Health Risk Assessment as Educational Tools for Health Promotion

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Abstract: Health risk Assessment (HRA) was developed to have patients modify their lifestyle from a viewpoint of primary prevention of lifestyle-related diseases. HRA has the following functions; 1) to estimate the risk of occurrence of lifestyle-related diseases, 2) to specify lifestyles which deteriorate these diseases, and 3) to evaluate health age and life expectancy after these lifestyles are modified. This paper discusses the criteria for selecting risk factors in developing HRA. The selected risk factors are predictable enough to alter the natural course of the diseases. HRA provides appropriate information to detect unsound lifestyles and offers life skills to recognize suitable approach to change the lifestyle. This paper also reviews effectiveness of HRA as the health educational tools. There have not been enough researches which show capabilities of HRA in primary prevention. Combination of health check-ups and HRA in Japan is expected to be a useful tool for individual health. Efficacy of HRA in modifying unsound lifestyles should be elucidated.

Key words: Health risk assessment; Health education; Lifestyle-related disease; Health promotion

Introduction

The Japan Medical Association organized the Health Investment Project Committee in 1997 and proposed the basic concepts for health, medicine and welfare in response to the structural reform of medical care. The Committee pointed out the importance of prevention and promotion of national health asset beyond the current framework of early detection and early treatment for health of the Japanese people in the future.

In order to promote health asset, it is indicated that health activities preceding primary prevention are important just as securing the life-long system for health and medicine. For preventive medical activities preceding the onset of disease, prevention of lifestyle-related diseases centering on health education has been advocated.

However, these activities, though objective and highly reproducible, have not yet been

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adequately studied. Health risk assessment (HRA) is an educational tool for health promotion proposed by Robbins and Hall in the 1970s in the United States.²³

For adopting HRA techniques in daily clinical medicine, the author reviewed current references related to the method and utility of health risk assessment.

Historical Background of HRA

HRA is an educational tool to motivate its subjects to improve their lifestyle by predicting their health in the future based on their current lifestyles and laboratory test results and by proposing the expected levels of improvement for their health through modifiable lifestyles. It is characterized by the following features.

● To analyze the future health risks using a disease model based on the current lifestyle
● To express health risks by using three indexes of the risk for disease occurrence, the life prolonging effect, and the health age
● To re-evaluate the health risks of the subjects in view of their lifestyle modification targets and express the level of improvement using three indexes
● To offer materials for understanding usefulness of improvements that should be made for lifestyles.

Kondo et al.²³ and Nakamura et al.³ described the Japanese version based on HRA originally developed in the United States.

When carrying out HRA, the following questions are asked regarding seven lifestyle factors proposed by Breslow.⁴

(1) Optimum alcohol intake
(2) Bodyweight control
(3) Physical exercise
(4) Eating breakfast
(5) Not eating between-meal snacks
(6) Sleeping hours
(7) Non-smoking

Questions are so designed as to obtain concrete answers regarding these factors.

Self-reported information on family history and past history that may participate in development of the disease and laboratory test results (total cholesterol and HDL cholesterol) are also used.

Often-used HRA predictive indexes are described below.

● Risk for developing disease
● Life prolongation effect
● Health age

The risk for developing disease is calculated by using the disease development model based on the lifestyle and disease-related factors obtained from the questionnaire sheet. For calculating risks of a group, the ratio of the group possessing each factor is used. For calculating life prolongation effect, risk of death in addition to occurrence of the disease should be calculated.

Life prolongation effect is the difference between life expectancy calculated with mortality of the time when the problematic lifestyle was improved and life expectancy at the current time point. This index was devised for use in understanding effectiveness of improving lifestyle.

Health age represents the current level of health risk of an individual as compared to the health risk of the general population. Since the health risk of the general population increases uniformly with advance in age, indicating the health risks of an individual corresponding to those of a group would inform the individual of the problems of his/her lifestyle in view of the difference between his/her actual chronological age and the age of the group to which his/her health age corresponds.

Selecting Diseases for HRA

HRA aims to improve lifestyles and the following standards are needed to select its object diseases.

(1) Lifestyle is related to the disease.
(2) Degree of improvement made for life-
Lifestyle and Life Skill

In order to implement HRA, lifestyles for evaluating health risks must be analyzed. While HRA uses such lifestyles as smoking and drinking, it is necessary to analyze the factors that habituate such habits. Recently, the focus is on health education using life skills. Life skills mean techniques to establish the lifestyle, which is desirable for self, not to offer traditional health education such as stopping smoking or moderating drinking.

