Current Trend in Prevalence of Diabetes Mellitus in Japan, 1964-1992

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Prevalence of diabetes mellitus in Japan was investigated through studying the published reports from 1964 to 1992 by searching the electronic data base and some leading Japanese journals following certain inclusion criteria. Out of total 74 retrieved reports, 14 were found eligible for review, some containing data of multiple community and / or periods and were converted into total of 40 reports following a predetermined criteria. Review analysis of only the prevalence of diabetes was done paying much attention to age range, survey methodology and response rate. Oral glucose tolerance test (OGTT) was done in 19 (47.5%) with and in 21 (52.5%) reports without initial urine and / or blood sugar screening. OGTT was done using 75, 50, or 100 grams glucose following either Japan Diabetes Society or WHO criteria. The recent prevalence was estimated ranging from 9.6-11.9% in both sexes of 40 years or over, 4.2-13.1% in men and 2.6-12.9% in women. The higher prevalences were found in and around 1990 and the lower values in and around 1970. Regression analysis shows the upward trend of the prevalence of diabetes 2.2% in men (p< 0.01), 1.6% in women (p< 0.01) by 10 years.

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It is considered that the environmental factors to some extent are responsible for the development of diabetes mellitus besides genetic factors 1,2. Change of life style from a rural or traditional pattern to an urban or nontraditional pattern often increases the prevalence of diabetes mellitus (non insulin dependent type) by 5-10 fold 3. The Japanese life style and especially the food habits have been changing fast during the last 30 years. Job stress, family disharmony and other stressors are increasing remarkably. There is no doubt that the prevalence of diabetes mellitus is higher in the higher age group. People of age 40 years or over were 46.4% of the total Japanese population in 1990, increased to 50.8% in 1998 and are still increasing in this country 4. The prevalence of diabetes was reported to be 1.3% in 1980 5 and 11.9% in 1990 6, a remarkable difference within only a 10 year period. The prevalence of diabetes mellitus in Nisei (2nd generation) Japanese Americans was found to be much higher, 20% in men & 16% in women 7. The direct and indirect (e.g. absenteeism from work) cost related to diabetes management is noteworthy; for instance, the estimated expenditure per diabetic patient per year in 1992 was more than 3000 US dollars in the United states and 2000 US dollars in Germany 8. In Bangladesh it was about 100 US dollars in 1989 9. To cut the management cost to a reasonable amount for any country, it is essential to know the actual situation and the trend of diabetes of that country. Considering all these matters the authors made a review study to realize the prevalence and trend of diabetes mellitus in Japan.

MATERIALS AND METHODS

The reports on the prevalence of diabetes mellitus considered for this review were published mostly in English and few were in Japanese. It was essential to select the appropriate relevant documents for review as different authors used different screening methods, diagnostic criteria, populations and age
range without details. In this review study, the authors considered the study result of the different geographical areas or of the different periods of the same report as an individual separate report. The inclusion criteria of reports for this review was a) survey area: the individual geographic area; b) survey period: the actual period of the survey conduction. In the case of a long cohort study, the authors took the most recent figures where possible; c) survey type: general population survey or selective population survey; d) specific age group: 40 years or over; and e) prevalence rate of diabetes mellitus. The reports were excluded when any of the above criteria either was not available or mismatched. From the selected reports the following variables were noted down where available: a) number of subjects participated in the study; b) response rate%; c) initial blood sugar and/or urine sugar screening result; d) amount of glucose was used per case while performing oral glucose tolerance test (OGTT); e) diabetes mellitus diagnostic criteria: World Health Organization (WHO) criteria 2, Japan Diabetes Society (JDS) criteria 4, or any other criteria; f) age adjusted prevalence rate; g) prevalence trend with age; h) sex dominance in prevalence.

