

## Multiple Sclerosis in the Negro\*†

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THE distribution of multiple sclerosis (MS) has been extensively studied in past decades. It is generally accepted that the frequency of MS declines toward the equator probably as a result of environmental factors. However, most studies were done on white populations. Only a few articles deal with MS in the Negro.

### HISTORICAL BACKGROUND

In 1922, Bailey<sup>1</sup> found that MS accounted for only 3.5 per cent of organic diseases of the nervous system among Negro draftees during the first World War, as compared with 7.4 per cent for the full group of draftees. Steiner,<sup>2</sup> in 1938, and Brickner and Brill,<sup>3</sup> in 1940, both considered that this disease was uncommon in Negroes. However, no study of prevalence of MS in the Negro was done until 1942 when Kolb,<sup>4</sup> in Baltimore, concluded that MS occurs as frequently and in the same form in the Negro as in the white.

Kurland and Westland,<sup>5</sup> who studied the frequency of MS in many cities in the United States and Canada, reported that there was no significant difference in frequency of MS between the white and Negro in a given area. However, Kurland<sup>6</sup> reported that the crude death rate of MS was higher for the white than the Negro.

Alter<sup>7</sup> studied 92 Negro patients with MS at the Neurological Institute of New York treated during the period of 1947 to 1957 and concluded that the clinical characteristics of MS in the Negro were not different from those in the white. He also found that the northern born Negro had a higher proportion of "typical" cases than the southern born Negro. However, he did not compare the frequency of MS in Negroes and whites.

Beebe et al.,<sup>8</sup> in a recent study of MS in American World War II veterans, concluded that the risk of MS in the Negro was about half the expectation based on the army ratio distribution, even when corrected for place of residence.

From this review, it is clear that there are conflicting opinions on the frequency of MS in the Negro.

### PREVALENCE, MORTALITY AND CLINICAL FEATURES IN THE NEGRO

The prevalence rate of MS in the Negro is shown in Table 1 which summarizes the available data and compares prevalence in whites and Negroes in the U.S. and Canada. It is evident that there is a statistically significant difference between the two races in many cities of the United States. An exception is noted in Boston and Halifax. The most marked difference is noted in Washington, D.C. where Negroes constitute more than 50 per cent of the total population but the total number of Negro MS cases is less than those of whites. The ratio of prevalence rates of whites and Negroes varies from 2 to 7.5:1. Statistically significant differences were also noted when these data were pooled. It suggests that the prevalence of MS in the Negro is lower than that in whites in most U.S. cities.

The prevalence rates in the Negro are higher in the north than the south. Thus, both whites and Negroes show a gradient of decreasing prevalence of MS toward the equator (Fig. 1).

Stazio et al. have shown that there are no differences in sex specific or age specific prevalence rates of MS when whites and Negroes are compared except that the rates are generally lower in Negroes.<sup>9, 10</sup>

The average death rate for the Negro since 1947 was 0.43/100,000 population.<sup>11</sup> This was

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half the rate of whites (Table 2). Statistical analysis of these data also showed a significant difference between the two races. Over the past 20 years, there is no sign of an increase in the death rates of MS in either race. Death rates were higher in female whites as well as in female Negroes than male counterparts.

It is generally accepted that clinical characteristics of MS are similar in Negroes and in whites. This has been proven by pathological studies.<sup>4, 7</sup> In both rates, the female is more susceptible to MS.<sup>9, 10</sup> Other aspects of the natural history of MS between two races are shown in Table 3. No significant differences are noted.

These findings indicate that MS in Negroes is

like that of the white population in all respects compared except frequency; the frequency is lower in Negroes than in whites.

DISCUSSION

The present review has made several points clear relative to MS in the Negro: 1) the prevalence rates in the Negro are in general lower than those in the whites; 2) higher prevalence rates in the northern U.S. and lower rates in the southern U.S. are noted in the Negro as well as in the white; 3) the death rates of MS in the Negro are lower than those of the whites; and 4) the clinical picture of MS in the Negro is not different from that of the white.