Life skills include the following:

- Cognition of the situation
- Cognition of the role
- Alternative activity
- Selecting lifestyle

Table 1  Studies on Effectiveness of HRA

<table>
<thead>
<tr>
<th>Authors</th>
<th>Subject population</th>
<th>Period of observation</th>
<th>Result index</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connell et al. (1995)</td>
<td>2,196</td>
<td>12 months</td>
<td>Total cholesterol</td>
<td>• Decreases in BP and BMI</td>
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<td></td>
<td></td>
<td></td>
<td>BP</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Frequency of physical exercise</td>
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<td></td>
<td></td>
<td></td>
<td>Obesity</td>
<td></td>
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<tr>
<td>Dunton et al. (1990)</td>
<td>1,735</td>
<td>6 months</td>
<td>Safety belt use</td>
<td>• Increased belt use</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Use of auxiliary materials irrelevant</td>
</tr>
<tr>
<td>Gemson and Sloan (1995)</td>
<td>161</td>
<td>3 years</td>
<td>Frequency of physical exercise</td>
<td>• Improved health age and physical activity</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Seat belt use</td>
<td>• Greater improvement in cholesterol,</td>
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<td></td>
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<td></td>
<td>Cholesterol</td>
<td>frequency of physical exercise, BP, and</td>
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<td></td>
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<td>Bodyweight</td>
<td>bodyweight in group with</td>
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<td></td>
<td></td>
<td></td>
<td>BP</td>
<td>larger health risks</td>
</tr>
<tr>
<td>Merrill and Sleet (1984)</td>
<td>3,947</td>
<td>1 year</td>
<td>Seat belt use</td>
<td>• Improved seat belt use ratio</td>
</tr>
<tr>
<td>Nice and Woodruff (1990)</td>
<td>625</td>
<td>1 year</td>
<td>Health related factors</td>
<td>• Those taking HRA are younger than those</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>not taking and have shorter education record.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Improved in smoking and excessive drinking, but not significantly</td>
</tr>
<tr>
<td>Spilman et al. (1986)</td>
<td>4,721</td>
<td>1 year</td>
<td>Health related factors</td>
<td>• Improved physical activity and cessation of smoking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Improvement in health risks</td>
</tr>
</tbody>
</table>

4. Effect of intervention

4.1 Adaptability to the subject population

4.2 Quality of information
To recommend smokers to stop smoking requires explaining not only the health hazards of smoking, but also the ways to avoid the behavior by life skills.

References Regarding Efficacy of HRA

Table 1 shows the studies\textsuperscript{5-10} which investigated effectiveness of health education using HRA.

Some report recognize improvements to health risks by health education techniques using HRA, but others do not observe significant differences.

Improvements of HRA

1. Extending HRA from Primary Preventive Activity

HRA has so far been developed and used mainly for disease prevention by improving lifestyle. In addition to conventional uses as preventive activities, it is necessary to develop HRA related to daily clinical medicine.

In daily clinical medicine, we need to consider encounters patients who are disease carriers or who are about to manifest symptoms. Although current HRA calculates the degree of risk for development of diseases, HRA should be developed to show how the prognosis might be affected for asymptomatic patients.

Concretely speaking, guidance on lifestyle is important for DM or glucose intolerance patients, and evaluation of future health risks (prognosis and complications) attributable to lifestyle is necessary.

2. Extending Subject Population

Current HRA mainly addresses lifestyle-related diseases and is applied to those in their 30s to 60s. The concept of HRA is not to be limited to lifestyle-related diseases, but should be adapted to decrease the burden on health of the subject populations.

More concretely, HRA should be developed and adapted for the elderly or the younger populations and for those in the perinatal period. Departments of Gynecology & Obstetrics and Preventive Medicine of St. Marianna University School of Medicine have prepared an Obstetric Data Base to study disease models on abnormal deliveries.

Disease-specific HRA should also be studied. HRA for osteoporosis that can increase burdens on health of the aging society is necessary, and it can be used to evaluate younger women.

3. Coordination with Health Screening Programs

Development and adaptation of HRA coordinated with conventional health screening programs are also necessary. Yoshida \textit{et al.}\textsuperscript{11} developed a system of health education by incorporating general health screening and HRA to predict changes in health screening results of the following year by improving lifestyles.

HRA model for predicting changes in hypercholesterolemia is being built in order to relate HRA with the health-screening program under the Law of Health and Medical Services for the Aged.\textsuperscript{12}

Conclusion

In addition to secondary preventive activities, family physicians are expected to incorporate primary preventive activities in their daily clinical services.

Optimum tools for primary preventive activities are required, and HRA is a useful technique for expressing the effects of intervention for health promotion by disease simulation.

This paper reviewed references on current
HRA and studied the components of HRA in daily clinical medicine in the future.

REFERENCES