The authors initially searched the electronic data base using the search words diabetes mellitus, diabetes, prevalence, epidemiology, epidemiologic, control, etiology, causes and Japan in different possible combinations. The authors saved their time during the primary selection of reports by going through the abstracts as the full text was not available on the electronic data base. The full text of the selected articles was then retrieved from the journals and was gone through thoroughly. Some reports were excluded at this stage because of the lack of required information. The reference list of each of the selected reports was checked carefully, and if related strongly, the full text was then retrieved. The retrieved text was selected for review if the inclusion criteria were fulfilled. The authors found 70 reports with the prevalence rate, still they could not accept them all. For example, regarding age groups, they decided to take the diabetes mellitus cases of 40 years or over. Some researchers looked for the diabetes mellitus cases of those aged 20 years or over, then mentioned the prevalence of diabetes mellitus of the total age group, no break up data was available for the individual age group, like age group of 30s, 40s etc. When the break up data of the individual age group was there, the authors calculated the prevalence for the age group of those aged 40 years or over. From 74 reports they selected 14 reports out eligible for this review, some containing data of multiple community and/or of periods and these were converted into a total of 40 reports following the criteria mentioned above. Out of the excluded 60 reports, 47 included cases of those aged less than 40 years; 5 reports described the risk factors for diabetes mellitus development and only the incidence rate but no prevalence rate; 5 reports described the diabetes mellitus prevalence in immigrant Japanese living abroad; 1 (one) report described the diabetes mellitus prevalence in endocrine disordered cases; 1 (one) report described the diabetes mellitus prevalence in cases with abnormal insulin like ‘insulin Wakayama’ 6; 1 (one) had the prevalence among pancreatitis patients. Review Information was collected about the prevalence of diabetes mellitus only, not about other kinds of glucose tolerance. Statistical analysis was done by using SAS statistical package, version 6.12. The reports with the survey period from 1964 to 1979 were coded as 1970s, with the survey period from 1980 to 1989 were coded as 1980s, with the survey period from 1990 to 1992 were coded as 1990s during analysis by SAS statistical package.

