Gender Difference in Large Vessel Disease In Asian Indians With Diabetes

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There is paucity of information on morbidity and mortality in diabetes among Asian Indian populations, due to lack of uniform and standardised studies. In this context, the relevant data from the following studies – world Health Organization, Multinational Study on vascular diseases (in NIDDM), 1975-1977[1], Indian Council of Medical Research, Non-Insulin-Dependent Diabetes Mellitus Study, 1984-1990[2]' Mortality data, All India Institute of Medical Sciences (AIIMS), 1977-1983[3], Morbidity at death, AIIMS 1977-1987[4], Mortality Data Nizam's Institute of Medical Sciences, 1993-1994[5] as available with the authors is reviewed here for gender-specific differences in diabetic vascular complications.

I. WHO MNSVD, 1975-1977.

Between 1975 and 1977, a random sample of 555 diabetics with non-insulin-dependent diabetes (NIDDM) was drawn after stratification of the diabetic base population attending AIIMS Hospital clinic by sex, duration of diabetes and age[1]. A common protocol, standardise examination procedures, and centralised laboratory methods were used in the investigations in this 14-nation WHO study on vascular complications in diabetes.

In the broad category of large vessel disease (LVD) with objective evidence (e.g. centrally-analysed ECG results, limb amputation) and subjective evidence (e.g. symptom enquiry for angina, claudication and stroke), prevalence of LVD in women (36.8%) was more than in men (32.5%) Table 1.

Table 1
Vascular Complications in NIDDM, WHO MNSVD Delhi 1975-1977

Between 35-54 years age		Men n = 289	%	Women n = 266	%
LVD		94	32.53	98	36.84
CAD	ECG possible	48	16.61	57	21.43
	probable	19	6.57	8	3.01
EYE	minimal	5	1.73	7	2.63
	medium	50	17.30	24	9.02
	severe	15	5.19	8	3.01
KIDNEY	minimal	45	15.57	55	20.68
	severe	38	13.15	18	6.77

LVD includes all components of CAD, peripheral vascular disease and stroke.

This female excess was reported as due to the high rate of 'ECG Coronary Possible' (ST,T wave abnormalities), and the higher symptom complaint rate for 'Angina Pectoris' than in diabetic men. The most objective evidence of arterial disease, 'DCG coronary Probable' (Q wave items) rate was however, approximately twice more in men than in women.

II. ICMR NIDDM STUDY, 1984-1990

Between 1984 and 1990, 2783 men and 1854 women with diabetes and not dependent on insulin were examined for vascular complications in a large cross-sectional study[2]. This national study was supported by the Indian Council of Medical Research (ICMR) at 9 teaching hospital and the diabetics (nos.) examined at each centre were – Delhi (507), Udaipur (569), Lacknow (563), Jabalpur (432), Calcutta (502), Pune (579), Cuttack (499), Madras (555), and Trivandrum (431).

Prevalence of vascular complications as reported in men and women were, coronary artery disease (CAD) by Minnesota coding of ECG as 'coronary probable in 8.9 and 5.1%. cerebrovascular disease (CVD) manifesting as stroke in 1.6 and 1.8% peripheral vascular disease (PVD) resulting in gangrene in 0.7 and 0.4% , retinopathy in 16.3 and 14.3%, and nephropathy as defined by serum creatinine exceeding 2.5 mg/dl in 15.4 and 13.3% respectively (Table 2). While cerebrovascular disease alone was more common in women with NIDDM, other vascular complications were more frequent in men.

