

CONTRASTING SUICIDE RATES IN INDUSTRIAL COMMUNITIES

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DIFFERENCES between the suicide rates in various parts of the same country or in different parts of an urban area have frequently been investigated. Correlations between the incidence of suicides in different districts of large cities and their socio-economic characteristics have been established (Cavan, 1928; Sainsbury, 1955). Suicide rates of contrasting communities, urban and rural, have been compared (Carstairs and Brown, 1958).

Differences in the suicide rates of various cities of the same country have received little attention. It has repeatedly been observed that there is a positive correlation between the size of an urban population and its suicide rate (Durckheim, 1952; Waldstein, 1934; Gruhle, 1940). Exceptions to this rule have sometimes been reported, most recently by Capstick (1960) in a study of suicide in Wales. These exceptions are worthy of study because they are likely to be due to special factors which it may sometimes be possible to isolate.

The suicide rates of some industrial communities in the North of England have been found to show striking differences which are at variance with expectations. Although it is hardly ever possible to study all the numerous factors influencing the suicide rates, an attempt has nevertheless been made to explore these discrepancies.

In the North of England, two urban communities stood out as unusual with regard to their suicide rates. Sheffield, an industrial city of half a million inhabitants, had a surprisingly low suicide rate. Burnley, on the other hand, has had a very high suicide rate, although its population is only about one-sixth of that of Sheffield and would therefore be expected to have a lower suicide rate than Sheffield. The Sheffield rate was below, the Burnley rate far above the national average. Leeds has been included in this study. Its population is of approximately the same size as that of Sheffield, but its suicide rate has not been exceptionally low.

Table I shows the mortality rates from suicide calculated per 100,000 of the estimated populations of Sheffield, Leeds and Burnley for the five years 1952 to 1956. The major part of the data for this investigation was collected during 1957 and 1958. The figures were based on the reports of the Medical Officers of Health.

TABLE I
Suicide Mortality Rates per 100,000 of the Population

	Sheffield	Leeds	Burnley
1952	8·0	11·7	19·1
1953	9·3	11·9	27·6
1954	5·6	13·2	30·1
1955	9·0	12·4	26·5
1956	10·0	11·0	42·5

Enquiries into the suicide rates of other comparable communities in the Midlands and the North of England were made, but they could not be included in this study. The towns were Nottingham, Rotherham, Doncaster and Blackburn. The suicide rates in these communities were higher than in Sheffield and Leeds. In the first three they exceeded the national average, which was to be expected for industrial communities. The Blackburn figures for 1953, 1954 and 1955 were as excessive as those of Burnley. This appears to be in keeping with the fact that Blackburn has more in common with Burnley than with any other of the towns mentioned above. It is only slightly bigger than Burnley and the two towns are known to share many social problems, especially those arising from the decline of the cotton industry.

The reliability of suicide figures has often been questioned. They no doubt have considerable fallacies and are probably underestimates. They do not include suicides masked as accidents and deaths indirectly due to suicidal injury. However, those fallacies are likely to be fairly constant and do not deprive fluctuations in the suicide rates of their significance, especially in large populations. In this country, variations in the practice of individual coroners have sometimes been suspected to be largely responsible for differences in the suicide rates of different communities. However, this source of error can be overestimated. Coroners, like other judiciaries, tend to follow precedent in deciding, in case of doubt, whether death was due to suicide or accident, or whether an open verdict is appropriate. But even if coroners should differ in their practice, it is doubtful whether this would grossly affect the suicide rates, because the latter are based on the figures reported by the Medical Officers of Health. A proportion of cases in which the coroner gave an open verdict are allocated by them to the category of suicide. This discrepancy is not surprising. Judicial verdicts have to be based on criteria different from those of a post-mortem diagnosis. While the coroner must refrain from judgment when the evidence of suicide is not beyond doubt, clinical and pathological diagnosis requires no more than a high degree of probability. The legal implications of a suicide verdict may also contribute to the coroner's reluctance to giving such a verdict. Possibly, open verdicts will be given less frequently now that suicide is no longer a criminal offence.

This study is based largely on evidence collected from various official records, including those of coroners' inquests. We are indebted to the Medical Officers of Health for valuable information concerning the characteristics of the populations under review.

