

DEATHS CAUSED BY HEART FAILURE IN THE BANTU IN DURBAN*

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In the past 2 decades, although much has been said and written regarding heart failure in Africa, the main concern has been either the high incidence of heart failure of obscure origin or the rarity of coronary thrombosis in the indigenous population of the continent. There are but few reports in the literature which deal with the over-all incidence of mortality from heart failure, as assessed from necropsy analysis. The field has been adequately covered in the Transvaal by Becker's analysis of cardiovascular diseases in the Bantu and Coloured subjects in Johannesburg,¹ and later by Siew² in a comparative analysis of cardiovascular disease in the Bantu, Coloured and White races on the Witwatersrand, but there have as yet been no adequate supplements of these works by similar studies from Natal or other centres in the Republic. In fact, with a few exceptions, the continent as a whole lacks information of this nature.

Becker,¹ from an analysis of 3,000 consecutive necropsies on Bantu and Coloured patients, found that while the lowest incidence (10%) of cardiovascular disease occurred during the first decade of life, there was a steady increase

in frequency thereafter, reaching a peak of 90% in patients over 60 years of age. No difference in incidence between the 2 sexes was observed, and the author also remarked that there was no evidence of any particular racial susceptibility to cardiovascular disease among the Bantu and Coloured people of South Africa. Becker recorded the incidence of cardiovascular disease among these subjects as being 46% and concluded that, while cardiovascular disease in general was responsible for an all-age average incidence of 12% of all deaths in routine necropsies on Bantu and Coloured patients, congestive heart failure accounted for 11% of all deaths.

Siew² analysed necropsy statistics covering a period of 21 years (1936-1956 inclusive) and stated that the incidence of cardiovascular disease at necropsy was higher in the White races (41%) than in the Bantu (25%) or Coloured (31.8%) races. No difference was found in the sex incidence in any of the 3 race groups.

From East Africa, Vint,³ in a series of 1,000 consecutive necropsies on African subjects, found the incidence of deaths due to disease of the cardiovascular system in general to be 5.6%. Davies⁴ considered congestive heart failure to be relatively common at Mulago Hospital,

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Uganda, with an incidence of 6.2% for all age-groups in 3,705 necropsies. In 1,000 consecutive necropsies on Bantu patients in Salisbury, Rhodesia, the incidence of cardiac disease was found to be 6.7%.⁵

MATERIAL AND METHODS

This section represents a review of necropsy records, and the material studied consists of 9,898 consecutive routine postmortem examinations performed on Bantu and Indian patients at King Edward VIII Hospital during the 5-year period January 1958 - December 1962. Medico-legal post-mortem examinations are not included. Data on Indians have been included for comparative purposes.

Population Sampled

The necropsy material for the survey was drawn from both King Edward VIII Hospital and its subsidiary hospital in Clairwood. These hospitals are situated in Durban and together serve the majority of the immediate Bantu and Indian population of the city and its peri-urban areas. Through referral from district hospitals and clinics a small proportion of patients are drawn from many areas within the province.

The Bantu population attending these hospitals consists mainly of Zulus employed in industry as unskilled or semiskilled labour, in commerce as shophands and messengers, and in domestic service. In comparison, only a very small number of doctors, nurses, schoolteachers and businessmen use these services. As in any large town or city in the Republic, the great majority are detribalized, living in an environment which is wholly westernized, and are therefore different from African communities in remoter parts of the continent.

The majority of Indian patients are mainly from the lower-middle and poorer classes and are therefore not representative of the Indian population of Durban as a whole.

Age and Sex Distribution of Patients Sampled

All age-groups, with the exception of neonatal deaths, have been included. It is relevant to mention that few Bantu patients are able to state their age accurately and in many instances a rough estimate of age had been made on admission to hospital. Such estimates were based partly on appearances and partly on recollection of important events. Five patients whose ages were not stated have been excluded from the analysis.

The age and sex distribution of Bantu subjects is shown in Table I. It will be noted that more than half (59.1%)

TABLE I. AGE AND SEX DISTRIBUTION IN 9,069 CONSECUTIVE BANTU NECROPSIES

Age-groups (years)	Males		Females		Total	
	No.	%	No.	%	No.	%
Under 9	2,854	58.2	2,505	60.1	5,359	59.1
10 - 19	107	2.2	118	2.8	225	2.5
20 - 29	205	4.2	255	6.1	460	5.1
30 - 39	385	7.9	333	8.0	718	7.9
40 - 49	479	9.8	263	6.3	742	8.2
50 - 59	383	7.8	279	6.7	662	7.3
60 - 69	299	6.1	267	6.4	566	6.2
70+	187	3.8	150	3.6	337	3.7
Total	4,899	100.0	4,170	100.0	9,069	100.0

Excluded are 5 cases in which ages were unknown.

of all Bantu necropsy subjects are below 10 years of age. In fact the vast majority of patients falling into the group 1 month to 9 years were under 3 years of age. Of the total number, 54% were males and 46% were females.