TABLE 1.—PREVALENCE RATES (PER 100,000 POPULATION) OF PROBABLE MULTIPLE SCLEROSIS IN WHITES AND NEGROES IN NORTH AMERICA

Date of Study	New Orleans <sup>9</sup> 1951	New Orleans <sup>9</sup> 1962	Charleston <sup>12</sup> 1955	Washington <sup>10</sup> 1958	Denver <sup>14</sup> 1949	Boston <sup>5</sup> 1950	Halifax <sup>12</sup> 1955
Total Population	685,000	868,000	188,000	788,196	415,800	846,000	198,000
Whites	485,000	599,000	94,000	384,189	399,168	820,620	190,000
Negroes	200,000	269,000	94,000	404,007	16,632	25,380	8,000
Number of Patients	59	83	16	244	154	344	42
Whites	49	71	14	142	152	336	41
Negroes	10	12	2	102	2	8	1
Prevalence Rates							
Crude Rates	8.6	9.6	8.5	27.0	37.0	40.7	21.2
Race Adjusted Rates*	9.4	11.0	13.4	32.1	34.8	39.6	20.7
Whites	10.0	12.0	14.9	34.0	38.0	41.0	21.9
Negroes	5.0	4.0	2.1	20.0	11.0	31.0	12.5
Chi square X <sup>2</sup> between the rates in the Whites and in the Negroes	4.05	9.92	8.34	26.33	2.70	0.39	0.31

\*Race adjusted rates were calculated on the basis of 1960 U. S. population census. Total population: 179,323,175 Whites: 158,831,732 Negroes: 18,971,831

\*\*Many of cited articles used "non-whites" instead of Negroes. Since the majority of non-whites in the U.S. are Negroes, "Negroes" and "non-whites" are interchangeably used for convenience in our tables.

TABLE 2.—DEATH RATES (PER 100,000 POPULATION) OF MULTIPLE SCLEROSIS BY RACE AND YEARS<sup>11</sup>

Year	Whites			Negroes		
	Total Population	No. of M.S. Deaths	Death Rate	Total Population	No. of M.S. Deaths	Death Rate
1947 <sup>6</sup>	126,600,000	1,254	0.99	15,000,000	45	0.30
1951	138,149,000	1,334	0.97	16,211,000	84	0.52
1956	149,877,000	1,368	0.91	18,297,000	80	0.43
1961	162,488,000	1,328	0.82	21,154,000	106	0.50
1966*	172,364,000	1,436	0.83	23,493,000	97	0.41
Average	157,305,000	1,352	0.86**	20,158,000	87	0.43**

Age-adjusted death rates 1966: 0.81 in whites and 0.48 in Negroes.

\*\*Chi square X<sup>2</sup> between the rates in the whites and in the Negroes: X<sup>2</sup>=71.2, P (0.015).

TABLE 3.—PERCENTAGE FREQUENCY OF MAJOR SYMPTOMS AT ONSET OF MULTIPLE SCLEROSIS IN WHITES AND NEGROES

Symptoms	Stockholm (Mueller) <sup>21</sup>	Negroes (Alter) <sup>1</sup>
Impaired vision	20	18
Weakness of limbs	32	32
Sensory: numbness, paresthesia	11	18
Incoordination of limbs	8	9
Sphincter trouble	5	1
Diplopia	13	5
Slurred speech	1	
Vertigo-giddiness	11	
Lhermitte's sign		1
Tic douloureux		1
Facial palsy		1
Mixed		14
Total cases	793	79

The lower prevalence rates of MS in the Negro need explanation. Several explanations have been forwarded by the previous workers:

1. Chance variation: Alter et al.<sup>12, 13</sup> concluded in his studies of prevalence rates of MS in Halifax, Canada, and Charleston, S.C. that the difference between the races is within chance variation. It has to be noted that the "possible MS cases" are included in his analysis. If the analysis is confined to the "probable MS," we come to a different conclusion; there is a significant difference between the two races in Charleston but not in Halifax.