A large number of social factors are known to influence the suicide rates. They are related to social conditions and to the composition of the population by age, sex and social class. The hypothesis to be tested is that Sheffield and Burnley differed, in the period under review, with regard to those factors in such a way that they made for a high suicide rate at Burnley and for a low suicide rate at Sheffield. Leeds could be expected to hold the balance between the two extremes.

THE COMPOSITION OF THE POPULATIONS

Burnley used to be one of the cotton towns. The predominant feature of its industry was that both husband and wife went to work. The cotton industry has during the last three decades gone through a series of crises, the latest one beginning in 1952 and reaching its climax in 1955. As the mills closed, many of the women stayed at home and did not register as unemployed, while many of the men had reached retiring age. Therefore, the number of persons registered as

unemployed, who during the period 1952–56 averaged 609 for both sexes, did not show the true picture of unemployment. During and since the last war, the whole pattern of industry in Burnley has changed. In 1959, weaving constituted only about 12 per cent. of all types of industry. Recently there has been a shift to light industry which, it is hoped, is going to stop the drift of young people from the town.

The population of Burnley has shown a steady decline over the last three decades. In this respect it differed conspicuously from most other industrial communities in the United Kingdom. The process of decline had already started during the decade 1921–1931 when the town's population fell by 5,000. Between 1931–1951 it decreased from 98,258 to 84,950. In recent years the decline has been slowed down and has been in the region of 500 to 600 per year. In a survey of migration of industrial workers in the *Bulletin for Industry* (1959), the textile industry was shown to be responsible for by far the highest proportion of loss of employment and consequent loss of working population in the regions involved. According to the Census 1951, Burnley had shown the highest decrease among county boroughs, except for Salford, Oldham and West Ham, where the decrease was largely due to boundary changes and population movement within the same conurbation.

The Census 1951 shows that the number of persons aged 60 years and over was relatively greater in Burnley than in Leeds and Sheffield (Table II). According to the Medical Officer of Health of Burnley the loss of population has been entirely due to the migration of the young, and the present population has an excessively large proportion of the old age groups.

TABLE II
Percentage of Persons Aged 60 Years and Over
Census 1951

	Persons	Male	Female
Burnley	18·2	21·6	20·0
Leeds	15·6	12·1	13·4
Sheffield	15·2	13·4	16·7

Burnley's high annual death rate, compared with the death rates of Leeds and Sheffield (Table III) also reflects the relatively higher proportion of aged people among its population.

TABLE III
Average Annual Death Rates per Million for Burnley, Leeds and Sheffield for the
Years 1950 to 1953

(Registrar-General's Decennial Report of 1958)

	Male	Female
Burnley	16,405	14,087
Leeds	13,628	11,487
Sheffield	13,312	10,670

Leeds and Sheffield have, in contrast to Burnley, been prosperous during the last two decades. The population of Leeds has grown steadily and was 505,219 in 1951. The fall in the population of Sheffield from 504,464 in 1931 to 489,701 in 1951 is only apparent. It is due to overspill into adjacent areas, where the City has built many housing estates. There was no evidence of massive emigration from either Leeds or Sheffield.

Indices of Social Disorganization. Some of these indices, i.e. the illegitimacy rates and the proportion of widowed and divorced people, could be ascertained for the three cities. They were lowest in Sheffield. In 1957 the illegitimacy rate for Sheffield was 3·8 per cent., compared with 5·8 per cent. for Burnley, 6·4 for Leeds and 8·9 for Greater London.

The percentage of widowed and divorced people together was slightly lower in Sheffield (7·5) than in Leeds (7·9) and considerably lower than in Burnley (9·1). Among the Lancashire boroughs, Burnley had the highest percentage of widowed and divorced persons, apart from Blackpool (10·8) and Southport (10·9) which occupy a special position, being resorts with a large population of retired people.

Social Class is another factor to be considered here. Cavan and Sainsbury, in their surveys of urban populations, found that the incidence of suicide was relatively higher among the upper and middle classes than among the rest. The class composition of the three cities under investigation is shown in Table IV which also lists the relevant figures for Greater London and the country as a

TABLE IV
Social Class Distribution, per 1,000 Males Occupied and Retired Aged 15 and Over, According to Census 1951

	I	II	III	IV	V
Sheffield	25	117	560	132	166
Leeds	27	135	575	128	135
Burnley	19	118	554	153	156
Greater London	47	162	551	107	133
England and Wales	33	150	527	162	128

whole. The upper two classes formed a smaller part of the population in the three Northern communities than in Greater London. The figures for Classes I and II were lower for Burnley and Sheffield than for Leeds. This is in keeping with the fact that the former two cities have a smaller business community than Leeds.

