A COMPARATIVE STUDY ON THE HEALTH PROBLEMS OF SCHOOL AGE CHILDREN IN JAKARTA AND HOKKAIDO

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Abstrak

Penelitian ini bertujuan membandingkan keadaan penyakit dan kelainan-kelainan yang terdapat pada anak usia sekolah di Jakarta, Indonesia dan Hokkaido, Jepang. Data diperoleh dari hasil pemeriksaan kesehatan yang dilakukan di puskesmas yang ada di DKI Jakarta, dan health centre yang ada di Hokkaido. Pada hasil penelitian ini menggambarkan besarnya perbedaan prevalensi dari penyakit maupun kelainan yang menyerang anak usia sekolah antara 6-12 tahun di kedua tempat tersebut. Tampak prevalensi kelebihan nutrisi (2,1%), kelainan mata (20,3%), Conjunctivitis (3,2%), karies gigi (93,1%), dan penyakit mulut lainnya (16,3%) di Hokkaido sangat tinggi dan bermakna (p<0,0001) dibandingkan dengan keadaan Jakarta. Dan sebaliknya, prevalensi malnutrisi (1,2%) dan penyakit infeksi kulit (0,9%) di Jakarta lebih tinggi dan bermakna (p<0,0001) dibandingkan dengan keadaan di Hokkaido. Perbedaan-perbedaan yang terjadi pada anak usia sekolah pada kedua tempat yang berbeda tersebut mungkin disebabkan oleh faktor-faktor seperti iklim, GNP, kebersihan dan tingkat pendidikan.

Abstract

Comparison of the prevalence of disabilities and diseases, using the same method for health examination of school age children in Jakarta, Indonesia and Hokkaido, Japan was carried out with a view to develop a health-planning program. Thus, this study describes the differences of the prevalence of disabilities and diseases of 6 to 12-year-old school age children in Jakarta and Hokkaido, and shows that the prevalence of excessive nutrition (2.1%), visual defects (20.3%), conjunctivitis (3.2%), dental caries (93.1%) and oral diseases (16.3%) in Hokkaido were significantly higher (p<0.0001) than those in Jakarta. By contrast, the prevalence rate of malnutrition (1.2%) and infectious skin disease (0.9%) in Jakarta were significantly higher (p<0.0001) than those in Hokkaido. These differences indicated that school age children in both areas might be affected by the conditions of climate, GNP, hygiene as well as the education level.
Introduction

In the last 10 years the Indonesian economy has been rapidly modernizing. The GNP has increased by 26%, the infant mortality rate decreased by 26% and access to a safe water supply has grown by 10%, while the daily calorie supply per capita has increased by 7% \(^{1,2}\). At the present time, Indonesia and other developing countries are aiming to improve the social environment, and health education, to the level of industrialized countries such as Japan and Korea.

In the developed countries most formerly prevalent infectious diseases have been controlled. In the third world and in developing countries malnutrition and infectious diseases are more prevalent in urban areas than in rural areas. This is also indicated in Jakarta, Indonesia. Although Jakarta is the capital city and is developed in many ways, the risks of health problems, for children under 5 years old and among school age children are still high. This is especially for infectious diseases and malnutrition \(^3\). Among the developing countries in ASEAN, the prevalence of health problems in children under 5 years of age in Indonesia is still higher than in Singapore, Thailand, etc. On the other hand, the problem of disorders and disabilities among school age children is still one of the major in many countries throughout the world \(^1,2\). Although in developed countries such as Great Britain, the U.S.A, and Japan, the disorders and disabilities caused of infectious diseases and malnutrition have been controlled, but the prevalence of visual defects, dental caries and excessive nutrition are becoming higher than in developing countries \(^4,5\). Furthermore, there are not yet any detailed reports on the comparing of prevalence of disabilities and diseases of school age children in developing nations through the use of the same methods in different environments.

In this epidemiology study, school age children who lived in Jakarta, Indonesia and Hokkaido, Japan were selected. Because these areas are almost use the same health examination system in health center. This study will describe the differences of the prevalence of disabilities and disease of 6 to 12-year-old school age children in Jakarta and Hokkaido. The results of this study should provide ideas for health planning programs in both areas and be useful for the development of health policies for public schools.

