TYPE 2 DIABETES MELLITUS IN THE FRENCH OVERSEAS DEPARTMENTS AND TERRITORIES: THE “SYNDROME OF NAURU”

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Nauru is a small island in the South Pacific ocean, where people were traditionally living from hunting and fishing. After the Second World War, they were submitted to an extraordinary socioeconomic transition: the intensive exploitation of guano resulted in a spectacular increase of the incomes, in huge importations of western products, and, consequently, in deep changes in the general standard of living. In a few decades of westernization, the prevalence of Type 2 diabetes, a disease so far unknown, reached 40% in adults [1]. Hence, if a rapid increase of obesity and diabetes is observed in a population submitted to this type of transition, this population may be considered at high risk, and we may define this state as the “syndrome of Nauru”.

This is what is being observed in many tropical regions, including the French departments and territories. In these regions, the main public health problems were initially related to infectious and parasitic diseases, and the health care facilities were implemented accordingly. For a long time, chronic diseases, especially type 2 diabetes mellitus, were considered as specific to affluent societies, and therefore of secondary importance, if not totally ignored. This also held for the French departments and territories; the worrying data observed in particular populations, as in Nauru, in the Pima Indians, or in Tunisia, finally drew the attention toward diabetes [1]. Beside their genetic differences and their particular history, these populations shared a common feature, the fact that they experienced a lifestyle rapid transition: disparition of staple food, development of mass marketing, giving up of hunting, fishing and gathering, and consequently lack of physical exercise; in addition, they got into deleterious habits such as smoking, drinking, consumption of sweet and salty foods, use of motor vehicles, watching television. Thus, the cohort of diseases associated to fatness, i.e. hypertension, type 2 diabetes, and cardiovascular diseases, appeared and then increased very rapidly.

In the French departments and territories, the physicians were the first to warn the health authorities about this problem, most of them through the CORIs (Council for Orientation of Research of the INSERM) implemented in the 80’s by the French National Institute of Health and Medical Research (INSERM). Epidemiological surveys were performed in Guadeloupe, in New-Caledonia, in French Polynesia and in the Réunion Island, where the prevalence of diabetes mellitus was assessed in random samples of the adult population.

The available data are presented below.

METHODS

The data presented in this review are issued from the literature, and in some cases from personal communications during exploratory missions. Regarding the methods, all samples can be considered as representative, as the subjects were randomly selected in the general population. As to the screening of diabetes, fasting plasma glucose (FPG) was used in some surveys for greater convenience; in the others, a classical 2-hour glucose tolerance test (OGTT) was performed.

RESULTS

The results are presented in Table I. Even if the methods were not exactly identical, it is clear that diabetes mellitus has a worrying increasing health impact in the West Indies, in the French territories of...
the South Pacific, and in the Réunion Island, with prevalence rates far beyond those observed in mainland France (known diabetes: 3.0%, undetected diabetes, about 1.5%).

To our knowledge, no similar data are available in French Guiana.

Details on the available studies are given in the next paragraphs.

**West Indies**

A population survey performed in 1981 by ORS-TOM provided a first estimate of 4.5% for the prevalence of known cases in Martinique, in subjects aged 15 years or more [2]. The survey was based on interview and focused on nutritional status (not specifically on diabetes mellitus). This high crude rate, although probably underestimated, was a useful indicator to warn the health authorities on the extent of the problem, which had not been yet identified.

In Guadeloupe, the overall prevalence was 6.6%, including 80% of known cases [3] in about 1,000 subjects aged 18 years or older, examined in 1984-85 in an INSERM study. This was rather a low estimate, considering the low sensitivity of fasting plasma glucose, used as criterion (cut off point: 1.40 g/l). Among the 66 known diabetic patients, only 6 were insulin-treated. The prevalence rate was higher in women and increased regularly with age, up to 17% beyond 70 years. Prevalence was particularly high among subjects from Asian origin.

