Epidemiology of Diabetes

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Epidemiology of Diabetes- The study of the distribution and determinants of the disease in its population or community setting has proved to be an important and useful tool in diabetes research. Epidemiologic studies of diabetes mellitus are performed to establish the prevalence of diabetes and its complications, to establish incidence of these conditions, and to establish and quantify the associations between diabetes, its complications and other variables, such studies provide data of the natural history of the disorder and its morbidity and help us to formulate etiologic hypotheses, appropriate diagnostic investigations and clinical management and scientifically based programmes of prevention and health care. A useful by-product of the population study is characterisation of the non-diseased population which leads to better criteria for normality, improved diagnostic criteria for the disease. Epidemiology of diabetes is concerned with groups, not individuals, yet it has originated and grown from artute bed-side or clinical observations such as Elliot P. Joslin's comments on the rarety of diabetes among the Pima Indians of Arizona early this century whom he visited while he convalesced from tuberculosis in Arizona (keen in Frontiers of diabetes research, current trends in NIDDM, 1989). The adoption of standardized methods for diabetes epidemiology studies in the 1980's promoted comparison between studies in various geographical region by different observers and permitted poling of results from different surveys. Epidemiologic studies in developing countries have been hampered due to ethnic variations, lack of education and co-operation, disparate standards of living, inadequate public health care system and poor filing of case records. Migrant studies have generated some new question and seek some solutions. That the prevalence of diabetes and its complications coincides with change to a more 'westernised' or 'urbanised' lifestyle is beyond doubt. What is alarming is the significant prevalence of diabetes in rural areas of developing countries than was previously suspected. This has far-reaching implications on national health priorities and intervention. Unless the health care systems keep place with the rapid urbanization, management of this growing problem may be woefully inadequate in the years to come.

Other relevant abstracts may be found in previous issues of Diabetes Bulletin particularly those on childhood diabetes and NIDDM, Readers are also reffered to an excellent review on 'Epidemiology of Diabetes in Asians of the Indian Subcontinent' by Ramaiya et al on page 15 of this issue of Diabetes Bulletin.

NATIVE PREVALENCE STUDIES

Epidemiological studies on the prevalence of Diabetes in Asian Indians in Fiji and Mauritius

Zimmet P, Tailor R, Ram P et al. Prevalence of diabetes and impaired glucose tolerance in the biracial (Melanesian and Asian Indian) population of Fiji in a rural-urban comparison. Amer J. Epidemiol. 1983; 118: 673-688.

Fiji:

Population profile: 55% Indians, 45% Melanesians.
Age Group: 20 yr and above.
Design: House to house visits; WHO (1985) criteria for diagnosis.
Those screened included: rural 452, urban 846, total 1298.

Prevalence: Bimodality in frequency of distribution of 2 hr. plasma glucose was observed in this population. Overall prevalence rate of diabetes was 12.6%. Prevalence of diabetes in rural Fiji Indians was considered unlikely to be due to obesity, or differences in diet or physical inactivity, because as farmers, they are less obese and physically more active than their urban counterparts. It seems more likely that genetic factors relating to susceptibility are much more important than environmental inputs in this particular community.

The high prevalence of non-insulin dependent diabetes and impaired glucose tolerance in Indian, Creole and Chinese Mauritians.

Dowse GK, Garechoo, H. Zimmet P et al.
Diabetes 1990; 39: 390-96.: Mauritius:

Population profile: 70% Indian origin, 27.9% Creoles (African origin), 2.1% Chinese.
Age Group: 25-74 yr.
Design: 10 population clusters; random selection. 5080 responders (Indian males 1559, females 1724) 75 gm oral glucose: fasting and 2 hr. plasma glucose. WHO Criteria.
Prevalence: Overall 12.3%. Univariate data and multiple logistic regression model indicated that age, family history, body mass index, W/H ratio and physical inactivity seem to act similarly in all ethnic groups. The absence of any significant difference between the ethnic groups was attributed to the exposure of all the communities to common environmental factors, BMI, WHR and physical inactivity showed independent odds ratio which were significant. It is suggested that their modification could significantly lower the occurrence of NIDDM in such a population.

