Original Article

The Coronary-prone Behavior Pattern of Okinawan Centenarians

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Summary: It is well known that the Okinawan people have the longest average life span in all of Japan and the rate per 100,000 of centenarians in Okinawa is about five times higher than the average for the whole of Japan. In this study, the author attempts to elucidate characteristics of Okinawan centenarians in terms of the Type A behavior pattern in their prime of life.

The survey was done for the subjects of sixty Okinawan centenarians and sixty-eight middle-aged and aged Okinawan controls using a brief questionnaire developed by Maeda based on Jenkins Activity Survey by recall method. In comparison of frequency of Type A, statistically no significant difference was found between centenarians and controls. Contents of the questionnaire and distributions of mean scores for each item demonstrated that profiles of the centenarians' Type A behavior pattern were different from those of controls, especially centenarians showed low scores in "time urgency" and "tension", but high scores in "self-confidence" and "unyieldingness".

Okinawan centenarians may be judged as Type A outwardly, but when considering their detailed profiles of behavior pattern they are different from the control group and in these profile differences it might be possible to find psychological or psychosocial clues for their longevity.

Key words: centenarians, coronary-prone behavior pattern, Type A, Okinawa, longevity

INTRODUCTION

The average life span of the Japanese, according to the 1993 WHO report, is 76.3 years in males and 83.0 years in females, which are the highest in the world. In Japan, according to the 1990 report of the Japanese Ministry of Health and Welfare, the average life span of the total Japanese population is 76.0 years in males and 82.0 years in females, and that of Okinawan people is 76.6 years in males and 84.4 years in females. This means that the Okinawan people have the longest average life span in all of Japan. The rate per 100,000 of centenarians in 1992 was 15.8 in Okinawa and 9.45 in the second highest prefecture, and for all of Japan was 3.36. This indicates that the number of centenarians in Okinawa is about five times higher than the average for the whole of Japan. Thus, Okinawa is considered to be one of the most longevous areas of the world.

We have reported several results of our medico-biological and socio-medical studies on Okinawan centenarians mainly from the view points of medical characteristics, clinical features, genetics, physical activities, food intake and so on. However, from the view point of behavioral medicine, there have been no reports about centenarians. One thing necesssary for achieving a healthy long life would at least be the prevention of coronary heart diseases (CHD). In this study, the author attempts to elucidate characteristics of
Okinawan centenarians in terms of the Type A behavior pattern.

SUBJECTS AND METHODS

Type A behavior pattern of Okinawan centenarians in their prime of life were retrospectively surveyed. The survey was done by a brief questionnaire developed by Maeda based on JAS (Jenkins Activity Survey), which consists of 12 questions (Fig. 4) with a triple choice form to be assessed by total scores.

Sixty Okinawan centenarians and sixty-eight middle-aged and aged controls in Okinawa were surveyed with the same questionnaire by recall method. The subjects were all at home, having no clear dementia, CHD findings and other related illness histories, and were taken to be healthy at present. As for centenarians, the author carried out a health check by visiting their homes. They were asked to indicate on a questionnaire their behavior pattern in their 30s to 40s or prime of life; responses were confirmed by their sons and/or daughters. In 22 cases (36.6%) the centenarians were incapable of replying by themselves, so their son or daughter answered in their behalf. The controls, who lived in the same districts, were similarly surveyed by the recall method at an annual medical health check held at regional citizens' halls (Table 1).

For each question, subjects were given three choices to choose among, “usually”, “sometimes” or “hardly ever”. In scoring, 2 points were given for “usually”, 1 point for “sometimes” and 0 to “hardly ever”. Type A diagnosis was given in cases where total score were equal or greater than 17. If simply calculated, the highest possible score would be 24 points; in using Maeda's method, double points were given to the 3 items, “perfectionism”, “self-confidence” and “punctuality” which had shown significant correlation to the behavior pattern of coronary patients, with 30 as the highest possible score.