Subjects and Methods

In this study, the data was based on the report of health examination from health center in 1990, and the 1989 of chronological science table for population and background characteristics were used. The subjects included all school age children from 6 to 12-year-old school of age, who lived in Jakarta and Hokkaido.

The methods of health examination for all children in both countries were based on the general medical and dental examinations by a team of medical professionals including a doctor, dentist and nurse.

In this report 8 items of disability, including nutritional status divided into malnutrition and excessive nutrition, visual defects, conjunctivitis, otitis media, and ryeal diseases, infectious skin diseases, oral diseases and dental caries were examined.

From the data we estimated the frequencies and prevalence of disabilities among the school age children in Jakarta and Hokkaido and compared them by the chi-square test.

Results

1. Geographical and social aspects

Data from the chronological science table of both areas are presented in Fig.1\(^6\). Geographically, Hokkaido is 35\(^\circ\) North of Jakarta. \(^6\), while the yearly mean temperature in Jakarta is 33% higher in Jakarta than in Hokkaido (Fig.2)\(^6\) , and the annual mean humidity in January is 30% higher in Jakarta than in Hokkaido (Fig.3). Mean rainfall in August in Hokkaido is 50% higher than in Jakarta (Fig.4)\(^6\).

Characteristics of the populations of Jakarta and Hokkaido are presented in Table 1.
The area of Hokkaido is 111.5 times that of Jakarta. However, the total population of Jakarta is 1.5 times higher than that of Hokkaido, the meaning is the population density in Jakarta is 162.1 times that of Hokkaido. Furthermore, the birth rate and mortality rate in Jakarta are 2.7 times higher than in Hokkaido, while the school age children population in Hokkaido is 1.3 times lower than in Jakarta.

examinations and 41.3% were examined for conjunctivitis and otopharyngeal diseases.

As mentioned above, the proportion of both of school age children age 6 to 12-year-old who received health examinations in Jakarta City was lower than in Hokkaido, except for the conjunctivitis and otopharyngeal examinations.

2. Health administration

In Jakarta, 47.9% of school age children age 6-to-12 year-old were received health examinations for the 7 disability items. In Hokkaido, 95.5% of school age children age 6-12 year of age received health examination for nutrition and infectious skin disease, 97% for visual defect, 94.7% received dental and oral

3. Prevalence of diseases and disabilities

The prevalence of 8 disability items and diseases among school age children are compared in Table 2. Among the 8 disability items, the prevalence of dental caries, oral disease and otopharyngeal diseases of 6 to 12-
Table 1. Characteristics populations of Jakarta and Hokkaido

<table>
<thead>
<tr>
<th></th>
<th>Jakarta</th>
<th>Hokkaido</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area</strong></td>
<td>748 Km²</td>
<td>83,409 Km²</td>
</tr>
<tr>
<td><strong>Total population</strong></td>
<td>8,254,000</td>
<td>5,679,000</td>
</tr>
<tr>
<td><strong>Density of population</strong></td>
<td>11,027/ Km²</td>
<td>68/ Km²</td>
</tr>
<tr>
<td><strong>Birth rate</strong></td>
<td>32.1%</td>
<td>11.9%</td>
</tr>
<tr>
<td><strong>Death rate</strong></td>
<td>12.6%</td>
<td>6.2%</td>
</tr>
<tr>
<td><strong>Population of primary school student</strong></td>
<td>1,031,919</td>
<td>441,917</td>
</tr>
</tbody>
</table>


Discussion

1. Geographical and social aspects

Table 2. Prevalences of diseases and disabilities on school age children in Jakarta and Hokkaido