Ethnic differences in the incidence of childhood Diabetes in Israel

Z. Laron, T. Mansour, O. Gordon, M.Karp and T. Shohat, Institute of Pediatric and Adolescent Endocrinology, Belinson Medical Center, Sackler Faculty of Medicine, Tel Aviv University, WHO Collaborative Center for the Study of Diabetes in Youth, Israel

In 1989 Israel had a total population of 4.56 million inhabitants, of these $1.7/10^5$ aged below 18 yrs ($1.3/10^5$ Jews and $4/10^5$ Arabs). A prospective survey conducted during the years 1989 and 1990 of all newly diagnosed IDDM aged 0-17 yrs, revealed 85 patients in 1989 ($5/10^5$) and 102 patients in 1990 ($6/10^5$). Ascertainment was 98%. The incidence per sex for the 2 years was: males $4.7/10^5$ and females $6.36/10^5$ ($p < 0.001$). As the Jewish population is not uniform, depending upon their geographical origin, inter-ethnic comparisons were made, comparing incidence rate by age of onset and sex. The incidence rates per 10^5 same aged population were as fallows:

				Jews				Arabs
	0.4	5.9	10-17	Ashk.	Seph.	Mixed Isr.	Mid. East.	
Total	2.7	7.6	8.1	9.5	6.1	5.7	4.4	2.8
Male	2.3	5.1	8.1	8.7	5.2	5.2	2.9	1.9
Female	3.0	10.3	8.1	10.4	7.1	6.2	6.0	2.4

This study revealed a) an increasing incidence of IDDM in all ethnic groups, b) a significant correlation between incidence and country of origin of the parents, c) a significant preponderance of females. As all patients were born in Israel

with similar socio-economic conditions, the differences between groups are attributed to genetic factors, the overall increase in incidence, possibly to environmental ones.

The study was conducted in the framework of Eurodiab Sub Area A of Epidemiol. & Aetiopathogenesis of IDDM & supported by the Esfandi Foundation, U.K.

Lim T.O: Prevalence, age at diagnosis, clinical characteristics and treatment of diabetes in the young in Pahang, Malaysia.

Diab. Res. Clin. Prac; 1991; 12:3:201-208.

The prevalence, age at diagnosis, clinical characteristics and treatment of young diabetics, younger than 40 years were determined on the basis of a cross-sectional study of medical records of 2 health districts in Pahang, Malaysia. There were only 20 IDDM, prevalence 0.07 per 1000 inhabitants. There were 84 NIDDM prevalence 0.3 per 1000 inhabitants. Three of the NIDDM patients malnutrition related diabetes. Many NIDDM patients were asymptomatic which is an important reason why many of them remain undetected in the community. 74% of the patients below the age of 30 years at diagnosis had NIDDM, 56% of the patients below the age of 20 years at diagnosis had NIDDM and 54% of the NIDDM patients had a strong family history of diabetes. Many NIDDM patients were misdiagnosed as IDDM, especially if they were underweights leading to considerable overuse of insulin.

This study confirms that IDDM is rare in Malaysia, as in other Asian countries. Most young diabetics have NIDDM and have a strong family history. This pattern of diabetes in the young is unlike that seen in the West.

Type 1 diabetes in the Maltese Islands.

Schraz AG, Prikatsyv

Diabetic Med. 1989; 16/3: 228.

The prevalence of type-1 diabetes in Malta was estimated by identifying all patients younger than 32 years by the end of 1987 who had attended the island's principle diabetic clinic.

The age-adjusted prevalence rate for 0-19 years olds was 110.3 per 100,000 (girls 126.2, n=65; boys 95.3, n=52). The mean annual incidence during the 1980-87 period, in 0 to 19-years olds was 13.3 per 100,000 (n=113, girls 14.1 and boys 12.6).

Males developed type-1 diabetes 2.1 years later than females (13.7 ± 6.9 [± SD] vs 11.6 ± 6.7 years). The most common age at onset was 10 to 14 years. The peak period of onset occurred during the cooler months of November to February. The incidence rates are close to those in Nordic countries and indicate that type-1 diabetes in Malta is underestimated.

Prevalence of IDDM in school children in Khartoum, Sudan

Elamin A; Omer MI; Hofvander Y; Tuvemo T.

Diabetes care 1989; 112/6: 430-2.

The prevalence of insulin-dependent diabetes mellitus (IDDM) in 42,981 school children (aged 7-14 years) in Khartoum, Sudan, was determined.

Using the 1985 WHO revised criteria for diagnosis and classification of diabetes mellitus, the overall crude prevalence rate of IDDM was 0.95/1000 in the age groups studied. This figure is thought to reflect the minimum prevalence of IDDM in that population, because there is an inherent tendency in the screening method used toward underestimating the true prevalence rate. The prevalence of IDDM was found to increase significantly with age and was slightly higher in girls than boys, but this was not satistically significant. Of 41 children with IDDM detected in the survey, 7 were not known to have it before but were showing suggestive symptoms at the time of the study. The results show that childhood IDDM is not rare in Sudan; a substantial number of undiagnosed cases probably exists.