Table 1. Subjects and Methods

<table>
<thead>
<tr>
<th></th>
<th>Centenarians</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>60</td>
<td>68</td>
</tr>
<tr>
<td>Sex (Female/Male, %)</td>
<td>45/15 (3.0)</td>
<td>48/20 (2.4)</td>
</tr>
<tr>
<td>Age (Mean ± SD)</td>
<td>101.93 ± 1.49</td>
<td>64.28 ± 9.93</td>
</tr>
<tr>
<td>Age range (Max.-Min.)</td>
<td>100–108</td>
<td>50–86</td>
</tr>
<tr>
<td>Area</td>
<td>whole mainland of Okinawa</td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>self-recall of the prime of their life</td>
<td></td>
</tr>
<tr>
<td>Residential style</td>
<td>all at home</td>
<td></td>
</tr>
<tr>
<td>Physical state</td>
<td>healthy (no abnormality by health check)</td>
<td></td>
</tr>
</tbody>
</table>

RESULTS

The occupational history of Okinawan centenarians and controls are shown in Figure 1. The results show that the rate for farmer and/or stockbreeding, in males was 80.0% for centenarians and 75.0% for controls, whereas in females it was 64.4% for centenarians and 66.7% for controls (Fig. 1).

The distribution of total scores by Maeda's weighting showed that both groups have their peaks at 17-points and both showed similar, normal distribution patterns (Fig. 2).

Fig. 3 shows results of the comparison of frequency of Type A. Statistically no significant difference was found between centenarians and controls by Maeda's weighting.

Contents of the questionnaire and distributions of mean scores for each item were demonstrated in Fig. 4. It is observed that each of the profiles of centenarians was different from that of controls, especially in items of “time urgency” and “tension” which showed low scores for centenarians, whereas they showed high scores in “self-confidence” and “unyieldingness”.

Table 2 shows the comparison of the mean score of
each item between centenarians and controls. Significant differences were found in "time urgency", "self-confidence", "tension", "unyieldingness" and "total score" between centenarians and controls. However, comparison of the mean score of "busyness", "absorption", "perfectionism", "punctuality", "intensity of temper", "competitiveness", and "weighted total score" showed no significant difference (Table 2).

DISCUSSION

Since Friedman & Rosenman first emphasized the specific behavioral pattern called Type A in their studies among the patients with coronary heart disease in United States in 1958, many researchers have reported the significance of this behavior pattern as one of the important risk factors of CHD. Williams has also pointed out the Type A behavior pattern has a close
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Fig. 2. Distributions of scores

Fig. 3. Comparison of the frequencies of Type A

Contents of a questionnaire

1) Did you have a busy daily life? (Busyness)
2) Did you feel pressed for time in your daily life? (Time urgency)
3) Did you easily become enthusiastic over your job or other things you did? (Enthusiasm)
4) When you were absorbed in something, did you feel it was difficult to change your mind? (Absorption)
5) Were you a perfectionist? (Perfectionism)
6) Did you have confidence in yourself? (Self-confidence)
7) Did you easily feel tense? (Tension)
8) Did you easily feel irritated or angry? (Irritability)
9) Were you punctual in everything you did? (Punctuality)
10) Were you unyielding? (Unyieldingness)
11) Did you have an intense temper? (Intensity of temper)
12) Did you easily become competitive about your job or other things you did? (Competitiveness)

Mean scores

Fig. 4. Contents of the questionnaire and distributions of mean scores of each item
Table 2. Comparison of mean scores for each item