Table 2
Vascular Complications in NIDDM, ICMR NIDDM, 1984-1986

	Men n = 2783	%	Women n = 1854	%
Large vessel disease	238	8.55	104	5.60
Coronary artery disease	248	8.91	95	5.11
Cerebrovascular disease	45	1.63	32	1.75
Peripheral vascular disease	20	0.72	7	0.37
Small vessel disease	782	28.09	467	25.20
Nephropathy	429	15.42	246	13.27
Retinopathy	452	16.25	265	14.29
LVD and/or SVD	971	34.89	537	28.96

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III. MORTALITY DATA, AIIMS 1977-1983

In an analysis of 407 death records of diabetics (with NIDDM) admitted to the All India Institute of Medical Sciences (AIIMS) between 1977 and 1983[3], large vessel. Coronary as well as cerebrovascular disease accounted for more deaths in women than in men (CAD 23.5 Vs. 19.6%, CVD 17.7 Vs. 6.3%) (Table 3)

Table 3
Major Cause of Death in NIDDM, Delhi 1977-1983

	Men		Women	
	n = 271	%	n = 136	%
Coronary	53	19.56	32	23.53
Cerebral	17	6.27	24	17.65
Renal	128	47.23	38	27.94
Non-vascular	73	26.94	42	30.88

Further to these reported causes of death, major morbidity events recorded in these diabetics during hospital stay were as in Table 4. At death, prevalence of coronary disease was equal in men (44.9%) and women (45.8) and peripheral artery disease was more in men (18.5%) than in women (9.6%). Cerebrovascular disease at death was noted in more women (30.2%) than men (22.1%).

Table 4
Vascular Complications at Death in NIDDM, Delhi 1977-1983

	Men		Women	
	n = 271	%	n = 136	%
Coronary	124	45.76	61	44.85
Cerebral	60	22.14	41	30.15
Peripheral	50	18.45	13	9.56
Renal	177	65.31	63	46.32
Eye	58	21.40	29	21.32

IV. MORBIDITY AT DEATH, AIIMS 1977-1987

A more detailed cross-sectional analysis of all hospital records of the All India Institute of Medical Sciences (AIIMS) from 1977 to 1987 led to the identification of 580'diabetic deaths' (all ages)[4]. Eleven patients had childhood onset (under 20 years of age and 19 had onset of diabetes at age 20-29.

Mean age at diagnosis (M 55.1± 11.5 range 30-88.7, F 55.1 ± 11.0 range 29.5-85 years T = 0.0166, P = 0.4934), age at death (M 57.7 ± 10.8 range 32-89, F 57.7 ± 10.3 range 30-85 years T= 0.0743, p = 0.4704) and duration of diabetes (M 2.6 ± 5.0 range 0-30, F 2.6 ± 4.9 range 0-35 years T = 0.1204, P = 0.4521) were similar in men and women.

Large vessel disease i.e. coronary as well as cerebrovascular disease as the reported causes accounted for more deaths in women than in men (CAD 23.0 Vs. 20.9%, CVD 17.3 Vs 24%) Table 5).

Table 5
Major causes of Death in Diabetic with Age at Diagnosis above 30 years, New Delhi 1977-1987

	Men		Women	
	n = 359	%	n = 191	%
Coronary artery disease	75	20.89	44	23.04
Congestive Heart failure	9	2.51	7	3.66
Cerebrovascular disease	26	7.24	33	17.28
Nephropathy	169	47.08	60	31.41
Ketoacidosis	12	3.34	11	5.76
Hepatic disease	6	1.67	4	2.09
Malignanacy	14	3.90	5	2.62
Infections	24	6.69	16	8.38
Miscellaneous	24	6.69	11	5.76

Data on hospital stay as obtained from these case records (Table 6) revealed that coronary disease i.e. myocardial infarction or LBBB was recorded at death in more men (46.0%) than women (43.5%), but non-specific coronary causes of cardiac disease i.e. congestive heart failure or pulmonary edema and insignificant ECG evidence for ischemic changes were noted more in women. However, cerebrovascular disease manifesting as coma (F 43.5, M41.8%) as well paralysis (F 25.1, M22.0%) was noted more in women before death.