RESULTS

The summary of the collected reports is shown in Table 1. The survey area covers almost all Japan. The survey period of the reports was between 1964 and 1992. Out of 40 reports 1 (one) was from a health check up center (Social health insurance scheme) survey 10, 1 (one) was an annual health check up survey of company employees 11, population of two reports was selective. Another study did a rural hospitals out patient survey and efforts were made to select the cases as randomly as possible 12. The other 37 (92.5%) reports were of a general population survey. The response rate was not described in most of the reports though it is of great help to assess how far the study represents the community. Only 4 (10%) out of 40 reports cited the response rate and they ranged from 78% to 84%. The age group of the subjects mentioned in 2 reports was 45 years or over, and in the rest of the 38 reports it was 40 years or over. It was mentioned in 14 (35%) reports that known diabetics were included to calculate the prevalence and other statistics. Before doing OGTT, initial screening was done by measuring blood sugar (fasting, random or both) in 14 (35%) reports and by measuring urine sugar in 22 (55%) reports. OGTT was done directly in 21 (52.5%) reports without any initial screening. 75 grams of glucose were used to measure the glucose intolerance following the WHO criteria in 19 (47.5%) reports, following the JDS criteria in 14 (35%) reports and following the National Diabetes Data Group (NDDG) criteria 13 in only one (2.5%) report (Table 2). 50 grams of glucose were used in 4 (10%) reports and 100 grams of glucose were used in 2 (5%) reports respectively to measure the glucose intolerance following the JDS criteria in 2 (2.2%) report used totally different criteria, called Wilkerson’s criteria 14 to diagnose the diabetic cases (Table 2). Out of total 40 reports the prevalence value of diabetes mellitus in men was found available in 39 (97.5%) reports and the mean prevalence value was calculated 6.5%. The prevalence in men for the survey period 1964 to 1979 was reported to be between 1.8-10.8%, 1.9-13.1% for 1980 to 1989 and 4.2-13.1% for 1990 to 1992 (Table 3). The highest prevalence...
| Survey area                        | Survey period | Author                  | Reference number | No. of subjects | Age group (Years) | Prevalence male % | Prevalence female % | Prevalence all % |
|-----------------------------------|---------------|-------------------------|------------------|-----------------|-------------------|-------------------|-------------------|------------------|
| Rural Osaka                       | 1964-1965     | Suzuki T.               | 14               | 3133            | ≥45               | 2                 | 2.2               | 2.1              |
| Rural and Urban Japan             | 1971-1974     | Toyota T. et al         | 11               | 14879           | 40-69             | 1.8               | 1.84              | 1.84             |
| (Izumisaki town)                  | 1972, 1973    | Toyota T. et al         | 11               | 2115            | 40-69             | 10.4              | 4.03              | 6.9              |
| (Yuri village)                    | 1971, 1974    | Toyota T. et al         | 11               | 405             | 40-69             | 3                 | 0.8               | 2.7              |
| (Tokyo city)                      | 1973          | Toyota T. et al         | 11               | 12359           | 40-69             | 8.1               | 4.9               | 5.8              |
| Hiroshima                         | 1978-'88      | Hara H. et al           | 26               | 2510            | ≥40               | 5.1               | 3.6               | NA               |
| Rural and Suburban Hiroshima      | 1981-1982     | Takashina et al         | 27               | 4770            | ≥40               | 7.7               | 5.4               | NA               |
| Rural Hiroshima                   | 1988-'89      | Takashina et al '91     | 5                | NA              | ≥40               | 6.1               | 3                 | 4                |
| Two areas in Shiga prefecture     | 1980          | Katabami '82            | 5                | 20000 Break up  | ≥40               | In Break up       | In Break up       | In Break up       |
| (Area A)                          | 1980          | Idbidem                 | 5                | NA              | Break up          | 1.9               | 0.9               | 1.3              |
| (Area B)                          | 1980          | Idbidem                 | 5                | NA              | ≥40               | 3.3               | 3.3               | 2.2              |
| Aito town                         | 1980-'82      | Kikkawa, Kobayashi '84  | 5                | 1887            | 40-64             | 2.4               | 1.3               | NA               |
| Shiga prefecture                  | 1980-'89      | Hidaka et al '91        | 5                | 1445            | 40-65             | 4.5               | 2.5               | 4.1              |
| A town in Shiga prefecture        | 1980s, 3 years| Kitazawa Y.             | 10               | 5172            | 40-64             | 6.1               | 3                 | 4                |
| Tokyo                             |              |                         |                  |                 |                   |                   |                   |                  |
| 6 geographical areas between Tohoku and Kyushu region | | | | | | | | |
| Okinawa                           | Nov '81-Mar'82| Takashina S.            | 12               | 2414            | 40-69             | 4.8               | 3.7               | 4                |
| (Ginnoza village)                 | 1983-'88      | Futenma H.              | 29               | 1911            | ≥40               | In Break up       | In Break up       | In Break up       |
| (le village)                      | 1985          | Idbidem                 | 29               | 856             | ≥40               | 2.7               | 3.2               | 3                |
| (le village)                      | 1986          | Idbidem                 | 29               | 1055            | ≥40               | 3.5               | 3.2               | 3.3              |
| Ginoza village                    | 1990          | Futenma H. et al        | 30               | 911             | ≥40               | 4.2               | 5.7               | NA               |
| Okinawa                           | 1988-'92      | Futenma H. et al        | 31               | 2322            | ≥40               | In Break up       | In Break up       | In Break up       |
| (le village)                      | 1988          | Idbidem                 | 31               | 1160            | ≥40               | 4.9               | 3.4               | NA               |
| (le village)                      | 1989          | Idbidem                 | 31               | 1074            | ≥40               | 5.7               | 3.4               | NA               |
| (le village)                      | 1990          | Idbidem                 | 31               | 976             | ≥40               | 5.7               | 3.2               | NA               |
| (le village)                      | 1991          | Idbidem                 | 31               | 1174            | ≥40               | 6.3               | 4.5               | NA               |
| (le village)                      | 1992          | Idbidem                 | 31               | 1115            | ≥40               | 5.2               | 3.7               | NA               |
| (Ozawa village)                   | 1988          | Idbidem                 | 31               | 963             | ≥40               | 3.5               | 2.9               | NA               |
| (Ozawa village)                   | 1989          | Idbidem                 | 31               | 1053            | ≥40               | 5.2               | 3.4               | NA               |
| (Ozawa village)                   | 1990          | Idbidem                 | 31               | 945             | ≥40               | 5.5               | 2.6               | NA               |
| (Ozawa village)                   | 1991          | Idbidem                 | 31               | 1147            | ≥40               | 8.2               | 3.2               | NA               |
| (Ozawa village)                   | 1992          | Idbidem                 | 31               | 1207            | ≥40               | 9.3               | 4.9               | NA               |
| Hisayama town,                    | 1988          | Fujishima M.            | 32               | 2427            | 40-79             | 13                | 9                 | NA               |
| Fukuoka prefecture                | 1988          | Hasuo et al '91         | 5                | 3391            | ≥40               | 13.1              | 9.1               | NA               |
| Fukuoka prefecture                |              |                         |                  |                 |                   |                   |                   |                  |
| Funagata town,                    | 1990          | et al                   | 6                | 864             | ≥45               | 10.5              | 12.9              | 11.9             |
| Yamagata prefecture               | 1989-'92      | et al                   | 15               | NA              | ≥40               | 5.2               | 7.9               | NA               |
| The whole country                 |              |                         |                  |                 |                   |                   |                   |                  |
| (Osaka)                           | 1990          | Idbidem                 | 15               | NA              | ≥40               | 10                | 6                 | 9.6              |
| (Osaka)                           | 1991          | Idbidem                 | 15               | NA              | ≥40               | 8.7               | 4.9               | NA               |
| (Kasai town, Hyogo)               | 1990          | Idbidem                 | 15               | NA              | ≥40               | 6                 | 3.2               | NA               |
| (Kasai town, Hyogo)               | 1992          | Idbidem                 | 15               | NA              | ≥40               | 9.2               | 4.7               | NA               |
| (Hiroshima)                       | 1990          | Idbidem                 | 15               | NA              | ≥40               | 7.8               | 3                 | NA               |
| (Hiroshima)                       | 1991          | Idbidem                 | 15               | NA              | ≥40               | 9.5               | 4.7               | NA               |
| (Hiroshima)                       | 1992          | Idbidem                 | 15               | NA              | ≥40               | 7.4               | 5.8               | NA               |
| (Hisayama town)                   | 1990          | Idbidem                 | 15               | NA              | ≥40               | 13.1              | 9.1               | NA               |
| (Hisayama town)                   | 1992          | Idbidem                 | 15               | NA              | ≥40               | 12.9              | 8.6               | NA               |
| (Okinawa)                         | 1990          | Idbidem                 | 15               | NA              | ≥40               | 9.4               | 11.7              | NA               |