Kurland et al.<sup>14</sup> interpreted the difference between the races in Denver, Colorado as being due to chance alone.

Kurland and Westland<sup>5</sup> did not find a statistically significant difference between the races in Boston and New Orleans. Stazio et al.<sup>9</sup> reported the corrected data of New Orleans study of 1951 which was originally studied by Kurland and Westland. Statistical analysis of the corrected data of 1951 and the newer data of 1962 both show a statistically significant difference (Table 1)

2. Inferior medical facilities for Negroes or reluctance to diagnose MS in Negroes: Steiner in 1938<sup>2</sup> assumed that MS occurred as frequently in the Negro as in the white but was less often diagnosed because Negroes did not seek medical aid as often and alternatively, Negroes with MS sought medical aid but there was a hesitancy by physicians to make a diagnosis. Perhaps fewer competent physicians were available to Negroes to make the diagnosis of MS. This might have been

true in 1938. However, after 20 years of illness it is less likely that any MS patient, whether whites or Negroes, would not have consulted a specialist or a competent physician especially under the present U.S. health system.

The influence of medical facilities on the prevalence of MS was studied by Kurtzke<sup>15</sup> who compared the distribution of MS and that of medical facilities in Norway, Sweden, Denmark and Switzerland. He concluded that the two variables were unrelated in the four countries. This suggests that the lower prevalence rate of MS in the Negro is unlikely due to inferior medical facilities.

3. Genetic influences: According to Kurtzke's three frequency band concept of MS distribution in the world<sup>16</sup>, Africa is in the low frequency band. Dean<sup>17</sup> was unable to find a single case of MS among the south African Negro. Cruikshank<sup>18</sup> mentioned the rarity of MS among the Negro in Jamaica. Georgi and Hall<sup>19</sup> reported that MS is rare in Negroes in East Africa. Since American Negroes are descendant from African Negroes, a genetically lower susceptibility has to be considered as a possible explanation. That American Negroes have a higher prevalence of MS than their counterparts in Africa, and the northern American Negroes have a greater risk than the southern Negroes to MS suggests that other factors are more important. It may be possible that the racial mixing of American Negroes would have increased the risk to MS.

The genetic influence on MS was studied by Mackay and Myriantropoulos<sup>20</sup> in their studies of MS in twins and their relatives. They concluded that the concordance rate was slightly but consistently higher among monozygotic than among dizygotic twins. If we calculate Holzinger's index of heritability\*, it was 0.05, suggesting that the contribution of heredity in determining the development of MS in the population was less than 1 per cent. This study also minimizes the genetic role in the development of MS.

4. Environmental factors: In recent years, environmental factors in relationship to the pathogenesis of MS have been emphasized by many and discussed by Kurland et al.,<sup>22</sup> Acheson,<sup>23</sup> and Leibowitz et al.<sup>24</sup> The role of solar radiation, geomagnetic latitude, and geographic latitude in the pathogenesis of MS are far from clear al-

\* Heritability Index (H) =  $\frac{CMZ - CDZ}{100 - CDZ}$   
 CMZ—The percentage of concordant monozygotic twins.  
 CDZ—The percentage of like-sexed dizygotic twins.<sup>21</sup>

