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The present situation and problems in the mass screening of lung cancer in relation to the law for preservation of the health of the elderly in Okinawa

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ABSTRACT

Mortality from lung cancer has been on the increase in all of Japan. It has been the leading cause of death in the Okinawa prefecture particularly since 1982. In Okinawa prefecture the mass screening of lung cancer was introduced to public health service for aged people in 1987. We investigated the present situation and problems of the mass screening of lung cancer on the basis of municipality enforcement reports which included examination rate, close examination rate and detection rate of cancer. The data for all of Japan, Okinawa, villages in Okinawa and Naha city were analysed separately by age groups and years from 1987 to 1992. In Okinawa prefecture the coverage rate for the mass screening of lung cancer was 75.5%, 94.3% and 100% in 1987, 1988, and 1992 respectively. The number of people screened in Okinawa were higher in towns and villages than in cities. We therefore need to intensify the examination rate in cities, particularly in the Naha city. The examination rate was highest among people above sixty years of age. The close examination rate and the detection rate of cancer increased with age. In Okinawa prefecture 500,311 people were screened for lung cancer until 1992. Three hundred and twenty-two cases were detected as lung cancer and 26 cases had an early hilar lesion. The detection rate of lung cancer was 0.064%. The decrease in the detection number of early lung cancer of hilum is parallel with the decrease in the number of sputum cytology. It is therefore necessary to heighten the examination rate of the High-Risk-Group and especially, to increase the number of sputum cytology. Since Japanese men have a high smoking rate. We intend to research into the relationship between smoking and lung cancer in the Okinawa prefecture in future. *Ryukyu Med. J.*, 17(1)15~19, 1997

Key words: mass screening, lung cancer, okinawa

INTRODUCTION

The Incidence of lung cancer has increased rapidly in recent years. It is estimated to be the 1st and 2nd leading cause of death from cancer in men and women, respectively by the year 2000^{1,2)}. In Okinawa prefecture, lung cancer mortality is highest among all cancer mortalities, surpassing that of carcinoma since 1981. The increase in lung cancer mortality with age was higher in Okinawa compared to all of Japan from 1970 to 1992 (Fig. 1). The death rate (per 100,000 population) of lung cancer in people above 40 years of age is highest in Okinawa (Fig. 2).

Early detection and treatment of lung cancer at an

early stage is important to tackle the present problem³⁾. In Okinawa prefecture, the mass screening of lung cancer was introduced into the health service for the elderly and implemented in 1987.

In this study we investigated the present situation and problems of the mass screening of lung cancer on the basis of the enforcement reports of the towns and villages in Okinawa from 1987 to 1992.

MATERIALS AND METHODS

The target population of the mass screening of lung cancer are all persons 40 years and over according to the law for preservation of health of the elderly.

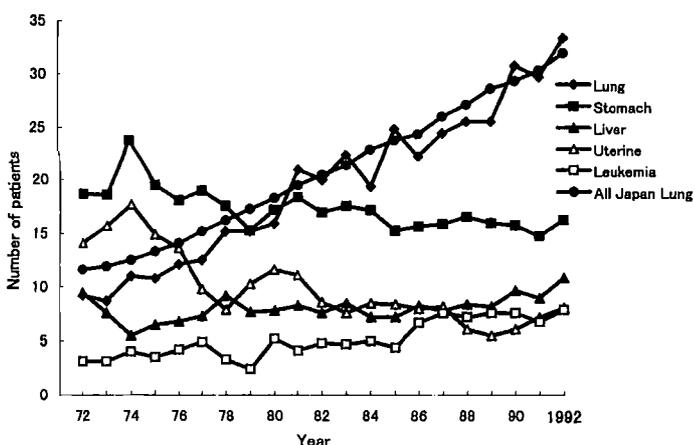


Fig. 1 The death rate of malignant neoplasm in Okinawa prefecture and lung cancer in all of Japan. (per 100,000 population)