Survey areas in parenthesis ( ) are the break up areas; NA means figure was not available.
value for men (13.1%) was found in Hisayama town in Fukuoka prefecture in 1990. The notable points of this study were a) Efforts were made to obtain the maximum response rate; b) 75 grams oral glucose tolerance test was done directly without doing any initial screening test. The lowest prevalence value for men (1.84%) was found in Itayanagi town of Aomori prefecture in 1974. The notable points of this study were a) the survey area was a typical farming town b) OGTT was performed only in the cases with a positive urine sugar test in the initial screening. c) OGTT was done by 50 grams glucose following the JDS '70 criteria. The prevalence rate of diabetes mellitus in women was found available in 39 (97.5%) out of 40 reports and the mean prevalence value was calculated to be 4.2%. The prevalence in women from 1964 to 1979 was reported as 0.8-4.03%, 0.9-9.1% from 1980 to 1989 and 2.6-12.9% from 1990 to 1992 (Table 3). The highest prevalence value for women (12.9%) was found in Funagata town of Yamagata prefecture in 1990. The notable points of this study were a) the population were from a agricultural community. b) the response rate was 77.8%; c) 75 grams OGTT was given directly without any initial screening test. d) the age group was 45 years or over. The lowest prevalence value for women (0.8%) was found in Tokyo in 1973. The notable points of this study were a) selection of population, company employees b) OGTT was performed only on cases with positive urine sugar or positive post prandial blood sugar in the initial screening. c) OGTT was done by 50 grams glucose following the JDS '70 criteria. The prevalence value of diabetes mellitus in men and women combined (all) was found available in 16 (40.0%) out of 40 reports and the mean prevalence value was calculated to be 4.8%. The prevalence for all was reported 1.8-6.9% from 1964 to 1979, 1.3-5.8% from 1980 to 1989 and 9.6-11.9% from 1990 to 1992 (Table 3). The highest prevalence value for all (11.9%) was found in Funagata town in Yamagata prefecture in 1990. The lowest prevalence value for all (1.3%) was found in Shiga prefecture in 1980. The higher prevalence values for men or women were mostly found in and around 1990 and the lower were mostly in and around 1970. Age adjusted prevalence value for men was found in 2 (5%) reports, for women in 2 (5%) reports and for all in 3 (7%) reports. Male predominance in the prevalence of diabetes mellitus was found in 33 (82.5%) reports and the Female predominance in 4 (10%) reports. In 2 (5%) reports no information about sex predominance was available and the same for both men and women was found in 1 (2.5%) report. Prevalence trend with age in men and women was found in only 3 (7.5%) reports. In all of these 3 reports, the trend increased proportionally with age. The prevalence in men was reported to be 1.8-3.0% in urban areas and 2.0-10.4% in rural areas from 1964 to 1979, from 1980 to 1989 it was 1.9-13.1% in urban and 2.7-8.1% in rural areas, from 1990 to 1992 it was reported as 6.0-13.1% in urban and 4.2-9.3% in rural areas (Table 4). The prevalence in women was reported to be 0.8-1.8% in urban areas and 2.2-4.0% in rural areas from 1964 to 1979, from 1980 to 1989 it was 0.9-9.1% in urban and 2.9-5.4% in rural areas, from 1990 to 1992 it was reported as 3.2-