The differences in relative rates of IDDM in developing countries ranging from 0.2 to 20% of all diabetic patients has been attributed to differences in diagnostic criteria and bias in population sampling, especially in relation to age of onset of diabetes. Nevertheless it seems that prevalence of IDDM is greater than previously suspected.

Increasing incidence of diabetes mellitus in Norwegian children 0-14 years of age 1973-1982

Joner G, Sovik O.

Diabetologia 1989; 32/2: 79-83.

A retrospective technique was used to register all newly diagnosed cases of diabetes mellitus in Norwegian children 0-14 years of age during the ten year 1973-82 period. A total of 1914 newly-diagnosed cases was detected in an average population of 932,037 children. The degree of ascertainment was near 99%. Male incidence exceeded female incidence by 12% ($p<0.02$). the mean yearly incidence for the 10 year period was 20.5 per 100,000. Comparing the 25 year periods 1973-77 and 1978-82, the mean yearly incidence increased from 18.5 to 22.7 per 100,000 ($p<0.0001$).

There was a marked geographic variation with the highest incidence in the southeast and a lower incidence in the northern part of the country. However, in the northern, there was a remarkable increase in the annual incidence from the first to the second 5-year period (12.9 vs 19.3/100,000). The highest numbers of new cases were detected in January and October and the lowest numbers in May and July. The seasonal pattern was significantly different from a uniform distribution of new cases throughout the year ($p<0.001$). The age-specific incidence increased towards a peak at 12 years for both sexes. The authors concluded that Norway has a high and apparently increasing incidence of childhood diabetes. The geographic variation and secular trend present challenging clues for a search for aetio-pathogenic factors.

A similar rising trend in incidence of IDDM has been reported in many northern European countries, with a rate equivalent to a doubling time of 20-30 years in some. Will this increase relate only to genetically susceptible individuals or would changing environmental factors over-whelmingly affect this increase.

The Eluru Survey: prevalence of known diabetes in a rural Indian population

Rao PV; Ushabala P; Seshiah V; Ahuja MM; Mather HM-

Diabetes Res. Clin. Pract. 1989; 17/1: 29-31.

Asian Indian migrants have a strikingly high diabetes prevalence but prevalence in India has been considered to be relatively low. However, there have been few recent studies, especially in rural India. A house-to-house survey was undertaken in a defined area of Eluri, a small town in South India and in four adjoining villages. A total of 9563 subjects (4729 male, 4834 females) were surveyed, of whom 5699 lived in Eluru and 3864 in the four villages. Enquiry was made of known diabetes in each household. In all 157 known

diabetic subjects (89 male, 68 female) were ascertained. The prevalence of known diabetes was 6.1% in all subjects aged 40 or over and rose to 13.3% in the age group 50-59 years. The overall crude prevalence of known diabetes was 1.6% (1.9% male, 1.4% female). The prevalence in Eluru (1.5%) was similar to that in the four villages (1.9%). The age-adjusted rates for known diabetes in the middle aged and elderly subjects were unexpectedly high, considering the poor socio-economic, circumstances decreased health awareness and decreased access to medical facilities and were comparable with those of similar surveys in relatively affluent Delhi and in Southall, London. The prevalence in rural (as well as urban) India may be much higher than previously realized. Large formal prevalence studies are urgently required.

The myth that diabetes is a disease only of the rich and urbanite has been well and truly negated.

Abnormal glucose tolerance in the Maltes. A population-based longitudinal study of the natural history of NIDDM and IGT in Malta

Schranz AG.
Diabetes Res Clin Pract 1989; 7/1: 7.

A population-based longitudinal study of abnormal glucose tolerance in adult Maltese was carried out within the WHO-assisted National Diabetes Programme. During the 6 year interval, impaired (IGT) as compared to normal glucose tolerance (GTT) was found to be related to significantly higher mortality: the age- adjusted relative risks of death were 3.3 times in diabetic females and > 2 times in IGT and diabetic males. In a repeat epidemiological survey. 1422 subjects (66.8% of the initial sample) were re-investigated with the oral GTT being interpreted according to the WHO's 1985 recommendations. The age-standardized prevalence rates in the 35 to 69 years-old males and females were, respectively 12.89 and 13.24% for IGT and 9.07 and 10.77% for diabetes.

