1. Introduction

There have been many studies of infectious diseases such as malaria, schistosomiasis and dengue fever that are common in tropical areas. Such studies have formed the basis of ‘Tropical medicine’. In arid and semi-arid areas, desertification and drought present a serious threat to the well-being and health of the local populations. However, there are few studies focusing on dryland health and medicine and thus a specialized health area has not been established. We (a dryland health and medicine group) aim to develop the field of dryland health and medicine to improve the health levels of people living in arid and semi-arid areas.

2. Specific diseases in arid and semi-arid areas

Diseases specific to arid and semi-arid areas are summarized in Table1. Heat related illnesses include heat cramps, exhaustion, and stroke. Heat stroke can be severe and fatal with core temperature elevated to more than 40.5 degree centigrade. In Saudi Arabia, which has a very hot dry climate, the number of deaths from heat stroke was more than 1000 during the Haj season in 1985. Most deaths were of pilgrims from outside Saudi Arabia. Our study indicated that sweating rates were almost the same under low or high humidity conditions at the same temperature, though subjects did not feel so hot in low humidity conditions. The difference of how heat was felt under variations in relative humidity may be related to many pilgrims from outside of Saudi Arabia suffered from heat stoke in the hot dry conditions.

Dust and sandstorms (DSS) have cause considerable damage to transportation and public health. DSS may also cause pneumoconiosis and be a potential allergic factor. Infectious diseases include zoonosis and malaria, though the latter is more common in very hot and humid areas. Nutritional disorders because of desertification and drought are serious problems especially for women and children. Other diseases specific to arid and semi-arid areas are water pollution related diseases such as those caused by arsenic pollution and disorders related to dryness.

3. Study on respiratory diseases due to DSS

The DSS that are devastating Northeast Asia are known as kosa or Asian yellow dust. Kosa are considered natural phenomena that originate in deserts and arid lands. The frequency and volume of kosa are increasing. The DSS issue is a concern shared by Japan, Korea, China and Mongolia. Epidemiological studies have shown relationships between daily mortality and the occurrence of kosa. There are, however, few reports of pathological studies of pulmonary toxicity induced by kosa. The health impact of kosa has not been clarified.

Our study focuses on topics related to respiratory diseases caused by DSS:
1. Experimental study on the toxicity of kosa (nano-particles)
2. Disease monitoring of a variety of animals in affected areas
3. Survey of respiratory symptoms and diseases caused by kosa in the affected areas
4. Study on how to prevent respiratory diseases caused by kosa (respiratory protective devices, early warning systems and environmental restoration in source areas)