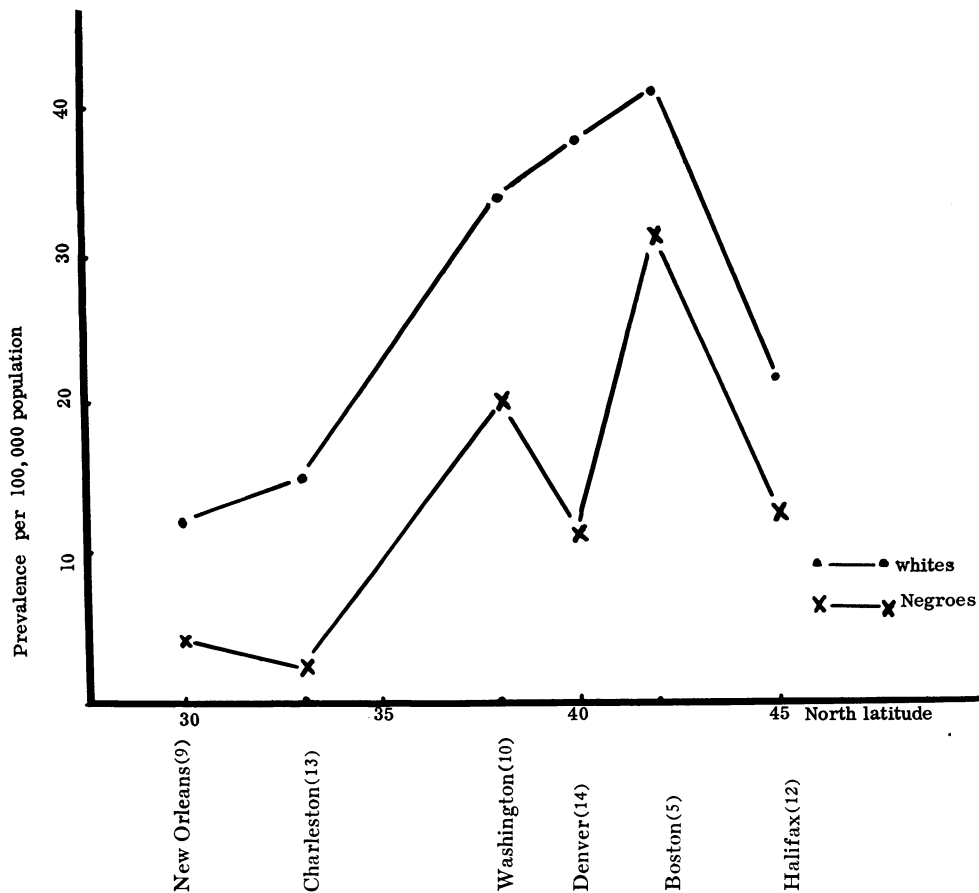


Fig. 1. Prevalence rates of multiple sclerosis in the whites and Negroes in various cities of the United States and Halifax, Canada.

though some of them have high correlation with the prevalence of MS.

Antonovsky and his associates<sup>25</sup> reported a relationship between the risk of MS and "urbanization" and also concluded that an environmental factor correlated with latitude could account for the distribution of MS. Miller and his colleagues<sup>26</sup> found a positive association between the risk of MS and the socio-economic status. Beebe et al.<sup>8</sup> found a preponderance of MS cases in most metro professional groups. They also found a statistically significant difference between MS cases and controls in the urbanization index, socio-economic status, and the geographic location of induction center or place of birth. Leibowitz et al.<sup>24</sup> presented in their recent study of various factors on the distribution of MS that there were 20 factors which were well correlated with the prevalence of MS and many of these factors may be regarded as measures of the state of development.

They concluded that in general, countries with highly developed economies tend to have a higher prevalence of MS than underdeveloped countries.

All these findings suggest that "socio-economic status" or "standard of living" may be somehow intimately involved in the risk of MS. Since it is generally accepted that the socio-economic status or standard of living is lower in the Negro than in the white, the lower prevalence rate of MS in the Negro may be due to this factor.

The necessity of further epidemiological study of MS in the Negro is quite clearly shown by the present review, and such studies may give us more insight into the pathogenesis of MS.

SUMMARY

The problem of MS in the Negro was reviewed. It has been shown that there is a lower prevalence of MS in the Negro than in the white both in the north and in the south. Various explanations

were discussed. Socio-economic status or standard of living is suggested as the factor which accounts for the lower risk of MS in Negroes. The importance of further epidemiological study of MS in the Negro was emphasized.

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