These gradually increased after age 40, IGT peaking in the 60+ year groups and diabetes 10 years later. Heredity (especially diabetes in close relatives seemed a major influence, whilst excess body weight appeared the more important associated environmental factor. The incidence levels (% per annum) of diabetes during the interval were 0.71 for normoglycaemics and 5.1 for IGTs; this 7 times higher risk in the latter was slightly lower in females than in males but significantly higher in the < 60-year-olds compared to older subjects. Of the initial IGTs 36% remained IGT and 33% reverted to normal glucose tolerance, whilolst 11% of the initial normoglycaemics deteriorated to IGT.

The determinants more strongly influencing worsening of glucose tolerance were age (>50 years), baseline glycaemia (fasting > 5.5 mmol/L and a 2-hour post-load glycaemia > 9.5 mmol/L and initial body mass index (> 27 kg/m2). These data permit a better insight into the natural history of and risk factors for, disturbed glucose tolerance in this community.

Diabetes mellitus in Tunisia: Description in urban and rural populations

Papoz L.; Ben Khalifa F; Eschwege E; and Ben Ayed H; Int. J. Epidemiol. 1988; 17/2: 419

A prevalence survey of diabetes mellitus was carried out in Tunisia on two random samples of households. The first sample (3826 adult subjects) was drawn from the Gouvernorat of Tunis, the second one (1787 adult subjects), was drawn from a rural area, the Gourvernorat of Siliana. The families were investigated at home and diabetes assessed on the basis of an interview (to determine known cases) and of fasting blood glucose level in subjects having no personal history of diabetes (new cases). Prevalence rates were estimated considering known cases and newly found ones together. Overall, the age-standardized prevalence rate was found to be much higher in the urban sample compared to the rural one, especially for women (4.6% versus 2.3% in men, 3.5% versus 0.6% in women). Diabetes was often associated with obesity, especially in men. Within the urban sample, the prevalence rate was similar in subjects born in Tunis and in those born in the rest of the country, thus mainly of rural extraction. In contrast, a family history of diabetes was more often reported in the former group. The results are consistent with other epidemiological findings, showing that a dramatic increase in diabetes morbidity paralles the rapid westernization of urban centres in developing countries.

Increase in prevalence of diabetes with 'westernization' is a uniform and recurring conclusion of several epidemiological studies in the developing countries.

Prevalence of diabetes and impaired glucose tolerance in rural Tanzania

Mc Larty G, Swai A.B.M., Kitange H.M., Masuki G, Mtinangi BL., Kelema P.M., Makene W.J., Chuwa L.M., Alberte KGMM. Lancet. 1989 ; 1: 871.

The prevalence of diabetes mellitus and IGT was assessed by use of WHO diagnostic criteria in 6299 Africans aged 15 years and above living in six villages in Tanzania. 0.87% (1.1% male, 0.68% female) had diabetes and 7.8% (6.9% male, 7.7% female) had IGT Prevalence rates were 1.1% and 8.4% respectively, when age adjusted to the USA population. Only 7 (13.5%) of the 53 individuals with diabetes had been known to have the disorder; 34 (74%) of the other 46 were symptom free. Mean age was 54 (SD 20) for diabetic subjects and 37 (17) years for the whole population. Diabetes and IGT rates did not differ significantly between villages despite geographical, socioeconomic, and dietary differences. Diabetes rates increased modestly with age and body mass index (BMI). Fasting blood glucose (FBG) levels did not rise significantly, with age but correlated positively with systolic blood pressure (BP) and negatively with hemoglobin concentration (Hb) and BMI. The 2 hour post-glucose load blood glucose values correlated positively with age, sex, and systolic BP and negatively with Hb. Diabetes is less prevalent in rural Africa than in developed countries, even when age has been corrected. This difference is probably related to body weight, diet and exercise.

Glucose tolerance in rural African not only differs from that in developed countries and Black population in United States but also from that in urban Africans.

Impaired glucose tolerance, hyperinsulinaemia, and hypertriglyceridemia in Australian Aborigines from the desert

O'Dea K. Traianedesk K., Hopper J.L. and Larkins R.G. Diabetes Care 1988; 11/1 23.