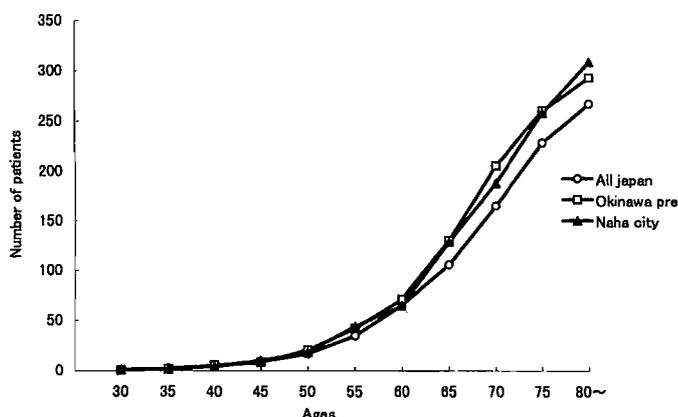


Fig. 2 The death rate of lung cancer by age groups. (per 100,000 population)

However, we excluded employees from the sample population according to age groups using the national census of 1985 and 1990. We used the estimated population of 1991 and 1992 as the subject of investigation.

The mass screening of lung cancer is part of with the regular health examination for tuberculosis prevention. We did oral interviews, checked chest X-ray photographs, and sputum cytology was performed if necessary. The oral included present medical history, smoking history, attendance to any of the screening programs in the past, overall medical history and so on. The chest X-ray photographs had double check and comparative check.

The guidelines and evaluation criteria for X-ray photographs and sputum cytology suggested by the Japan Lung Cancer Society in 1987 was followed in the screening cancer program⁴⁾. A close examination for diseases other than lung cancer is recommended if the person was evaluated as "d" indicating double check and "D" indicating comparative check of X-ray photograph, and examination for lung cancer if the remark was "e" and "E". The sputum cytology was done for subjects in the High-Risk-

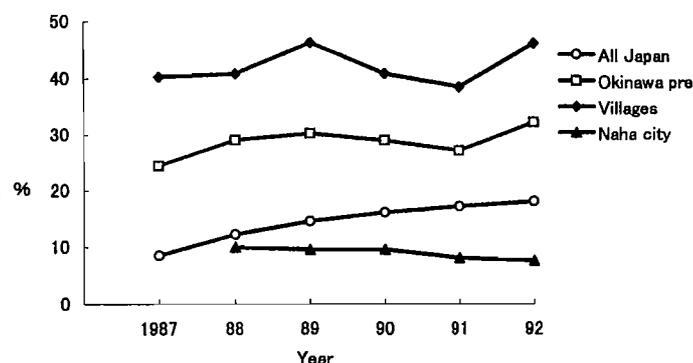


Fig. 3 The examination rate of the mass screening of lung cancer from 1987 to 1992.

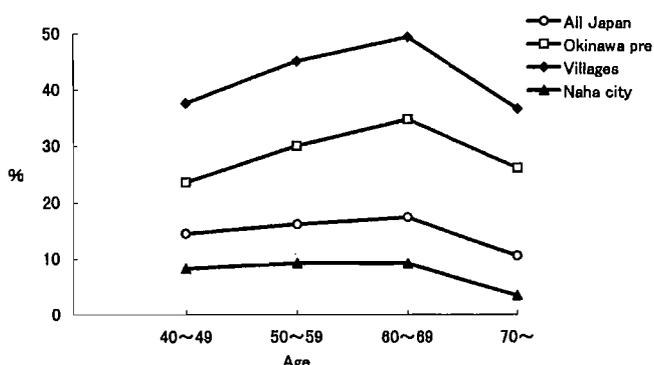


Fig. 4 The examination rate of the mass screening of lung cancer by age groups.