The data listed above showed marked contrasts between Burnley and Sheffield with regard to a variety of factors which are generally assumed to be related to the suicide rate. In the light of these data, the suicide rate would be expected to be high in Burnley and low in Sheffield. On the other hand, the upper two social classes were under-represented in both cities, which would be expected to make for a low suicide rate. The reason why it failed to have this effect in Burnley will have to be discussed.

THE COMPOSITION OF THE SUICIDE SAMPLES BY SEX, AGE AND SOCIAL CLASS

The percentage of females among the total numbers of suicides was higher in Burnley than in the other two cities during the five-year period of 1952 to 1956. In 1956 it was 51·4, thus slightly exceeding the male proportion. The average percentage of female suicides during the above period was 43 for Burnley, 37·1 for Leeds, 36·3 for Sheffield and 37 for England and Wales as a whole.

The Burnley group had a higher proportion of persons aged 65 and over than the Leeds and Sheffield samples. The percentages of persons over 65 who committed suicide were 43·3 for Burnley, 26·5 for Leeds and 34·8 for Sheffield. These figures lent support to the hypothesis that the excessive suicide rates at

Burnley were related to the excessive size of those age groups. However, the age factor alone could not account for the differences in the suicide rates. This was shown by the following calculation.

The incidence of suicide which might have been expected in each sex, in each year from 1952 to 1956, and in the age groups 24-44, 45-64, and 65+ in Burnley, if the same factors had operated as in Leeds, was calculated from the Leeds suicide figures (1952 to 1956) and the population figures in the 1951 Census. The "expected suicide rate" for Burnley in these groups was found to be lower than the real rate. This correction, for comparative purposes, of the age distribution in the two towns, indicates that age differences, though important, do not completely explain the higher suicide rate in Burnley. (It was not possible to carry out a similar comparison with the Sheffield figures, as not all the data necessary for this calculation were available.)

Among factors other than age, those usually regarded as indices of social disintegration, i.e. the proportions of divorced and widowed, and of the illegitimates, are likely to have played a part also. Those indices were higher in Burnley than in the other two cities (p. 1014). At least one of those factors, i.e. the rate of widowed in the population, is related to age.

The role of social class in the incidence of suicide in the three communities is far from clear. The relatively low representation of the upper two classes in Burnley and Sheffield would be expected to make for a low suicide rate in both places. Table V shows the social class distribution among the male suicides in

TABLE V

Social Class Distribution Among the Male Suicides, Occupied and Retired, Aged 15 and Over, in Burnley, Leeds and Sheffield. The Figures are Percentages of the Total Numbers of Male Suicides Belonging to Each Class and Refer to the Years 1952 to 1956

		I	II	III	IV	V
Burnley (69 cases)	..	—	8.8	60.8	13	17.3
Leeds (194 cases)	..	6.6	11.8	55	6.6	19.5
Sheffield (116 cases)	..	3.7	15.2	55.6	13.2	12.2

the three communities investigated. Comparison with Table IV demonstrates that the first two classes were under-represented among the suicides only in Burnley, while they were over-represented in Leeds and Sheffield. However, as the representation of those two classes in the general population was lower than in England and Wales, their contribution to the suicide rates was probably still lower than in the country in general. Strictly comparable figures are not available, but in Sainsbury's series of suicides in London the degree of over-representation of the upper two classes among the suicides was higher than in Leeds and Sheffield. At any rate, the low representation of the upper two classes in the general population as well as among the suicides in Burnley failed to reduce the suicide rate in that city.

Why this should have been so is open to speculation. It has been shown elsewhere that in the old age groups, the suicide rates of the upper and lower classes tend to decline and to approximate those of the other socio-economic classes. The higher average age of the population and of those who committed suicide in Burnley may partly account for the fact that a low representation of Classes I and II in the general population of that city was not correlated with a low suicide rate.