A cross section of adult full-blooded aborigines from three small isolated communities in the desert region of northwest Australia was surveyed for diabetes, impaired glucose tolerance (IGT) insulin levels, and lipoprotein lipids. Sixty-three men and 86 women from a total adult population of 330 were tested. Of the people tested, 67.6% had normal glucose

tolerance, 25% had IGT, and 7.4% had diabetes. Both diabetes and IGT were strongly age related. Fasting insulin levels and insulin responses to oral glucose (elevation above basal) were elevated. Although fasting insulin rose with age, insulin response did not rise after adjustment for body mass index (BMI). Plasma triglyceride levels were high particularly in men > 35 yr old (3.13 ± 0.32mM), but cholesterol levels were not elevated. Multiple regression analysis of fasting glucose, 2-h glucose, plasma, triglyceride, fasting insulin and insulin response for the nondiabetic subjects revealed 1) BMI was independent risk factor for elevated 2-h glucose levels women but not in men and was strongly related to fasting insulin concentrations in both gender; 2) fasting insulin concentration was an independent risk factor for increase in fasting glucose, insulin response, and triglyceride levels 3) insulin response was related to the 2-h glucose level; 4) fasting and 2-h glucose levels and fasting insulin and triglyceride concentrations all rose with age in both genders with the rate of increase generally greater in men. The most striking difference between these desert Aborigines and previously studied coastal Aborigines from the same geographical region was the significantly higher insulin response. It is possible that the more severe hyperinsulinaemia in the desert Aborigines may indicate a greater degree of susceptibility to type II diabetes than in the coastal Aborigines as the duration of urbanization increases.

The prevalence of diabetes mellitus in the adult population of Guadeloupe as estimated by history or fasting hyperglycemia.

Costaghola D, Delaunay C, Moutet J P, Kankambega P, Demeulemeester R, Donnet JP; Papoz L, Eschwege E; Diab Res. Clin. Prac; Prac, 1991; 12: 3:209.

A study was conducted between January 1984 and March 1985 to determine the prevalence of diabetes in the adult population of the French Caribbean island of Guadeloupe (18 years of age and over). A two-step sampling frame, using a sampling fraction of 0.46%, where the primary units were composed of districts and where sub-units where households was used. The household refusal rate was 22%. Subjects were classified as 'diabetic' when they were either already known or when their fasting plasma glucose was above 8.0 mmol/L. The total age and sex standardized revalence of diabetes among the adult population of Guadeloupe can be estimated at 6.6%. the high prevalence rate appears to be related to obesity (strongly in women), a genetic susceptibility (2.5% of age standardized prevalence among subjects of Asian Indian origin for both sexes), and, possibly in men of African origin only, to a maternal history of diabetes.

Guadeloupe, like other Caribbean islands has a population mainly of African descent with a large minority of Asian Indian origin. However due to their status as a French department, their socio- economic status and health coverage is better.

MIGRANT PREVALENCE STUDIES:
Impaired Glucose Tolerance and Diabetes Mellitus Hindu Indian immigrants in Dar es Salaam.

Ramaiya K.L., Swai A B M, Mc Larty D G, Alberts KGMM; Diabetic Medicine. 1991; 8: 738.

The prevalence of impaired glucose tolerance (IGT) and diabetes mellitus was studied in a migrant Hindu Indian community in Dar es Salaam, Tanzania Using 1985 WHO criteria, 75 g oral glucose tolerance tests (OGTT) were performed on 1147 (583 men, 564 women) subjects age 15 years and over. The age standardized prevalence of IGT in men and women was 15.2 and 17.2%, and that of diabetics was 9.1% (6.5% known; 2.6% previously undiagnosed) and 9.0% (3.7% known; 5.3% previously undiagnosed), respectively. Diabetes was present in 12.9% of men and 12.8% of women aged 35 years and above. The overall age and sex standardized prevalence of IGT was 16.2% and of diabetes 9.1%. The major risk factors associated with diabetes in both men and women were age, family history of diabetes, and physical inactivity, and in women body mass index (BMI) Age and BMI contributed to the higher frequency of IGT in women as compared with men, while in men, age was the only contributory factor. Despite overweight and obesity being more frequent in women than men, age-standardized prevalence rates of IGT and diabetes were similar between men and women. The decreased prevalence of diabetes in men and women performing moderate/heavy physical activity was independent of age and BMI.

Type 2 (NID) diabetes mellitus, migration and westernization

Ostbye T., Welby T J., Prior I A M, Salmond C E., Stokes Y M.;
The Tokelau Island Migrant study
Diabetologia. 1989; 32: 585.