Group (50 years old and over, smoking index BI: over 600, or people 40 years old and over with history of coughing up bloody phlegm in the past six months). The sputum cytology was done by homogenization (the cell collection method) or the method of direct smear of the accumulated sputum, followed by staining with papanicolau stain^{5,8)}. Persons evaluated, as "D" or "E" after cytology, were given close examination^{4,6)}.

The investigation reports from the whole country, and Okinawa prefecture (including all villages and Naha city) were analyzed by year and age groups; Consequently, the examination rate, close examination rate, and selection rate were calculated.

RESULTS

The examination rate for the mass screening of lung cancer in all Japan was 8.6% in 1987 and doubled to 18.1% in 1992. It increased from 24.4% in 1987 to 32.2% in 1992, in Okinawa prefecture. In the villages it was 40.8% and 46.1% in 1987 and 1992, respectively. But the Naha city examination rate declined from 10.0% in 1989 to 7.7% in 1992. The target examination rate of lung cancer set by the Ministry of Health and Welfare is 22.5%⁷⁾ (Fig. 3). The examination rates for Okinawa prefecture and the villages are higher than that of the target but for Naha city it is about 1/3rd of the target rate. The

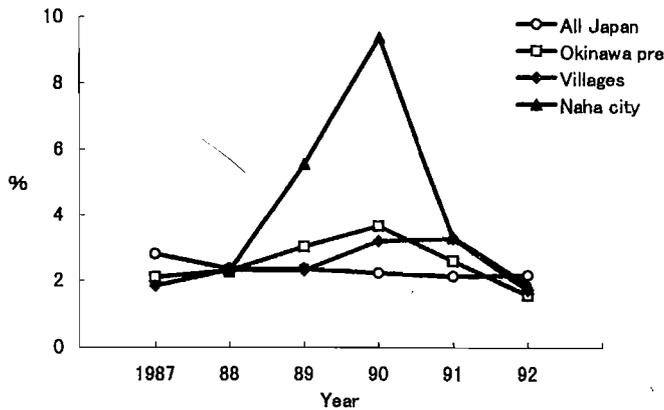


Fig. 5 The close examination rate of the mass screening of lung cancer from 1987 to 1992.

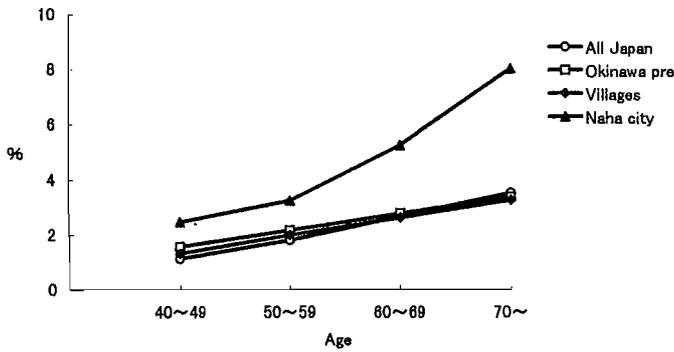


Fig. 6 The close examination rate of the mass screening of lung cancer by age groups.

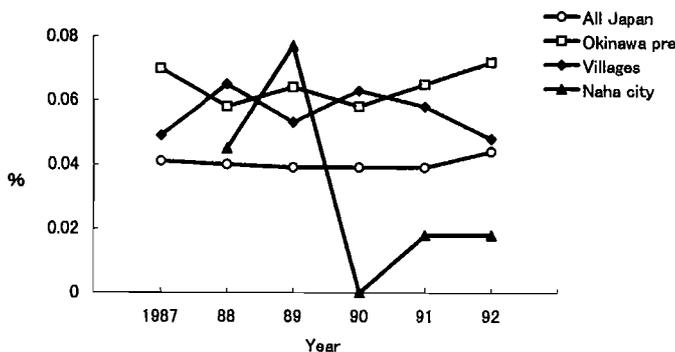


Fig. 7 The incidence of lung cancer detected by mass screening from 1987 to 1992.

examining rate by age groups indicate that the age group 60-69 had the highest in the whole country, Okinawa prefecture, villages and Naha city (Fig. 4). The necessary close examination rate changed by approximately 2-3% in all the study areas except Naha city where the maximum rate was 9.4% in 1990 (Fig. 5). The necessary close examination rate increased with age in all the study areas (Fig. 6).