**New-Caledonia**

The first data on diabetes mellitus were provided by an Australian group. In a study performed in 1979 in the Melanesian community, 40 diabetic cases were identified, i.e. 4.3% in a sample of 936 subjects [1]. Some years later, in the central hospital of Nouméa, the admissions for diabetes ranked first among non communicable diseases. The health authorities got worried about this situation and decided to undertake a large screening and preventive programme against diabetes mellitus. An INSERM study was performed in 1992-94 on 9 390 subjects over the whole territory and estimated the diabetes prevalence at 10.2% in the age group 30-60 years, according to the WHO criteria [4]. The highest risk was observed in the group of Polynesians (15.3%). The rate observed in Melanesians and Europeans was similar (8.4%). Among 219 known diabetic patients, only 20 were insulin-treated.

In the urban area, the android distribution of fatness was highly prevalent in all ethnic groups. The comparison between Melanesians living in Nouméa and those living in traditional villages showed an excess of diabetes prevalence of 40%, while the subjects of European origin presented the same prevalence rate in urban or rural areas. This finding confirms the particular effect of the environment in the groups presenting a high genetic susceptibility.

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**TABLE I. Overall prevalence of diabetes mellitus in overseas French territories.**

<table>
<thead>
<tr>
<th>Population (Reference)</th>
<th>Years</th>
<th>Sample</th>
<th>Diagnosis</th>
<th>Prevalence rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guadeloupe [3]</td>
<td>1984-85</td>
<td>Random sample of 1,027 subjects ≥ 18 yrs</td>
<td>FPG</td>
<td>6,6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Europeans</td>
<td>8,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Melanésians</td>
<td>8,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Polynesians</td>
<td>15,3</td>
</tr>
<tr>
<td>French Polynesia [5]</td>
<td>1995</td>
<td>Random sample of 1,273 subjects ≥ 16 yrs</td>
<td>OGTT</td>
<td>18,0</td>
</tr>
</tbody>
</table>
French Polynesia

A prevalence study on obesity, hypertension and diabetes was conducted in 1995 by the Direction of Public Health of Tahiti on a random sample of 1,273 subjects aged 16 years or more. Diabetes was assessed using WHO 1985 criteria. In all subjects, fasting capillary blood glucose was measured, and a 2-hour capillary blood glucose measurement was performed in those with a fasting value > 1.60 g/l. Diabetes prevalence was estimated at 18% and appeared strongly linked to obesity and hypertension [5]. This estimate is consistent with that observed in migrant Polynesians living in Nouméa [4].

Réunion Island

In the course of a survey about arterial hypertension performed in the Réunion Island ten years ago, fasting plasma glucose was measured in a random sample of 1,000 adult subjects. Among them, 75 were identified as having diabetes [6]. This estimate was the basis for another INSERM study implemented in 1999 at the request of the local clinicians.

The results obtained in a representative sample of 3,600 subjects aged 30-69 ans, show a high prevalence of known diabetes mellitus (11.9%, i.e. 3.9 times that of mainland France), in addition to the new cases identified according to the recently revisited WHO criteria, leading to an overall rate of 17.7% [7]. In the age group 60-69 years, the age specific rate reaches 40.2%.

CONCLUSION

The available data show that Type 2 diabetes mellitus is booming in the French overseas departments and territories, more or less according to the various communities. In addition, it should be underlined that the risk of degenerative complications in these populations is far above that observed among diabetic patients in mainland France. This excess risk was particularly well documented in a comprehensive study on end-stage renal disease, showing that in 1995 the proportion of diabetic patients among dialysed was 25.7% overseas versus 13.0% in mainland France [8]. Few research groups seem concerned with this progression, which should mobilize all the energies in order to focus on the subjects at risk and to undertake preventive actions. It should be kept in mind that in Melanesians of New-Guinea, the prevalence of diabetes mellitus doubled in only 14 years, reaching the rate of 30% [9]. Presently, we can observe in the Réunion Island a twofold increase of the prevalence in the last decade [6, 7]. This “syndrome of Nauru” will result in diabetes prevalence rates even higher, if nothing is done to avoid it. Considering our specific French health system, it is urgent to check this progression, as this might lead soon to a financial and public health disaster.

REFERENCES

4 Papoz L, Barny S, Simon D and the CALDIA Study Group. Prevalence and incidence performed in the Réunion Island ten years ago, as having diabetes [6]. This estimate was the

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