The migration of Tokelauans from a traditional atoll in the Pacific to urban New Zealand is associated with a increased prevalence and incidence of Type 2 (NID) diabetes mellitus over the period 1968-1982. During the same period, a lesser but definite increase is seen among non-migrants in Tokelau. The age standardized prevalence rates rose from 7.5 and 11.7 to 10.8 and 19.9 per 100 respectively in the male and female migrants compared with an increase from 3.0 and 8.7% to 7.0 and 14.3 per 100 in the non-migrants males and females respectively. The incidence of diabetes is shown to be consistently higher in migrants compared to the non-migrants giving relative risks of 1.5 in males and 1.9 in females. The factors most likely contributing to this difference, are changes a higher calorie, high protein diet, higher alcohol consumption, a greater weight gain and altered levels of physical activity in the migrants. A number of populations in the Pacific have been shown to have a low rate of diabetes in their traditional setting , but may have a genetic predisposition for diabetes which responds to factors in the urban industrialized environment and life-style. The social and economic changes taking place in Tokelau are also clearly increasing the risk of diabetes. To reverse these trends and prevent the development of complications of Type 2 diabetes, it will be important to institute preventative programmes and to follow up the population in both environments for long-term outcomes, including mortality. This study is consistent with the studies of Prior et al in the 1960's Linking 'westernisation' and metabolic maladies in the New Zealand Maoris.

Prevalence of diabetes mellitus in Ethopian immigrants

Rubinstein A., Graf E., Landau E., Reisin L H, Goldbourt U.; Isr J Med. Sci. 1991; 27: 252.

The prevalence of diabetes mellitus among 445 new immigrant Ethopian Jews was studied immediately after their arrival to Israel, and found to be 0.4%. This low prevalence could be attributed to their long trek accompanied by severe malnutrition which caused death to the old, weak and sick, leaving a selectively young and healthy population group.

This low prevalence is similar to the prevalence found by peters in his survey in Gondar area of Ethopia (0.6% under 40 years age, 2.4% above 40 years) which differs remarkably from the survey of Coken et al (Metabolism 1961; 10: 50-58) who found a prevalence of 8.9% in 158 young Ethopian immigrants who had already been exposed to Israeli diet and Western life-style for 2.5 to 4 years. Incidence of clinical diabetes also increased markedly in Yemenite Jews over the first year after arrival in Israel.

DIABETES COMPLICATIONS:

The prevalence of microalbuminuria in diabetes: a study from North India.

Gupta DK, Verma LK., Khosla PK, Dash S C:
Diab. Res. Clin. Prac. 1991; 12: 2, 125.

In a study of "native" Indian, 102 non-proteinuric diabetic patients were screened (64 NIDDM, 38 IDDM, mean age and diabetic duration 48.7 and 6.5 years, 21.6 and 6.2 years, respectively) with blood pressure < 170/105 and without congestive heart failure, Ketonuria or urinary tract infection, for the presence of microalbuminuria (albumia excretion rate > 20 ug/min), 56 patients (34 NIDDM, 22 IDDM) also underwent detarted fundus examination 17 NIDDM (26.6%) and 3 IDDM (7.9%) patients had microalbuminurea.

Glycated hemoglobin was significantly higher in microalbuminurea in the NIDDM group ($p<0.05$) Diabetic retinopathy tended to occur more frequently in microalbuminuria (NIDDM and IDDM).

Race has been implicated as an important risk factor for development of diabetic nephropathy from prevalence of heavy or very heavy proteinuria in males with diabetes of longer than 14 years duration varying from 2.4% (Hong Kong) and 4.2% (London) to 23% (Delhi) and 34% (Tokyo) and 37% (Oklahome, USA).

Microalbuminuria in NIDDM: its prevalence in Indian compared with Europid patients.

Allawi J, Rao PV, Gilbert R, Scott G, Jarrett RJ, Keen H, Viberti G C. Mather H M.;
British Medical Journal. 1988; 296: 462.

NIDDM is strikingly common in British Indians, but their susceptibility to diabetic complications is unknown. The ratio of albumin to creatinine concentrations was measured in samples of the first urine voided in the morning in 154 Indian and 82 Europid patients with NIDDM and in control group of 129 non- diabetic Indians. The ratio was significantly higher in the Indian patients than in the Europid patients and the Indian controls. There were no significant correlations between the logarithm of the albumin: creatinine ratio and age, known duration of diabetes, HbA1c or body mass index within either diabetic group. Hypertension and raised albumin: creatinine ratio were significantly associated and significant correlations were seen between the log of the albumin: creatinine ratio and systolic and diastolic B.P. in Indian but not the Europid diabetes. Because of the high prevalence of diabetes at a relatively early age in Indian, nephropathy may emerge as an important clinical problem.

Higher frequency of Renal involvement-Indian diabetes than in other ratial groups has been observed in many studies now. The cause for this increased susceptibility has not been elucidated.