The cancer detection rate varied from 0.039% to 0.040% between 1987 and 1991 and increased to 0.044% in

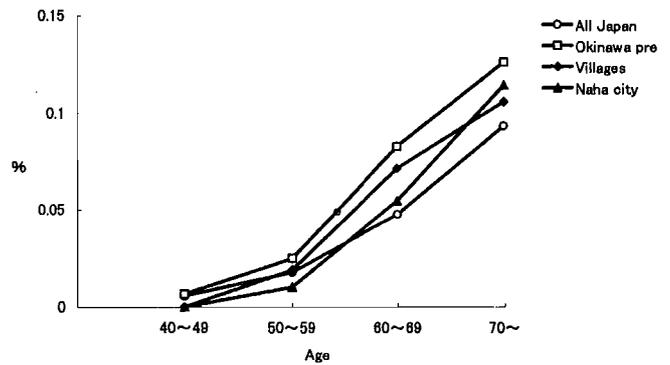


Fig. 8 The incidence of lung cancer detected by age groups.

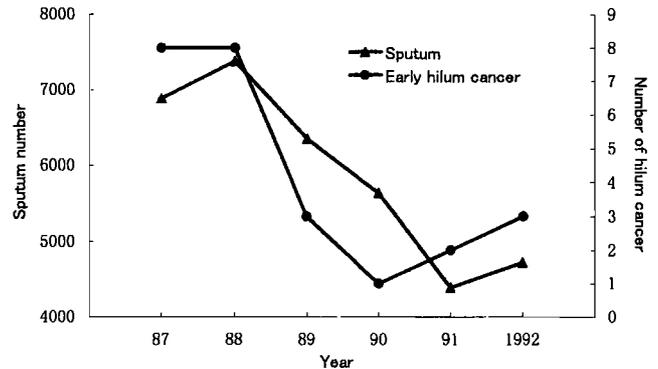


Fig. 9 The number of sputum cytology and early cancer of hilum of the lung detected by mass screening.

1992 in all of Japan. In Okinawa prefecture, the cancer detection rate varied from 0.06% to 0.07% between 1987 and 1992, and the average detection rate was 0.064% which was about 1.5 times higher compared to the whole country. In the villages, the average cancer detection rate was 0.056% for the period 1987 to 1992, showing a decreasing trend over the period. The detection rate in Naha city declined from 0.077% in 1989 to 0% in 1990 (Fig. 7). The cancer detection rate however increased with age in all the study areas (Fig. 8).

In 1987, the year of introduction of the lung cancer screening program, the total number of sputum cytology in the High-Risk-Group was approximately 7,000, but it declined gradually to about 4500 in 1992 (Fig. 9). The total number of early lung cancer in the hilum detected between 1987 and 1992 was 26. The number of cases were 8 and 9 in 1987 and 1988, respectively, and then declined gradually after words (Fig. 9).

DISCUSSION

The death rate (per 100,000 populations) of lung cancer in Okinawa prefecture surpassed that of gastric cancer in 1982. It is therefore necessary to ensure early diagnosis and treatment of lung cancer cases through proper implementation of the lung cancer screening program³⁾.

The examination rates observed in the whole Okinawa prefecture and the Village areas are much higher than the target rate set by the Ministry of Health and Welfare. On the contrary in the Naha city it is only about 1/3rd of the target rate. In the rural area it varied from 2-3%. In Naha city a very high close examination rate of 9.4% in 1990 is not consistent with a 0% lung cancer detection rate. This may point towards a lack of precision in case management.