<table>
<thead>
<tr>
<th>Disability and disease</th>
<th>Jakarta</th>
<th>Hokkaido</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total exam (%)</td>
<td>prevalence (%)</td>
<td>total exam (%)</td>
</tr>
<tr>
<td>Low nutrition</td>
<td>47.9</td>
<td>0.7</td>
<td>96.4</td>
</tr>
<tr>
<td>High nutrition</td>
<td>47.9</td>
<td>2.0</td>
<td>96.4</td>
</tr>
<tr>
<td>Visual defect</td>
<td>47.9</td>
<td>0.7</td>
<td>97.3</td>
</tr>
<tr>
<td>Conjugunctitis</td>
<td>47.9</td>
<td>0.8</td>
<td>40.7</td>
</tr>
<tr>
<td>Otopharyngeal disease</td>
<td>47.9</td>
<td>5.5</td>
<td>40.4</td>
</tr>
<tr>
<td>Infectious skin disease</td>
<td>47.9</td>
<td>1.3</td>
<td>96.4</td>
</tr>
<tr>
<td>Dental caries disease</td>
<td>47.9</td>
<td>78.6</td>
<td>95.2</td>
</tr>
<tr>
<td>Oral disease</td>
<td>47.9</td>
<td>10.5</td>
<td>95.2</td>
</tr>
</tbody>
</table>

P<0.0001

The purpose of this study was to investigate the selective prevalence rates of diseases and disabilities in students of two countries with different geographical characteristics and different social aspects. The results of this study highlighted certain problems concerning the health of students in both areas.

There were marked differences in the geographical conditions and populations studied. These disparities could be predisposing factors influencing the causes of disabilities and diseases. On the other hand, the geographical characteristics of both areas are also related to environmental conditions such as temperature, humidity and rainfall.

While the social aspect of populations in both areas could be examined using GNP as an economic factor, other factors...
such as of hygiene, access to safe water, the rate of illiteracy, birth rate and death rate in a country have direct or indirect relations with the outbreak of disease and disabilities among school age children.\(^1\)\(^2\)

2. Health administration

The rate of school age children who received the health examination in Jakarta was lower than in Hokkaido, except for conjunctivities and otopharyngeal examinations. It might be that the total man power, socio-economic situation and level of education were related to this condition. Moreover the extension of medical staff members and health insurance in Hokkaido were more developed. Tracy et al reported that health insurance has pronounced benefits for the determination of health care use.

3. Prevalence of diseases and disabilities

The differences in the prevalence of disabilities and diseases among school age children in both area might be related to the levels of socio-economic, education and hygiene condition, which were higher in Hokkaido than in Jakarta. In addition, there is many culture in the community who live in Jakarta, with different in daily habit that influence the health condition.

Nutrition

To prevent the malnutrition, the food supply, quality and knowledge about health and nutrition, which could depend on education level of the people, must be considered. These factors are related to socio-economic factors, as evidenced by the world development report of UNICEF stating that the literate individual is more capable to receive health education than illiterate individual.\(^1\)\(^2\)

Jakarta is an urban area where the food supply might be greater than in rural areas, but the level of individual knowledge about the quality of food and nutrition might still lower than in Hokkaido. Because the education level of individuals and socio-economic status are higher in Hokkaido than in Jakarta. This situation could influence the daily eating habits of the school age children in both areas.

Although there are no comparative data about the prevalence of malnutrition and excessive nutrition in Asian areas, the mean body weight, mean body height and daily calorie supply per capita of school age children in each area can be compared. The economic and education levels in Indonesia are lower than in Japan and other Asian areas, and the daily calorie supply per capita in Indonesia is lower than that of Japan but higher than those of Malaysia, Philippines and Thailand. Thus, it appears that malnutrition in Indonesia is still higher than in other Asian areas as shown in Table 3.

Visual defect

In Hokkaido the prevalence of visual defects was significantly higher than that in Jakarta. However, the prevalence of visual defects of junior high school age children in Hokkaido was similar to those of school-age children in America (20%) and Great Britain (21.9%) (19,21). This
difference might be due to differences in screening implementation. This policy depends on the expansion of facilities, manpower and awareness of the people about visual disorder. The similarity problem about visual defect was found in Taiwan (75%), this is because of the daily lifestyle of school age children could influence the occurrence of such condition. This occurrence rate is much higher than prevalence of visual defects in all primary school age children (21.2%), and all junior high school age children (41.6%) in Japan, while the contrast condition was shown in school age children in Jakarta.

The specific etiology of the occurrence of a high prevalence of visual defects is still unknown. The difference between the occurrence of visual defects in Hokkaido and Jakarta might be connected to the daily lifestyle of school age children. In Hokkaido electronic systems, such as televisions and video game systems are less common. Thus, the using on electronic systems could play a role important in the occurrence of visual defects.