Nephropathy in non-insulin dependent diabetes mellitus: comparative study with normoproteinuric and microproteinuric subjects.

J. Diabetes Complication 4/3 122-5-1990-John L, Ganesh A, Jogn G, Raju J.; Diabetes and renal failure: a southern Italian prospective Catalaco C, Cuzzola, Enia G, Postorino M, Maggiore Q Centro di Fisiologia Clinica del consiglio Nazionale delle Ricerche e Divisione Nefrologica, Reggio Calabria, IT
J, Diabetic Complications. 1989; 312: 124.

The authors carried out a retrospective survey assessing the total proportion of diabetic patients and the relative proportion of patients with type-I and Type-II diabetes among patients receiving renal replacement therapy and those evaluated for chronic renal failure in a southern Italian renal unit during the period 1972-1986. The proportion of diabetic patients among patients accepted for renal replacement therapy was 10% (34/336). Of the 34 diabetic patients, one was clearly affected by type-I diabetes, 26 had type-II diabetes, and in four patients the classification was uncertain. Similar relative proportions of types-I and II diabetes were observed among patients referred during the same period for evaluation of chronic renal failure.

Incidence of proteinria in type 2 diabetes mellitus in the Pima Indians

Kunzelman C.L., Knowler W.C., Pettitt D.J., and Bennett P.H.- Kidney Int. 1989; 35/2: 681.

Little is known of the natural history of nephropathy in type-2 (non-insulin-dependent) diabetes, yet type-2 diabetes is a major cause of end-stage renal disease in the United States. The incidence rate of heavy proteinuria was determined in Pima Indians participating in a longitudinal population study of diabetes and its complications. Heavy proteinuria was defined by a urine protein (g/liter) to urine creatinine (g/liter) ratio > 1.0 (> 113 mg protein/mmol creatinine), a level which corresponds to a urine protein excretion rate of about 1 g/day. The incidence rates of proteinuria in diabetic Pimas were 4, 12, 37 and 106 cases/1,000 person years at a risk in the periods 0 to 5, 5 to 10, 10 to 15 and 15 to 20 years after the diagnosis of diabetes. The cumulative incidence rates were 2%, 8%, 23%, and 50% at 5, 10, 15 and 20 years, respectively. The duration of diabetes, severity of diabetes as determined by the degree of hyperglycemia and type of treatment, and blood pressure were risk factors for proteinuria. The presence of heavy proteinuria was strongly associated with the development of renal insufficiency, defined by serum creatinine > 2.0 mg/dl (> 177 mMol/liter). The incidence of proteinuria in type 2 diabetes in pima Indians was as high as that reported in type 1 diabetes in other populations and represents a frequent, serious complication of the disease.

The Wisconsin Epidemiologic Study of Diabetic Retinopathy. IX. Four-year incidence and progression of diabetic retinopathy when age at diagnosis is less than 30 years

Klein R. Klein B.E.K., Moss S.E. et al.
Arch. Ophthalmol 1989; 107/2: 237.

Population-based epidemiologic data on the incidence and progression of diabetic retinopathy are important in medical counseling and rehabilitative services and for developing approaches to preventing diabetic retinopathy. We performed a population-based study in southern Wisconsin of insulin-taking diabetic persons diagnosed before 30 years of age. Of the 271 who had no retinopathy at the first visit, 160 (59%) developed it by the time they were re-examined four years

later, and 75 (11%) of the 713 free of proliferative diabetic retinopathy developed it. Overall, worsening of retinopathy occurred in 41% of the population, whereas improvement occurred in 7%. The incidence of proliferative retinopathy rose with increasing duration until 13 to 14 years of diabetes, thereafter remaining between 14% and 17%. These incidence data underscore the need for careful ophthalmologic follow-up of these people.

The Wisconsin Epidemiologic Study of Diabetic Retinopathy. X. Four year incidence and progression of diabetic retinopathy when age at diagnosis is 30 years or more

Klein R, Klein B.E.K., Moss S.E. et al.

Arch Ophthalmol 1989; 107/2: 244.

The four-year incidence and progression of retinopathy were investigated in a population-based sample of people with diabetes diagnosed at 30 years of age or older. For insulin users, 73 (47%) of the 154 who did not have any retinopathy at the first visit developed it in the four-year interval, and 31 (7%) of the 418 free of proliferative retinopathy developed it. Worsening of retinopathy occurring in a total of 34% (142/418). For nonusers of insulin, corresponding rates were 34% (110/320) for incidence of any retinopathy, 2% (11/486) for developing proliferative retinopathy, & 25% (121/ 486) for worsening. These population based data clearly indicate the risk of retinopathy worsening in a short interval (four years) in a large proportion of people with older-onset diabetes, a group previously thought to be relatively protected from retinopathy. Such patients who make up the largest proportion of diabetic patients in the United States need examination when diabetes is first diagnosed and regular follow-up.