The lung cancer detection rates, over the period 1987 through 1992, were 0.06 and 0.04% in Okinawa prefecture and all of Japan, respectively, which is about 1.5 times more in Okinawa than all of Japan. The lung cancer detection rate in the rural area is higher than that in Naha city. A greater elderly population in the villages may be the reason. However, the cancer detection rate in the villages has been declining in recent years. This may be due to the effective implementation of the screening program in the villages. There is an increased detection rate among the higher age groups, as observed through analysis by age groups. Since the incidence of lung cancer increases with age and the villages have a greater elderly population than Naha city, the detection rate will also be higher in the villages than in Naha city. Similarly, prefectures with a larger elderly population like Okinawa have a higher cancer detection rate compared to other prefectures. In Okinawa prefecture, the lung cancer death rate (per 100,000 populations) has shown an increasing trend in recent years. This suggests that the early detection of lung cancer is still a difficult task to perform. About 90% of male lung cancer patients are smokers which indicates a possible relationship between smoking and lung cancer.

Sputum cytology is a useful measure for detection of lung cancer in the High-Risk Group but unfortunately, the sputum cytology number has been decreasing gradually in Okinawa prefecture^{9,10}. This may be due to a lower attendance by the High-Risk Group. The other possibilities include technical set-backs, inadequate motivation of the Risk-Group and so on. It was observed by Genka that with time the total number of early lung cancer detection tends to decrease composed to examination rates¹⁰.

The main purpose of the lung cancer medical examination is to detect lung cancer at an early stage and sputum cytology is a very useful method for this, especially to detect early cancers involving hilum of the lung. But the decreasing number of sputum cytology (indicating lower attendance by High-Risk Group) is affecting the whole program because the follow-up of High-Risk Group is very important for early detection and treatment of lung cancer and thereby reducing lung cancer mortality^{10,12}. In Okinawa prefecture there is no mention of lung cancer involving the peripheral part of lung. According to Ikeda¹¹ and Naruge⁹, the detection rate of early lung cancer of the peripheral part is about

2.5 times higher than that of hilum of the lung in the whole country. The total number of lung cancer cases in Okinawa prefecture, including peripheral and higher lung cancer were 90, over the period 1987 to 1992. About 28% of the lung cancer cases were detected by the screening program. This is much lower in comparison to the detection rate of 45.8% of stomach cancer. This indicates that lung cancer detection is relatively difficult. To combat the present high rate of cancer, the measures for primary prevention is as important as medical examination and secondary measures, and should therefore be emphasized in future.

SUMMARY

- 1) The lung cancer screening program showed a sustained increase in the coverage rate in Okinawa prefecture from 1987 to 1992. The coverage rates were 75.5%, 94.3%, 96.2% and 100% in the years of 1987, 1988, 1989 and 1992, respectively.
- 2) The attendance for lung cancer medical examination is fewer in cities as compared to villages, particularly in Naha city, which should be given special attention.
- 3) Analysis of examination rate by age groups shows an increase among people above 60 years of age. The cancer detection rate also increased with age.
- 4) The total number of persons examined under the screening program from 1987 to 1992 was 500,311 and the total number of cancer detected was 322 (0.064%). Early lung cancer involving the hilum was detected in 26 subjects.
- 5) It seems that an increase in the performance of sputum cytology among the High-Risk Group may improve the detection of early lung cancers involving the hilum.
- 6) A precise management program is very important not only for lung cancer screening but also for medical examinations. A discrepancy between the high examination rate and very low lung cancer detection rate shows the lack of precision in the management program. To avoid such a discrepancy a counter-check system may be helpful.
- 7) Sex difference in lung cancer incidence rate is a well known fact, however records of lung cancer screening program in Okinawa prefecture was not distributed by sex until 1992. This caused a limitation in Okinawa prefecture. There is no proper follow-up sputum cytology for the detected lung cancer cases which is necessary for the evaluation of the total program.

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