The age and sex distribution of Indian cases is set out in Table II. Here it will be noted that just over one-quarter of the cases were under 10 years of age.

TABLE II. AGE AND SEX DISTRIBUTION IN 829 CONSECUTIVE INDIAN NECROPSIES

Age-groups (years)	Males		Females		Total	
	No.	%	No.	%	No.	%
Under 9	108	23.0	108	30.0	216	26.1
10 - 19	20	4.3	20	5.5	40	4.8
20 - 29	18	3.8	42	11.7	60	7.2
30 - 39	37	7.9	39	10.8	76	9.2
40 - 49	79	16.8	38	10.6	117	14.1
50 - 59	100	21.4	50	13.9	150	18.1
60 - 69	63	13.4	48	13.3	111	13.4
70+	44	9.4	15	4.2	59	7.1
Total	469	100.0	360	100.0	829	100.0

Deaths Caused by Heart Failure

Cases falling into the above category included (i) congestive heart failure from any cause other than acute bacterial endocarditis, acute pericarditis associated with pneumonia and uraemia, and possible toxic myocarditis occurring with diphtheria, typhoid, pneumonia, etc., and (ii) those in whom no evidence of congestive failure was found but death had been sudden and resulted from some

TABLE III. AGE AND SEX INCIDENCE OF 690 DEATHS FROM HEART FAILURE IN 9,069 CONSECUTIVE BANTU NECROPSIES

Age-groups (years)	Total male PMs	Heart failure deaths		Total female PMs	Heart failure deaths		Total deaths heart failure		
		No.	%		No.	%	No.	%	
Under 9	2,854	52	1.8	2,505	37	1.5	5,359	89	1.7
10 - 19	107	19	17.7	118	27	22.9	225	46	20.4
20 - 29	205	19	9.3	255	54	21.2	460	73	15.9
30 - 39	385	75	19.5	333	47	14.1	718	122	17.0
40 - 49	479	70	14.6	263	46	17.5	742	116	15.6
50 - 59	383	52	13.6	279	47	16.8	662	99	14.9
60 - 69	299	46	15.4	267	40	15.0	566	86	15.2
70+	187	31	16.6	150	28	18.7	337	59	17.5
Total	4,899	364	7.4	4,170	326	7.8	9,069	690	7.6

form of heart disease, e.g. syphilitic heart disease, coronary thrombosis, etc.

Using the above criteria, in 9,069 consecutive Bantu necropsies there were 690 (7.6%) cases in which heart failure was incriminated as the cause of death. Age and sex distribution is shown in Table III. The all-age average mortality from heart failure was found to be 7.4% in males and 7.8% in females.

In considering the incidence of such details with regard to age at time of death, the lowest percentage (1.7%) was shown during the first decade of life, and the highest (20.4%) during the second decade. Thereafter, apart from a slight fall in incidence, no definite trend is apparent, and little variation is noted through all age-groups.

In comparison, the all-age average incidence for Indian males was 22.4% and 20.3% for Indian females (Table IV). The lowest incidence (6.0%) was, as among Bantu, again observed during the first decade, and the highest (35.0%) in the second decade. A drop in incidence followed during the next 2 decades, but from the age of 40 years a steady rise is shown. Although no difference in the sex incidence was noted in the Bantu, the Indian showed a slight male preponderance from the 4th decade onwards.

Fig. 1 compares the incidence of mortality according to age in decades for both sexes and both race groups. Bantu male and female deaths from heart failure are lower than those of the corresponding sexes in Indians, and also lower for all corresponding age-groups.

The patient material sampled in the 2 races differs mainly in numbers included in the age-group 1 month - 9 years. Table V shows that in subjects aged 10 years and over, although the difference (Bantu 16.2%, Indians 26.9%) is less marked, the incidence of deaths from heart disease is still lower in the Bantu.