<table>
<thead>
<tr>
<th></th>
<th>Centenarians (n=60)</th>
<th>Controls (n=68)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Busyness</td>
<td>1.55 ± 0.74</td>
<td>1.73 ± 0.53</td>
</tr>
<tr>
<td>Time urgency</td>
<td>0.23 ± 0.56***</td>
<td>1.55 ± 0.73</td>
</tr>
<tr>
<td>Enthusiasm</td>
<td>1.43 ± 0.78**</td>
<td>1.70 ± 0.61</td>
</tr>
<tr>
<td>Absorption</td>
<td>1.03 ± 0.87</td>
<td>0.91 ± 0.74</td>
</tr>
<tr>
<td>Perfectionism</td>
<td>1.32 ± 0.81</td>
<td>1.58 ± 0.69</td>
</tr>
<tr>
<td>Self-confidence</td>
<td>1.10 ± 0.83***</td>
<td>0.30 ± 0.64</td>
</tr>
<tr>
<td>Tension</td>
<td>0.52 ± 0.7***</td>
<td>1.51 ± 0.65</td>
</tr>
<tr>
<td>Irritability</td>
<td>0.48 ± 0.7*</td>
<td>0.75 ± 0.77</td>
</tr>
<tr>
<td>Punctuality</td>
<td>1.50 ± 0.79</td>
<td>1.50 ± 0.73</td>
</tr>
<tr>
<td>Unyieldingness</td>
<td>1.33 ± 0.85*</td>
<td>0.92 ± 0.87</td>
</tr>
<tr>
<td>Intense of temper</td>
<td>1.33 ± 0.85*</td>
<td>0.92 ± 0.87</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>0.73 ± 0.83</td>
<td>0.69 ± 0.73</td>
</tr>
<tr>
<td>Total score</td>
<td>11.9 ± 4.06*</td>
<td>13.7 ± 4.41</td>
</tr>
<tr>
<td>Weighted total score</td>
<td>15.8 ± 5.33</td>
<td>17.1 ± 5.61</td>
</tr>
</tbody>
</table>

Weighted total score is weighted by Maeda. *p<0.05, **p<0.001, ***p<0.0001; Mean ± SD.

relation to a high hostility score in the Minnesota Multiphasic Personality Inventory among coronary patients in the United States. In the report, Williams concluded that interventions to reduce the contribution of behavioral patterns to coronary disease risk might profitably focus, especially closely, on reduction of anger and hostility. In recent years, it has been reported that a Type A behavior pattern may be an independent coronary risk factor. There are also several questionnaires to measure Type A behavior pattern including ones now being developed. However, it might be impossible to expect aged people to answer perfectly unless the questionnaires is a very simple form with question content easy and simple enough to be answered by the elderly even in the provinces. The author therefore considered that, at present, one of the most suitable Type A questionnaires available for such purposes would be the brief questionnaire constructed by Maeda as it has high reliability and is related to CHD. However, for 22 cases (36.6%) of the very old who would have difficulty with the questionnaire, the author selected, as the second preferable person to fill out the questionnaire, son or daughter as they would most likely answer with minimum prejudices and exaggerations.

In this study, both centenarians and controls were living in almost the same regions of the main island of Okinawa. Moreover, their background such as ethnicity (Okinawan), sex ratio (Table 1), daily lifestyles and occupational history (Table 2) were homogeneous and very similar. With regard to occupational history, it must be one of the important factors that influenced behavior pattern. It seems that one cannot consider Type A behavior without also considering circumstantial factors such as social class or socio-economic status in the context of occupational history. The results of the survey of occupational history of Okinawan centenarians and controls revealed that farming and/or stockbreeding ranked first in both sexes and also in both groups as well, with close values. The similarity of occupation in both groups means at least most important social and economical status was fairly equal for the two groups. In another survey, which included 369 Okinawan centenarians as subjects, the author obtained results showing that male centenarians’ occupational histories of farming and/or stockbreeding (76%) ranked first, whereas for the female counterparts, farming and household (65%) ranked first, followed by merchant and/or peddling (14%)18). These results are similar to those of present study. On the other hand, it is considered that other background factors, such as culture, and lifestyle are almost the same in the 2 groups15. Ishihara et al. have reported the distribution of Type A behavior pattern among Japanese middle-
aged male workers. In their study, 16, 363 males aged 30-59 in various kinds of occupations were surveyed. The results showed that among 29 kinds of occupational group, the highest percentage was in self-employed construction workers (39.3%), and the lowest in mail sorting workers (11.3%). However, agricultural workers, which was still considered one of the major professions in local areas in Japan, were completely excluded as subjects in their study.

It might be unexpected that results showed a high frequency of Type A diagnosis in centenarians. However, it is interesting that both subjects and controls have distribution peaks of a total score at 17-points, which is borderline between Type A and non-Type A. Although the frequency of Type A by Maeda’s weighting among the 2 groups showed statistically no significant difference, it turned out that profiles were different between centenarians and controls as the result of the mean score of each item between the 2 groups. Of particular importance, centenarians showed low scores in “time urgency” and “tension”, but high scores in “self-confidence” and “unyieldingness”. It is suggested that as a results the former two items were preferable in maintaining mental health and the latter two might have been indispensable for maintaining a strong willed character more than one hundred years.

