestinal and cardiovascular diseases varied from 1,3% to 8,7% and were statistically insignificant. On the other hand the consultation rates showed the highest discrepancies just in these disease groups. The Germans were nearly 4-times more frequently seen than the Americans due to cardiovascular diseases and almost 3-times more often because of gastrointestinal disorders. Of note is that 73% of the Americans belonged to the 65 – 94 years subgroup compared with only 41% of the Germans. Thus the results suggest that the discrepancies in the consultation rates can be accounted for by merely dissimilar states of health of both nations. This conjecture is favoured by a higher, although statistically insignificant attendance rate in the Germans due to trauma-related

conditions. Similar consultation rates for urinary tract disorders in spite of a 2-fold difference in their prevalence as revealed by the questionnaire also support the above suggestion. Other findings, although less spectacular are as well in favour of this viewpoint.

A nearly 2-fold difference in the frequency of locomotor system disorders was associated with an almost 5-fold discrepancy in the consultation rates. A similar relation concerned the group of the other diseases. A clinching argument in this respect is the frequency of consultations for seasickness which was 3-times higher in the Germans. This finding might partly have been influenced by the fact that some Americans would wear the scopolamine patches (Transderm Scop discs), the production of which in Europe by CIBA – Geigy was discontinued.

Although the consultation rates, for many conditions in the younger age subgroups were similar, their total percentage prevailed in the Germans (19,86% as opposed to 13,58%, $p = 0,01$).

An essential distinguishing feature between both nations was the health insurance system. The Americans had a basic insurance that would assume standard medical care carrying a low level of cover. On the other hand the Germans who took out a comprehensive “private insurance” were entitled to a wide range of refundable medical services. Thus, the health insurance system can, to a large extent, influence the patient’s decision to apply for medical attendance.

Interpopulation studies highly contribute to our improved understanding of various phenomena. The ship constitutes an excellent model for such purposes because of the homogenous, secluded milieu she provides. This study is to the best knowledge of authors the first interpopulation investigation carried out in such a model.

CONCLUSIONS

1. The differences in the frequency of consultations found between Americans and Germans, and especially in people above 65 years of age were mainly caused by their different insurance systems.
2. The differences in the incidence rates of chronic illnesses revealed by the questionnaire in the subjects aged above 65 years are hardly explicable and can become an investigation topic.

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