**Table 2. Measures used to diagnose the diabetic cases.**

| Diagnostic criteria (glucose) | WHO | JDS | NDDG | JDS | JDS | Wilkerson’s criteria |
|------------------------------|-----|-----|------|-----|-----|---------------------|
|                              | 75 grams | 75 grams | 75 grams | 50 grams | 100 grams |
| No. Of survey                | 23 (51.1%) | 14 (31.1%) | 1 (2.2%) | 4 (8.9%) | 2 (4.4%) | 1 (2.2%) |

WHO : World Health Organization, JDS : Japan Diabetes Society, NDDG : National Diabetes Data Group (Japan)

**Table 3. Prevalence range of diabetes mellitus.**

| Survey period | Male % (No. of reports) | Female % (No. of reports) | Both sexes % (No. of reports) |
|---------------|-------------------------|---------------------------|-------------------------------|
| 1964 to 1979  | 1.8-10.8 (4)            | 0.8-4.03 (4)              | 1.8-6.9 (4)                  |
| 1980 to 1989  | 1.9-13.1 (18)           | 0.9-9.1 (18)              | 1.3-5.8 (9)                  |
| 1990 to 1992  | 4.2-13.1 (17)           | 2.6-12.9 (17)             | 9.6-11.9 (3)                |
Table 4. Prevalence summary of diabetes mellitus.