Table 6
Vascular Complications at Death in Diabetics Diagnosed after 29 years age, Delhi 1977-1987

	Men		Women	
	n = 359	%	n = 191	%
Coronary				
MI/LBBB	165	45.96	83	43.46
CHF/Pulm. Edema	104	28.97	58	30.37
ST/T Changes	229	63.79	126	65.97
Cerebrovascular				
Coma	150	41.78	83	43.46
Paralysis	79	22.01	48	25.13
Peripheral Vascular				
Absent Pulses	59	16.43	18	9.42
Gangrene	50	13.93	20	10.47
Amputee	11	3.06	5	2.62
Retinopathy	38	10.58	16	8.38
Cataract	73	20.33	39	20.42
Blind	51	14.21	15	7.85

V. MORTALITY DATA, NIMS 1993-1994

Consecutive death records of 292 male (M) and 161 female (F) diabetics (Type 2) diagnosed (=?onset)

between 35 and 64 years of age and treated at Nizam's Institute of Medical Sciences in Hyderabad were studied[[5].

While mean age at diagnosis (M5.5 # 7.3, F49.8 # 7.6 years) was similar (T =0.8894, P=0.1871) in both genders, mean age at death in women (57.7 # 8.5, range 40-86 years) was significantly less (T = 1.7398. P = 0.0413) than in men (59.1 # 8.4, range 38-85 years).

The mean duration of diabetes (difference between ages at death and diagnosis) adjusted for age at diagnosis was also different (M 8.7 # 2.0, F7.9 # 1.5 years T =4.4380, p< 0.001) between men and women.

Diabetes was diagnosed at about the same age in both genders, nut duration of diabetes was significantly less in women before death, implying that diabetic women had higher susceptibility for vasculopathy and other morbidity factors leading to death at an earlier age.

Predominant morbidity factors (and prevalence %) at death in these diabetics were coronary heart disease (M 45.2, F 42.9%), nephropathy (M 37.0, F 30.4%), infections (M 30.8, F 34.2%), cerebral vessel disease – CVD (M 27.7. F 30.4). and ketosis (M 6.5, F 12.4%) (Table 7).

Table7
Vascular Complications at Death in Diabetics Diagnosed after 34 years age, Hyderabad 1993-1994.

	Men		Women	
	n = 292	%	n = 161	%
Coronary	132	45.21	69	42.86
Cerebral	81	27.74	49	30.43
Nephropathy	108	36.99	49	30.43
Infections	90	30.82	55	34.16
Ketosis	19	6.51	20	12.42
Neoplasms	14	4.79	11	6.83
Cirrhosis	16	5.48	5	3.11

CONCLUSIONS

Though age at onset (diagnosis) of diabetes was not different between genders, duration of diabetes was similar or even less in women as the age at death was either same or earlier in them.

Considering the longer female life expectancy Indian women with diabetes seemed more susceptible for vasculopathy and other morbidity factors leading to death at an earlier age.

Female excess in coronary vascular morbidity was reported due to the high rate of non specific ECG evidence of ischaemia and the higher symptom complaint rat for agnina. But the reported causes of death as well as the recorded evidence for large vessel disease at death indicated equal or higher susceptibility of women for coronary and Cerebrovascular disease.

Cerebrovascular disease was consistently reported more in women with diabetes in all morbidity and mortality studies reported here.

REFERENCES

1. Diabetes drafting group, WHO. Prevalence of small vessel and large vessel in diabetic patients from 14 centres. The world Health Organization multinational study of vascular disease in diabetics. Diabetologia 1985; 28: 615.-40.

2. Rao PV, Ahuja MMS. Vascular complications of diabetes mellitus: Indian data. In: Advances in Endocrinology, Metabolism and Diabetes, Kochupillai N, (ed) Macmillan Delhi, 1994; 2; 33-8.

3. Ahuja MMS unpublished data.

4. Rao PV , Ushabala P, Ahuja MMS. Unpublished data.

5. Sahay R, Rao PV, Anita BT, Prashant T, Shantaram V. Gender – differences in reduction of life expectation as related to morbidity at death in diabetes mellitus. Clin Proc NMS 1994; 9 (suppl 1) : 48.