DISCUSSION

It is extremely difficult to assess the incidence of a fatal disease in any given population. Lack of statistics based on postmortem examinations, and the criticism that necropsies are performed by many different patho-

TABLE V. COMPARISON OF INCIDENCE OF DEATH FROM HEART FAILURE IN BANTU AND INDIAN SUBJECTS UNDER AND OVER 10 YEARS OF AGE

Age-groups (years)	Bantu			Indian		
	Total necropsies	Deaths from heart failure		Total necropsies	Deaths from heart failure	
		No.	%		No.	%
Up to 9	5,359	89	1.7	216	13	6.0
10 and over	3,710	601	16.2	613	165	26.9
Total	9,069	690	7.6	829	178	21.5

logists who will certainly differ with regard to the diagnostic criteria and terminology used, would appear to be the main obstacles. In addition, necropsies are performed on a highly selective group, and to what extent they reflect the general population is not known. The present survey need not even reflect the hospital incidence of mortality from heart failure, since not all deaths occurring within the hospital are investigated in the post-mortem examination room. Necropsy studies, nevertheless, are of immense value today despite these limitations, and

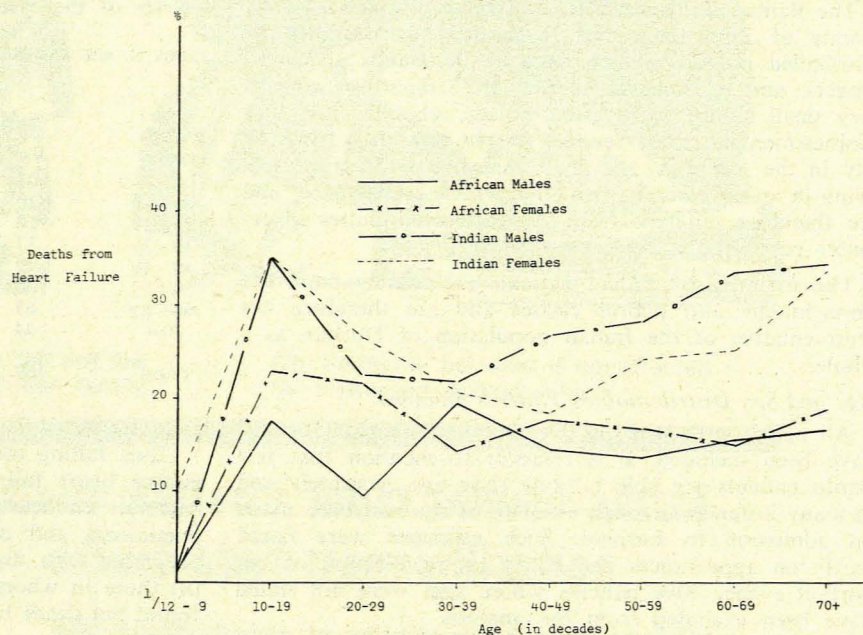


Fig. 1. Incidence of heart failure in relation to age, sex and race.

TABLE IV. AGE AND SEX INCIDENCE OF 178 DEATHS FROM HEART FAILURE IN 829 CONSECUTIVE INDIAN NECROPSIES

Age-groups (years)	Total male PMs	Heart failure deaths		Total female PMs	Heart failure deaths		Total PMs	Total deaths heart failure	
		No.	%		No.	%		No.	%
Under 9	108	2	1.9	108	11	10.2	216	13	6.0
10-19	20	7	35.0	20	7	35.0	40	14	35.0
20-29	18	4	22.2	42	11	26.2	60	15	25.0
30-39	37	8	21.6	39	8	20.5	76	16	21.1
40-49	79	21	26.6	38	7	18.4	117	28	23.9
50-59	100	27	27.0	50	12	24.0	150	39	26.0
60-69	63	21	33.3	48	12	25.0	111	33	29.7
70+	44	15	34.1	15	5	33.3	59	20	33.9
Total	469	105	22.4	360	73	20.3	829	178	21.5

while they lack exactness they remain the only means of confirming clinical evidence in the majority of cases and obtaining some picture, however crude, of the incidence of a fatal disease.

Before any comparison can be drawn with studies reported from elsewhere, allowances must be made for differences in patient material with regard to sex, age, and to some extent race, between this and other series. Of the necropsy subjects in the series analysed by Becker¹ 73% were males and the bulk of his patients were between 20 and 50 years of age; 11.2% were under 10 years of age. In the present study the sex variation is less marked (54% males and 46% females), and more than half our cases (59.1%) were under 10 years of age. In addition, Becker's figure of 11% (percentage deaths caused by congestive heart failure) included Coloured patients, and Siew² has shown the incidence of cardiovascular disease in the Coloured (31.8%) to be slightly higher than that in the Bantu (25%). It is therefore not surprising that the all-age average incidence obtained in the present series (7.6%) is lower than that reported by Becker.