| Survey period | Urban % (No. of reports) | Rural % (No. of reports) | Rural urban mixed % (No. of reports) |
|---------------|--------------------------|--------------------------|--------------------------------------|
| 1964 to 1979  | male 1.8-3, (2)          | male 2.0-10.4, (2)       |                                      |
|               | female 0.8-1.8, (2)      | female 2.2-4, (2)        |                                      |
| 1980 to 1989  | male 1.9-13.1, (8)       | male 2.7-8.1, (9)        | male 5.1, (1)                        |
|               | female 0.9-9.1, (8)      | female 2.9-5.4, (9)      | female 3.6, (1)                      |
| 1990 to 1992  | male 6.1-13.1, (5)       | male 4.2-9.3, (7)        | male 7.4-10, (5)                     |
|               | female 3.2-12.9, (5)     | female 2.6-5.7, (7)      | female 3-6, (5)                      |

Table 5. Estimated prevalence of diabetes mellitus based on polynomial regression analysis.

|          | 1970 (%) | 1980 (%) | 1990 (%) |
|----------|----------|----------|----------|
| Male     | 1.6      | 2.7      | 6.0      |
| Female   | 0.9      | 1.6      | 4.0      |

12.9% in urban and 2.6-5.7% in rural areas (Table 4). Regression analysis shows that an increase in the survey period is associated with a measurable increase of the prevalence in diabetes mellitus 2.2% in men (p<0.01), 1.6% in women (p<0.01) by 10 years. In general, the trend of diabetes mellitus is upwards in men and women from 1964-1992 (Figure 1). The prevalence of diabetes mellitus estimated from 2nd degree polynomial regression analysis is 1.6% for men and 0.9% for women in 1970, 2.7% for men and 1.6% for women in 1980, 6.0% for men and 4.0% for women in 1990 (Table 5).

**DISCUSSION**

The prevalence of diabetes mellitus in native Japanese is almost similar to that of some other countries; for instance, Alaska 1.9% (Eskimo), Sweden 14.3%, Finland 15.7% in men and 4.6% in women. The higher prevalence values were found mostly in western Japan with the exception of Funagata in Yamagata prefecture, a north eastern town and the lower prevalence values in the central part of Japan. Sasaki A et al also reported a higher prevalence of diabetes mellitus especially in western Japan 18. The prevalence of diabetes mellitus found in some tropic and subtropic countries is as follows: Australia 2.3% (Caucasoid), 11.0 (Aborigine); Nauru 30.9% (Micronesian); Fiji 6.9% (Melanesian), 14.8% (Indian). The prevalence in Japanese Americans is similar to that of Cherokee Indians (29.0%) in USA 19, Australian aborig-
ine, Micronesian Nauruan and Indian Fijian may be because of a changed life style particularly eating habits. In one report in 1975 Toyota T et al concluded that they found no tendency for diabetes to increase year by year in Japan even though there was a rapid economic growth over a 10 year period 11. In another report in 1983 Takashina S. et al mentioned that they believed that the prevalence of diabetes mellitus in Japan had steadily and definitely increased over the previous 20 years. 12. In this review study the prevalence was found to be remarkably high in and around 1990 and was quite low in and around 1970, though only 4 reports (Table 3) from the 1970's are too few to make any comment about the prevalence status at that time. More over this review study has a lot of limitations such as many of the researchers screened the diabetes mellitus cases measuring the urine sugar and/or blood sugar initially followed by OGTT, the calculated prevalence value might be lower than the actual value of that community, because urine sugar especially may be within normal range even in a diabetic case. At the same time there are generally some more drop out cases from the following OGTT test, so naturally the real prevalence figure might be higher than the figures they reported. The prevalence of diabetes mellitus in urban areas was estimated to be higher than rural areas from 1980 to 1992 in this review study in Japan. Some other authors also reported a higher prevalence in urban areas than rural. For instance, Sayeed MA et al 16 in Bangladesh (urban 8.0%, rural 3.8%), Arab M 17 in Egypt (urban 23.7%, rural 9.9%), Al-Nuaim AR 18 in Saudi Arabia (urban: men 12%, women 14%; rural: men 7%, women 14%) and Ramachandaran A 19 in India (urban 8.2%, rural 2.4%). One peculiar outcome of this review study is that the prevalence of diabetes mellitus in rural Japan was estimated to be higher than urban Japan from 1964 to 1979 (Table 4). The notable points of this outcome are: a) 50 gram oral glucose tolerance test was done only in the urine or random blood sugar positive cases in both of the two urban areas, more over subjects of the Tokyo study were selective, employees of a company 10. b) In rural areas, for instance in Yuri village (Prevalence 10.4% in men and 4.0% in women) the 50 gram oral glucose tolerance test was done without any initial urine or blood sugar screening 11. Mbanya JC et al reported that they found higher prevalence of NIDDM in rural areas than urban areas even after doing oral glucose tolerance test without any initial urine or blood sugar screening where the response rate of the study subjects was more than 90%. 20. Ramachandaran A reported male predominancy in diabetes prevalence 21, this review study also reveals a similar type of outcome (Table 3). Sasaki A et al in one study 22 analyzed the data from 10 epidemiological survey sites in Japan and then compared the estimated prevalence of diabetes mellitus in Japan with that of 25 other countries. They arranged all populations in order of diabetes prevalence and divided in to a high, moderate and low prevalence groups; the diabetes prevalence was reported ranging from high to low in Japanese men, and from moderate to low in Japanese women depending upon the locality. They reported mean prevalence of diabetes mellitus as 7.1% in Japanese men and 4.5% in Japanese women of those aged 40-64 years between 1975 and 1993. The current review study estimated similar type of diabetes prevalence for the year 1990 (male 6.0%, female 4.0%) based on the polynomial regression analysis (Table 5).