The rapid worsening of retinopathy in a short interval in older onset diabetes is usually not within prevailing common knowledge.

Diabetes mellitus as a risk factor for acute myocardial infarction in Asians and Europeans

Woods KL, Samanta A, Burden AC

Br. Heart J. 1989; 162/2: 118.

Ischemic heart disease is more common among immigrants from the Indian subcontinent than among Europeans in the United Kingdom.

The excess cannot be accounted for by differences in smoking, blood pressure, or lipid concentrations. There is, however, an increased prevalence of diabetes mellitus in the Asian population. Separate estimates of the relative risk of acute myocardial infarction associated with diabetes from parallel case-control studies were made to compare the importance of diabetes as a risk factor in the two ethnic groups. For Asians the relative risk was 3.3 (95% confidence interval 1.9 to 5.8) and for Europeans 1.3 (1.0 to 1.7). Calculations of population attributable risk indicated that clinical mellitus accounts for 21% of the incidence of myocardial infarction in Asians but only 3% of the incidence in Europeans. Diabetes mellitus is of sufficient quantitative importance as a risk factor to account for the whole of the observed excess of deaths from ischemic heart disease among Asians in the United Kingdom.

The differences observed as regards anthropometry, nutritional habits or biochemical profile in the Asian and Europeans have not been elucidated nor other risk factors as family history hypertension, states of glycemic control stated.

Hypertriglyceridaemia as a risk factor of coronary heart disease mortality in subjects with impaired glucose tolerance or diabetes. Results from the 11-year follow-up of the Paris Prospective Study.

Fontbonne A, Eschwege E, Cambien F, Richard JL, Ducimetiere P, Thibult N, Warnet JM, Claude JR, Rosselin GE

Diabetologia. 1989; 32/5: 300.

The Paris Prospective study is a long-term investigation of the incidence of coronary heart disease in a large population of working men. The first follow-up examination involved 7,038 men, aged 43-54 years. Subjects with impaired glucose tolerance or diabetes (n=943) were selected from the total population for a separate analysis of coronary heart disease mortality risk factors.

During a men follow-up of 11 years, 26 of these 943 subjects with abnormal glucose tolerance died from coronary heart disease. Univariate analysis showed that plasma triglyceride level ($p<0.006$), plasma cholesterol level ($p<0.02$), and plasma insulin level both fasting and 2-hour post-glucose load ($p<0.02$), were significantly higher in subjects who died from coronary heart disease compared to those who did not. In multivariate regression analysis using the Cox model, plasma triglyceride level was the only factor positively and significantly associated with coronary death. The distribution of plasma triglyceride levels was clearly higher for the subjects who died from coronary heart disease than those who did not die from this cause or were alive at the end of the follow-up. This new epidemiological evidence that hypertriglyceridaemia is an important predictor of coronary heart disease mortality in subjects with impaired glucose tolerance or diabetes suggests a possible role of dyslipidemia in the excess occurrence of atherosclerotic vascular disease in this category of subjects.

Mortality and causes of death in type II diabetic patients: a long-term follow-up study in Osaka district, Jaan

Sasaki A, Horiuchi N, Hasegawa K, Uehara M

Diabetes Res Clin Pract. 1989; 7/1: 33.

A follow-up study of 1939 diabetic patents with a mean observation period of 9.4 years was carried out in Osaka, Japan. The mortality rates per 1000 person-years were 31. 35 for males and 21.99 for females and the ratios of observed to expected number of deaths were 1.69 for males and 1.74 for females, indicating an excess mortality for diabetic patients of both sexes and higher mortality in men than in women in Japan. Factors related to the patients prognosis were age, elevated fasting glucose level, lower obesity index, hypertension, diabetic retinopathy and albuminuria at entry into the study. Insulin treatment was also associated with poor prognosis. Cerebro-cardiovascular and renal disease were the major causes of death in diabetic patients, heart disease killed 19.5% cerebrovascular disease 16.7% and renal disease 13.1%. the relatively high frequency of renal disease as a cause of death in type II diabetes, especially in patients with a lower age at onset, was noteworthy, suggesting some difference in the clinical manifestations of diabetes between Japan and Western countries. Malignant neoplasms accounted for 25% of deaths and cirrhosis of the liver for 6.4%.