While the over-all incidence of heart failure in the Bantu in Durban agrees with that reported by Davies⁴ and Gelfand,⁵ it is unfortunate that details of their patient material with regard to age and sex are not known. The incidence of 5.6% for all deaths from cardiovascular disease in general, reported from East Africa,³ appears to be lower than that of a similar race group in Durban.

Although the incidence of deaths due to heart failure is lower in the Bantu for all age-groups and for both sexes than in the Indian, the general pattern tends to be similar (Fig. 1). In both races the lowest incidence was observed during the first decade and the highest in the second decade of life, with a slight fall in incidence thereafter. The very low incidence recorded during the first decade in Bantu particularly, can be explained on the basis that in Durban a considerable number of deaths in children are caused by malnutrition and infection. It has been stated above that the majority of cases falling within this age-group were under 3 years of age. Wainwright⁷ reported that 92% of all deaths in children under 3 years of age, at King Edward VIII Hospital, were found at necropsy to have been due to malnutrition and/or infection. The results obtained for this age-group are therefore not comparable with figures reported in other populations, particularly those of white races in South Africa and most other countries.

The generally lower rate shown among Bantu in the first 3 decades of life, in comparison with the Indian, may also be due to a higher death rate from infections and from malnutrition in the Bantu. None the less, as shown in Tables I and II, heart disease appears to be an important cause of mortality in the Bantu during the second and third decades of life. On comparison this finding is similar to that observed among Indians. The difference in incidence between the 2 races is least marked in the fourth decade of life, but thereafter the Bantu does not show the same increase in incidence as the Indian. The most likely explanation for this appears to lie in the behaviour of atheromatosis in these 2 race groups. As men-

tioned, Becker¹ reported that the incidence of cardiovascular disease in the Bantu after the age of 60 years was in the region of 90%, and that after the age of 40 years some abnormality of the cardiovascular system was present in two-thirds of his cases. This, however, is not reflected in mortality statistics to the same degree. Becker concluded that the commonest cardiovascular lesion among the Bantu and Coloured races was atheromatosis, and showed that its incidence increased with age. He concluded further that, while it was difficult to assess how far atheroma contributed towards a fatal outcome, only 0.4% of all deaths in his patients could be regarded as being the direct result of atheroma. He said, '... there are many instances too where atheroma has produced significant disease of the cardiovascular system but the fatal outcome was due to some other cause'. Vint's findings were similar.³ However, Wainwright⁷ has shown that atheromatous involvement of the aorta and coronary vessels is of a lesser degree in the Bantu than in either the Indian or White races in Durban.

Apart from the over-all difference in incidence between Bantu and Indian subjects, the Indian showed a slight male preponderance of deaths due to heart failure, while no sex difference was observed in the Bantu. This trend among the Indians was noted regularly through all age-groups after the third decade. Among Bantu, although more female deaths from heart failure are noted in the second and third decades, no definite trend is apparent thereafter. While this may be a pattern of disease in the Bantu, it is possible that it could be accounted for by errors in estimates of age.

Siew² has shown that at necropsy the incidence of cardiovascular disease was lower in the Bantu than in the Coloured and White races on the Witwatersrand. The present study indicates a lower incidence of deaths from heart failure in the Bantu than in the Indian in Durban.

SUMMARY

The all-age average incidence of deaths from heart failure in the Bantu in Durban is almost 8%. This is lower than that observed for Indians (21.5%). After the age of 10 years the difference is less marked, but the Bantu still shows by comparison a lower incidence.

The variations in incidence in the different races and age-groups are discussed.

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REFERENCES

1. Becker, B. J. P. (1946): *S. Afr. J. Med. Sci.*, **11**, 1, 15, 18, 97 and 107.
2. Siew, S. (1958): *Leech (Johannesburg)*, **28**, 61.
3. Vint, F. W. (1937): *E. Afr. Med. J.*, **13**, 332.
4. Davies, J. N. P. (1948): *Ibid.*, **25**, 10, 117, 228, 322 and 454.
5. Gelfand, M. (1957): *The Sick African*, 3rd ed. Cape Town: Juta.
6. Wainwright, J. (1964): *S. Afr. Med. J.*, **38**, 982.
7. *Idem* (1961): *Lancet*, **1**, 366.