COMMUNITY SCREENING PROGRAMS OF CANCER AND CARDIOVASCULAR DISEASES IN JAPAN

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The Health and Medical Services Law for the Aged was implemented from February, 1983 in Japan. This paper describes the present status of health examination programs and cancer screening programs and related issues as follows: methods of the basic health examination and cancer screening, the number of the examinees, detection numbers and rates of targeted diseases, i.e. hypertension, anemia, cancer of the stomach, uterus, lung, breast, and colon etc. The Goals of Japanese Government of the Health Services by the year 2000 are discussed from the several points of view. J Epidemiol, 1996; 6: S159-S163.

According to the Japan vital statistics, until the middle of the 20th century, death due to infectious diseases such as pneumonia, bronchitis, tuberculosis and gastroenteritis prevailed in Japan. As shown in the Figure 1, after the Second World War (1945), they have rapidly decreased and have been supplemented by cerebrovascular diseases, malignant neoplasms and heart diseases.

In 1951, the death rate from stroke became to be the leading cause of death among all deaths. In the same time, the mortality rate from cancer and heart disease were the second and third leading cause among all deaths, respectively.

These three chronic diseases account for approximately two-third of causes of all deaths of the Japanese (Figure 2). Therefore, the main objective of public health policy in Japan was prevention and also reduction of the mortality rates of the three major chronic diseases, i.e. cancer, heart disease, cerebrovascular disease.

In 1960, the deaths due to stomach cancer accounted for more than one-half of all cancer deaths (51.6%) in males. In females, the deaths due to stomach and uterine cancer amounted to 54.6% of all cancer deaths. Accordingly, the main target organs of cancer control activities in Japan were the stomach and the uterus.

At that time, we had not the effective methods for primary prevention, i.e. reduction of incidence of stomach and cervical cancer, but clinical physicians experienced that the earlier the detection, the better the prognosis of patient with stomach cancer or cervical cancer. Therefore, we felt it mandatory to extend our efforts into the general population to perform cancer screening for early detection.

Since around 1960 mass screening programs for stomach and cervical cancer were started actively and systematically in several municipalities, and gradually spreaded nationwide in Japan. The purposes of cancer mass screening should be the early detection and prompt treatment to reduce the cancer mortality in a given population. This is the secondary prevention.

On the other hand, it was known that excessive intake of sodium chloride resulted in cardiac infarction and stroke which were known to be fetal. For prevention of these diseases, it was essential to properly limit the salt intake.

Since around 1950 the campaign of "low salt intake in daily diet"-activity for prevention of hypertension which was closely related to cerebrovascular diseases began as national health policy, and also mass screening programs for the same objective has been conducted nationwide by measurement of blood pressure, examination of urine, examination by electrocardiogram, funduscopic examination and others.

THE HEALTH AND MEDICAL SERVICES LAW FOR THE AGED

The Health and Medical Services Law for the Aged was implemented from February 1983. The purpose of this law is...
to provide comprehensive health and medical services such as
disease prevention, treatment and functional training in order
to ensure the maintenance of good health and appropriate med-
cal care for elderly Japanese people, thereby improving
the national health and promoting the welfare of senior citizens).4.

The types of the health services other than medical care
based on the Law are as follows:

1) The issuance of a Health Handbook
2) Health education
3) Health counseling
4) Health examinations
5) Functional training
6) In-home visit guidance

These health services were started in a comprehensive way
intended for regional residents aged 40 or more with the aim of
maintaining health in elderly people.

This paper is mainly concerned with the current status and
evaluation of health examinations above mentioned.

THE HEALTH EXAMINATION PROGRAMS

The main bodies operating the health examination services to
regional residents are the municipal (city/town/village) govern-
ments, and the delivery of the service is commissioned to med-
ical institutions, cancer detection centers, health check-up cen-
ters, etc.

The health examination programs consist of two main pro-
grams; i.e. basic health examination and cancer screening. The
major target of these services is prevention and reduction of
morbidity and mortality rates of cancer, heart disease and
cerebrovascular disease which are the three leading causes of
death in Japan.

In 1983 the health services was implemented as the “First
Five-Year Program” and in 1987 the “Second Five-Year
Program” started. Recently the “Third Eight-Year Health
Service Program” has been conducted during the period of
1992-1999).

The methods of the two main health examinations are
described as follow:

**Basic Health Examination**

This health check-ups which we call “Basic Health
Examination”, are conducted to confirm the healthy status and
to detect disease risks in order to administer optimum care and
Table 1. Basic health examination

**Essential items:**
(a) Questionnaire: present symptom, past history, family history
(b) Physical measurement: height and weight
(c) Physical examination: inspection, auscultation and percussion, palpation
(d) Measurement of blood pressure
(e) Examination of urine: glucose, protein, occult blood
(f) Laboratory procedures: total cholesterol, HDL cholesterol, neutral fat, GOT, GPT, γ-GTP, creatinine

**Optional items:**
(a) Examination of electrocardiogram
(b) Funduscopic examination
(c) Examination of anemia: erythrocyte, Hb, hematocrit
(d) Plasma glucose

Source: “Vital Statistics”, Statistics & Information department, Minister’s Secretariat, MHW.

**Figure 2. Trends of the death rates by major causes of death**

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**Cancer Screening**

Hoping to control premature deaths from main cancers, cancer screening programs have been conducted on the basis of the Law for the Health and Medical Services for the Aged targeting the five types of cancer, i.e. stomach cancer, uterine cancer, lung cancer, breast cancer and colon cancer.