Conjunctivitis

Meng Ying Chow reported that the prevalence of conjunctivitis among school age children in Taiwan in the summer of 1986 was 46.05% 10. It was considered that the causative agent of conjunctivitis in Taiwan was CA24 virus. Aberg et al. suggested that the occurrence of conjunctivitis could be due to worse in an allergy condition, and that it was transmitted by direct interpersonal contact or indirect contact with fomites, and spread rapidly through the household or via sports activities and where students converged to perform various activities 11. Stephen et al. studied about the occurrence of conjunctivitis in lower middle class households in Puerto Rico, where the highest rate was found in school-age children. The occurrence was caused by enterovirus 70, and the transmission had a significant association with crowded housing condition 12.

However, there is no studies about the differences between the school age children in Hokkaido and Jakarta might have been because of difference in environmental factors, such as the daily lifestyle of school age children and individual awareness on disease prevention.

Otopharyngeal diseases

The etiology of otopharyngeal disease such as virus and bacterial infections, and of allergy and genetic disease might involve a predisposition to such conditions. Monto et al. reported that the spread of viruses over a large geographical area result from interactions among a large number of agents. Although viruses cause otopharyngeal diseases, various agents such as a strong wind can spread the viruses to other areas, and may aggravate allergy conditions 11.

Thus, it is possible that the difference in prevalence of otopharyngeal diseases between Jakarta and Hokkaido is due to viruses and other environmental factors as an etiological agents.

Infectious skin disease

The infectious skin disease among school age children in Jakarta is higher than in Hokkaido. Considering the etiology of infectious skin diseases, Gunnar suggested a relationship with hygiene condition 13. Moreover, the transmission of such diseases appears to occur by direct interpersonal contact through mediating agents or fomites 14,15. Infectious skin disease are rapidly transmitted in the crowded households with poor hygienic conditions. Most families in developing countries are large and in those with low incomes, hygiene is poor and the home is often crowded. As mentioned above, data from 7 Asian countries revealed that the GNP, illiteracy rate and access to safe water in Indonesia were still poorer than in Japan and the other countries as shown in Table 3. These factors might lead to a predisposition for the outbreak of infectious skin diseases.

Dental caries

The prevalence of dental caries among school age children in Great
Britain (95%) is similar to that of the school age children in Hokkaido (93.1%). In contrast, the prevalence in the developing country of Mozambique (62%) is similar to that of school age children in Jakarta (78.6%).

The World Health Organization reported many factors related to outbreaks of dental caries, for example behavior, social economy, and the method of medical examination, etc. Recently, some studies suggest that dental caries be related to increased sugar consumption. Furthermore, the use of refined carbohydrates in industrial countries is higher than in developing countries.

To study this disparity, the present study compared the socio-economic situation (GNP), education level (illiteracy rate), hygiene (safe water supply), and per capita calorie intake per day in 7 Asian countries. Table 3 shows that Indonesia has much lower GNP than the six other countries, but the prevalence of dental caries was indicated highest on school age children in Jakarta. However this condition is still lower than Japan. On the other hand, the daily calorie supply per capita of people in Indonesia is lower than in Japan and Singapore but higher than in Thailand. Thus, it is not only economy, education and daily calorie intake influence the occurrence of dental caries, but individual behavior is important to plays a role on the out-break of dental caries.

Oral disease

The prevalence of oral disease of school age children in Jakarta is lower than in Hokkaido. A previous study suggests that the etiology of oral disease be related to poor oral hygiene, which could consequently causes, such as gingivitis and periodontal disease.

However poor oral disease is not only due to socio-economic conditions, but also to the individual behavior. Among the 7 Asian countries, Indonesia had the lowest economic, education and hygiene levels, which could influence the occurrence of oral diseases. However, comparable data on oral disease were not available for all countries. Thus, the differences between school age children in Jakarta and Hokkaido, might not only because of environmental factors that indicate in Table 3, but also the awareness of community to use the health services in Jakarta is still lower than Hokkaido.

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References

3. DEKPES RI. Survei Kesehatan Rumatangga. 1995
4. Michael G and Jonathan G. World Health Statistic Quart. 1988; 41: 251-54