Most of the studies started before 1980, the year of publication of the WHO recommended diabetes mellitus diagnostic criteria, and followed the JDS '70 criteria. After 1982 both the JDS '82 and the WHO criteria were followed. The JDS '70 criteria was less stringent in establishing diabetes than the WHO criteria or JDS '82 criteria. The diagnosed diabetic case is called "Diabetic type" in JDS criteria and "Diabetes" in WHO criteria. The "Diabetic type" of the JDS 1970 criteria corresponds to "Diabetes" and "Impaired glucose tolerance" of WHO, which also corresponds to the "Diabetic type" and "Borderline type" of JDS 1982 criteria, so interpretation of the same survey results by the JDS 1970 criteria will give a higher prevalence rate than that of the WHO or JDS 1982 criteria 8. In one report the authors described that the use of 75 grams oral glucose in OGTT produces higher 1-hour, 2-hour values than that of 50 grams glucose use but it was quite difficult to calculate the 2-hour value corresponding the 75 grams glucose for any value of 50 grams glucose use because of an extremely large standard deviation 15. On the other hand WHO described that in a comparison of the 50 grams OGTT and of the 75 grams OGTT, 2-hour value with the 75 grams OGTT showed 15 mg/dl higher than the 50 grams OGTT method. For comparability with the recent studies done by using 75 grams glucose, WHO recommended adding 15 mg/dl to the 2-hour value of the 50 grams OGTT to get the corresponding value for the 75 grams OGTT. In this review study, no standardization of the diagnostic criteria and of OGTT's glucose amount was done before regression analysis to overcome the biases of the data. It will be more convenient to compare the prevalence value of different communities if researchers all over the world follow the same diagnostic criteria, may be WHO diagnostic criteria even at the cost of their own national diagnostic criteria while performing an epidemiological study on diabetes. For an ideal comparison it is wise to use the age and sex adjusted result. Unfortunately the authors didn't have enough information for adjustment, so they had to present the raw data in this review study. The diabetes mellitus of those aged 40 years or over are mostly non insulin dependent type 5,25, from that point of view the outcome of this review study may represent well the prevalence status of non insulin dependent diabetes mellitus in Japan.
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