For a cancer screening to be successful,
(a) the screening test has to be accurate enough to detect the target cancer;
(b) it must lead to early detection of the disease and better prognosis of the patients; and
(c) evidence that death rate from cancer is reduced in a population screened, should be obtained from well conducted studies, preferably from a randomized controlled trial which is said the best method, or second best methods, i.e. case-control study, time-series study, follow-up study, etc. Table 2. shows the present methods of cancer screening programs in Japan.

**Goals of the Health Services**

Japanese government decided the goals of the “Third Eight-Year Health Service Program”. Reduction of mortality rates of three major chronic diseases (cancer, heart disease and cere-
Table 2. Method of cancer screening

| Cancer      | Method of screening                                                                 |
|-------------|-------------------------------------------------------------------------------------|
| Stomach     | Roentgenographic screening (barium photofluorography)                                |
| Uterine     | Cytology (Pap smear)                                                                |
| Lung        | Roentgenographic screening (photofluorography or direct X-ray) and/or sputum cytology|
| Breast      | Inspection and palpation by trained doctor                                           |
| Colon       | Fecal occult blood test (immunological test, 2 days method)                         |

Table 3. Results of mass health examination and cancer mass screening in Japan, 1993 (nationwide statistics)

(1) Basic health examination

| Detected diseases | Number | Rate of examination |
|-------------------|--------|---------------------|
| Hypertension      | 1,454,632 | 33.6%               |
| Electrocardiogram | 1,612,680 |                   |
| Anemia            | 1,154,809 |                   |
| Liver disease     | 1,074,046 |                   |
| Diabetes          | 919,492 |                   |

(2) Cancer mass screening

| Cancer      | No. of examinees | No. of cancer detected | Detection rate |
|-------------|------------------|------------------------|----------------|
| Stomach     | 4,365,004        | 6,341                  | 0.14%          |
| Uterus      | 4,133,959        | 2,680                  | 0.06%          |
| Lung        | 6,298,527        | 2,726                  | 0.04%          |
| Breast      | 3,179,831        | 2,439                  | 0.08%          |
| Colon       | 3,596,289        | 5,431                  | 0.15%          |

EFFECTIVENESS OF THE HEALTH SERVICES

Evaluation of Cancer Mass Screening Programs

There are many methods and steps to investigate the accuracy of screening test, the feasibility of mass scale program, and the effectiveness of mass screening program (Table 4). In these methods, there have been many studies carried out in Japan. Table 5 shows research efforts design to evaluate the effectiveness.

Evaluation of mass health examinations

Table 4. Methods and steps of evaluation of cancer screening

(a) Accuracy of screening test (ROC analysis)
(b) Feasibility test (compliance, safety, cost etc.)
(c) Identification of high risk group
(d) Study of natural history
(e) Epidemiological study

randomized controlled trial
case-control study
time series study
non-randomized cohort study, etc.
Table 5. Evaluation studies of cancer mass screening in Japan (1995)

| Cancer      | RCT            | Case-control study | Non randomized cohort study | Time series study | Relationship between screening rate and change of death rate |
|-------------|----------------|--------------------|------------------------------|------------------|----------------------------------------------------------|
| Stomach     | on-going       | effective          | effective                    | effective        | effective                                                |
| Cervix      | (-)            | effective          | suggest                      | (-)              | (-)                                                      |
| Lung        | (-)            | suggest            | (-)                          | suggest          | (-)                                                      |
| Breast      | (-)            | (-)                | suggest                      | suggest          | (-)                                                      |
| Colon       | (-)            | effective          | suggest                      | (-)              | (-)                                                      |

RCT: Randomized controlled trial, (-): not conducted

The objective of mass health examination is to achieve a reduction of mortality rates of major chronic diseases (cancer, heart disease, cerebrovascular disease, diabetes etc.) by improvement of health education and health counseling and effective promotion of guidance for improving daily living habits.

There have been also many studies to investigate the effectiveness of mass health examination by comparing between the incidence of stroke or heart disease and hypertension, serum cholesterol level, etc.

In Japan, the mortality from stroke decreased dramatically during recent decades, however, the report from the Ministry of Health and Welfare of Japan showed us that the incidence of stroke never decreased, indicating that non-fetal stroke rather increased. According to the report of Abe, K. and Imai, Y. 8), the meta-analysis of primary prevention trials demonstrated that a modest decrease in diastolic blood pressure, that is 5 mmHg or so, associated with a significant reduction in stroke mortality by 28%, whereas mortality of coronary heart disease reduced by only 8%, which was not statistically significant.

CONCLUSION

The widespread programs of health services (mass health examination and cancer mass screening) based on the Law of the Health and Medical Services for the Aged is considered to be effective in reducing the morbidity and mortality rates from the major chronic diseases mentioned above in a target age population.

We have the Goals of reduction of these mortalities, however, according to government officials, 4) Ministry of Health and Welfare, it seems possible to reduce the mortality rates of stomach cancer, uterine cancer and cerebrovascular disease to the level of Goals we set up. And it seems rather difficult to achieve the Goals for lung cancer, colon cancer, breast cancer and heart disease.

Therefore, it is necessary to investigate the effective methods; for instance, improvement of comprehensive primary prevention for not only cancer but also heart disease and cerebrovascular disease, promotion to receive health check-up and/or cancer screening. Finally, I would say that we have to make our efforts to accelerate and achieve the Goals in Japan by the year 2000.

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