Because the design of this study was retrospective, it was unavoidable to use the recall method even though validity of such an approach has not yet been fully assessed in this field of behavioral medicine. However, there were several studies confirming validity of such methodology in nutritional surveys. The studies concluded that in the paired-t test in a 24-hr. recall study, no significant difference was found between the mean recalled and the mean actual intake of nutrients, with the exception of calories only, and in a comparison between 24-hr. recall and a seven-day record it was found that both methods provide about equally accurate estimates of the mean intake. But, in both studies regression validity suggests that the recall is prone to over-reporting low intakes and under-reporting high intakes. Although character and food are quite different, nutritional surveys may provide us with informative suggestions for the methodological point of view, especially in the point that one should also pay attentions to the essential nature of human disposition, temperament or character and that some are unchanged for such long periods.

Comparable to Williams et al., Matsushita referred to the word of “Edo-original” character (an old, traditional colloquial term which is used to denote the men who were born and grew up in Tokyo), which may result in the difficulty of discriminating coronary from non-coronary subjects in the Japanese male population. In this context, there are several unique character types in Okinawa. Above all, one of the most unique or peculiar Okinawan character may be the “sense of time” which combined with a concept of “tege” that almost all Okinawan people have in their Okinawan lifestyle. “Teges” means “not all”, “not punctual” or “not perfect”. Another interesting character, may be “gajuh” in Okinawan words. It means self-willed, especially common to many Okinawan female centenarians. They impress on their families that they always have their own way and will not give way to others. It is interesting that the two words “Edo-original character” and “gajuh” in the Okinawan language have very similar meanings because they are considered to depict most typical character for the respective localities, in terms of an old, traditional colloquial term denoting a self-willed character. From this point of view, Okinawan character, which is expressed typically in centenarians, might have been suitable to live for such long life. Thus, Okinawan centenarians may be judged as Type A outwardly, but when considering their detailed profiles of behavior pattern they are different from the control group and in these profile differences it might be possible to find psychological or psychosocial clues for their longevity.

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沖縄の百歳以上長寿者のCoronary-prone Behavior

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要約

沖縄県は全国一の長寿県として知られ、百歳以上の長寿者人口をはじめとする長寿指数においても、全国平均を大きく引き離している。本研究は虚血性心疾患を回避して生存するという一つのアプローチから、沖縄の百歳以上長寿者の過去の行動パターンについて考察した。

対象は、父母以上より沖縄県内に在住する百歳以上の長寿者（以下、百寿者と略す）60名（101.93±1.49歳）である。これらはいずれも健康な在宅者であり、訪問により家族の協力を得て質問票による調査のできた者である。質問票はタイプAに関する簡略問診票（前田聡）を用い、百寿者の30代および40代の行動パターンに関する項目について想定法による調査を行った。他方で住民検診の場で健常者のみを対照として、沖縄県内在住の50歳以上の一般高齢者68名（64.28±9.93歳）においても、同様の方法で調査を行った。

合計点の分布ではいずれの群も17点にピークをみ、正規分布に類似したパターンを呈した。また計点で17点以上をタイプAとし、それに属するものの頻度を比較すると百寿者と対照で有意差はなかった。さらに、それぞれの項目で群別にスコアの平均値を求め、それらの分布と平均点を比較した。すると各項目間でそれぞれの群のプロフィールが異なり、百寿者は時間切迫感や緊張性で有意に低く、自信や勝ち気性で高くなっていた。

以上のように、百寿者のような沖縄の長寿者は、一見タイプAと判別され仮性心疾患のハイリスク者と見られる可能性もあるが、詳細に見るとその行動パターンのプロフィールはかなり異なっていた。このこととは逆に、そのプロフィールの違いに心身面での長寿の秘訣が隠されている可能性が示された。

キーワード：百歳老人（百寿者）、冠動脈硬化性行動パターン、タイプA、沖縄、長寿