METHODS OF SUICIDE

In a comparative study of the incidence of suicide in different populations, the methods of self-destruction have to be considered. As not all methods are equally dangerous to life, a local preference for certain methods may increase or reduce the incidence of deaths by suicide. The order of frequency of the methods of suicide used in Sheffield, Leeds and Burnley have been compared.

During the 5 years under review, domestic gas headed the list of methods of suicide everywhere in England and Wales. On the average, 42 per cent. of the males and 55 per cent. of the females had killed themselves with coal gas. The corresponding figures for the County of London was 47 per cent. and 49·2 per cent., for Leeds 55·8 per cent. and 59 per cent., and for Sheffield 44·6 per cent. and 63·9 per cent. For Burnley the separate figures for the two sexes were not available. The figures for persons of both sexes together were 49·3 for the County of London, 51·8 for Sheffield, 61·9 for Leeds, and 65 per cent. for Burnley. The latter town, therefore, had the highest percentage of people who killed themselves with domestic gas. The proportion had been highest in 1956, when it reached 88 per cent. In 1957 it was 87 per cent. and in 1958 it reached 100 per cent., i.e. all people who killed themselves in Burnley during that year had gassed themselves. The actual number of suicides was 26. No general conclusions can be drawn from these small figures but it is noteworthy that the higher the suicide rate was, the greater was the proportion of suicides with coal gas. In all communities investigated here narcotics were second on the list of fatal methods. The proportion of suicide by narcotics ranged from 8·9 to 15·1 in Leeds during 1952–1956, and in Sheffield from 14·3 to 28·9. There was, therefore, in this sample, an inverse relationship between the use of gas and narcotics.

THE ROLE OF PHYSICAL ILLNESS

It was possible to study the records of the Leeds and Sheffield groups of suicides for the prevalence of physical illness and its role as a motive for suicide. Information was obtained from the post-mortem reports, and also from the depositions of witnesses and from suicide notes. Table VI shows the average percentage of the physically ill among the suicides in Sheffield and Leeds during

TABLE VI
Percentage of Suicides in Leeds and Sheffield Who Were Physically Ill

		1952–1956	
		Male	Female
Leeds	64·9	73·3
Sheffield	60·9	60·9

the five-year period, and those in whom physical illness appeared to have been the main motive for suicide. It was not possible to state that it had been the only motive, because almost invariably other factors which may have played an important part in the causation of the suicide, such as social isolation and depression, were also present. The proportion of people aged 60 and over was higher among those suffering from physical illness than among the whole suicide groups. This is shown on Table VII which also demonstrated certain data concerning the groups of suicides in whom physical illness was established post mortem. The illness was regarded as serious if it was incapacitating. From the information available it was possible to distinguish between those cases in

which physical illness had been the main motive for the suicide, and those in which it appeared to have acted only as a precipitating factor.

It is not proposed to present an analysis of the type of physical illnesses found in this case material. The data obtained will be used in a special investigation of this problem.

TABLE VII

Physical Illness Groups. The Figures are Percentages of the Total Numbers of Suicides Who Were Physically Ill

	60 Years +		Physical Illness Serious		Physical Illness Main Motive		Physical Illness Precipitated Suicide		Depressed for at Least 2 Months	
	M	F	M	F	M	F	M	F	M	F
Leeds ..	51.6	56.0	58.7	47.0	20.7	29.6	50.0	40.9	83.4	90.3
Sheffield ..	61.2	51.5	75.7	49.8	34.2	33.9	56.1	49.9	77.9	88.3

The role of mental illness could not be retrospectively assessed in any detail. However, 80 to 90 per cent. of those suffering from physical illness had been depressed for at least two months preceding the suicide. It was not possible to say whether in all those cases the depression had been a reaction to the physical illness. No attempt has been made to diagnose and classify the suicides according to psychiatric categories, as has been frequently done by other authors, sometimes on inadequate information.

DISCUSSION

The striking discrepancy between the suicide rates of the three industrial communities has been found to be related to differences in the age composition of the population and in other factors relevant to the incidence of suicide, especially social disorganization and social mobility. The higher suicide rate in the smallest of the three communities was correlated with a higher proportion of women among the suicides and with a more frequent use of poisoning with domestic gas as a method of suicide. The relative increase of suicide among females has been observed by several workers during the last three decades. Hartelius, studying suicide in Sweden, attributed this trend to "emancipation, secularization and urbanization", which have greatly changed the way of life of the female part of the population. It is no doubt also related to the greater longevity of women, which causes a higher proportion of females than of males to live in social isolation and to be exposed to physical illness.

The excessive representation of old people in the population of Burnley was caused by changes in industry which led to emigration of many members of the younger age groups. Thus, social mobility was higher in Burnley than in Leeds and in Sheffield. However, the degree of the discrepancies between the suicide rates of the three cities appears even higher than could be expected from the quantitative differences between the factors relevant to the incidence of suicide. Psychological factors, which cannot be measured, may have played a part. The effect of social conditions making for a higher suicide rate may be potentiated by superimposed psychological stress. Social changes such as those associated with industrial decline and consequent selective emigration, may enhance suicide proneness, especially among the older age groups. Some such psychological factors may have been responsible for the excessive use of one of the most deadly methods of suicide, i.e. poisoning with domestic gas. There

is no reason for assuming that this gas was more readily available in Burnley than in Leeds or Sheffield. In each of these cities it is available in almost every household. It must be assumed that the urge to die was more intensive in Burnley than in the other two communities, where domestic gas was used as a method of suicide only slightly more frequently than in the rest of the country.

It is often thought that detoxication of domestic gas, or its replacement by natural (methane) gas would result in a drastic reduction of the suicide rate. It is doubtful whether this would actually happen. At Basle, Switzerland, the detoxication of coal gas in 1958 was followed by only a brief decline of the suicide rate which within a year returned to its previous level, hanging and drowning having taken the place of gassing.*

The role of physical illness in the causation of suicide has often been commented on. There is reason to believe that it has been under-estimated in the past. Stewart (1960) reported on post-mortem findings in 122 cases of suicide in an industrial town in the North of England. Only 33 per cent. were free from organic disease. Twenty-seven per cent. had severe hypertension and the rest had "a wide variety of painful, disabling and fear-engendering diseases". Stewart found it impossible to assess how far those diseases had contributed to the suicides, but he concluded that those people had been a group of unfit or seriously ill individuals. As was to be expected in the two samples presented above, the average age of those physically ill was higher than among the whole groups of suicides to which they belonged.

The role of physical illness in the causation of suicide is difficult to assess. Control groups are not available. Routine post-mortem records of suicides are not always as informative concerning the presence of physical illness as those of hospital patients. Relevant figures in the literature vary considerably. Sainsbury found that in a London sample of 309 suicides committed in 1936-1938 physical illness had contributed to the suicide in 36.2 per cent. This is a considerably lower percentage than was found in 1952-1956 in Sheffield and Leeds. It would be rash, however, to conclude that the physical health of people committing suicide in London is better than that of a comparable group in the industrial North. Stengel and Cook (1958) found that in a group of 117 suicides committed in London in 1953, in 63.4 per cent. physical illness may have played a part in the causation of the suicides. The only conclusion which can be drawn from those data is that physical illness with or without manifest symptoms appears to be an important factor in suicides, and that improvement in the physical health of a population is likely to contribute to the reduction of the suicide rate. The difficulty of obtaining control groups for the study of this problem may not be unsurmountable.

SUMMARY

Differences between the suicide rates of industrial communities have been investigated. Contrary to expectation the smallest of three populations investigated had the highest suicide rate while the incidence of suicide in one of the two larger cities was exceptionally small.

Both anomalies could be explained by differences in the composition of the populations and their social mobility.

The excessive suicide rate in the smaller community was associated with an increase of suicides among females and of poisoning with domestic gas. The possible causes of these peculiarities have been discussed.

* I am indebted for this information to Professor Im Obersteg of the Institute of Forensic Medicine in the University of Basle.

Two of the three samples of suicide were investigated for the incidence of physical illness which was found to have been present in about two-thirds of the members of the two groups.

ACKNOWLEDGMENTS

This investigation was possible through a grant from the Mental Health Research Fund to which we express our thanks.

We are greatly indebted to the Coroners and the Medical Officers of Health of Leeds, Sheffield, and Burnley, for their invaluable help in this investigation and to Dr. F. A. Jenner for his assistance with the analysis of the data.

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