

Journal of Community Medicine



Scientific Journal Published Twice a Year by The Iraqi Community Medicine Society

Part one: Scientific Research

CONTENTS

- Lead Absorption Among Elementary School Children in Baghdad City, M. Jamil, D. A-Timimi and A. Abu-Timman 1
- 1- The Effect of Inhaled Flux-Coriated Electrode Welding Fumes on Lung Volumes, K. Al-Shammari, K. Karim and G. Al-Sayid 11
- 2- Household Products and Poisoning, G. Murtala and L. Seif 14
- 3- A Study of Sickness Absence Statistics in A Hospital, Author: Y. S. Al-Jarrah, G. J. Whitaker and W. F. Lee 16
- 4- Incidence of Rotavirus Gastroenteritis Among House and School Children in Baghdad, N. Abbas, T. Al-Haghi, A. A. Al-Jarrah, A. Chetani and S. A. Al-Jarrah 20
- 5- Epidemiological Attributes of Cases Admitted to Fever Hospital, From October 1970-1975, M. Mohammed, H. Saad, F. Husein, and M. Chetani 22
- 6- Urinary Tract Infection During Pregnancy, S. Al-Jarrah, W. J. Al-Jarrah, A. Al-Jarrah and M. Al-Jarrah 24
- 7- The Development of an Autocorrelation Function for the Prediction of the Blindness Curve, D. El-Jesshi, D. El-Jarrah, and S. Al-Jarrah 26

J. Comm. Med. 1988, Vol. 1, No. (1)

A STUDY OF SICKNESS ABSENCE STATISTICS IN A HEALTH AUTHORITY

Hikmet Jamil¹ MB ChB DVD DPH MSc PhD FFOM (I).

V.F. Hillier² BSc PhD; C.J. Whitaker³ BSc MSc and W.R. Lee⁴ MD MSc FRCP FFOM

(1) Dept. of Community Med., Coll. of Med. Uni. of Baghdad, Iraq.

(2) Computational Methods, Med School, Uni of Manchester.

(3) Statistics Advisory Uni Coll of North Wales, Bangor, Gwynedd, LL57 2UW.

(4) Dept. of Occupational Health, Med. School, Uni. of Manchester.

Key Words: Sickness Absence, Hospital Nursing

دراسة الاجازات المرضية لمنتسبي الصحة / سلفرد - انكلترا

الخلاصة:

تم دراسة اصابير ٧٥٧٢ منتسب يعمل في مؤسسات الصحة لمدينة سلفرد لعامين (٧٤-١٩٧٦) وبين ان اثنين من كل ثلاثة اجازات مرضية كانت من النوع اتي يمنحها الفرد لنفسه، علما ان مجموع الايام المفقودة للاجازات التي يمنحها الفرد لنفسه تشكل فقط واحد الى ستة يوم من الاجازات التي يمنحها الطبيب للفرد. لقد بينت الدراسة ان الشباب اكثر ميلا لاخذ الاجازة المرضية مقارنة بالكبار الا ان عدد اجازاتهم قصير، اما بالنسبة للاجازات كعدد وكايام فقد كانت اجازات الرجال اقل من اجازات النساء وان النساء اللواتي يعملن بدوام جزئي اكثر من اللواتي يعملن بدوام كامل. ان اعلى نسبة من الايام المفقودة بسبب الاجازة المرضية كانت عند الممرضات اللواتي يعملن في ردهات المسنين واقل نسبة عند الممرضات اللواتي يعملن في ردهات الولادة، في حين ان نسبة اجازات الممرضات اللواتي يعملن في ردهات الجراحة والباطنية كانت وسطا بين المجموعتين.

SUMMARY:

The sickness absences of 7572 employees (Administrative, Ancillary and Nursing) employed by a Health Authority, was studied over 1974-5 and 1975-6. About 2 out of every 3 spells of absence were 'uncertified' although these only accounted for about 1 in 6 of all days of sickness absence. Younger employees had a higher inception rate (spells), 3.8, than older employees but their average length of spell, 4.1 days, was

shorter.

Male employees had a lower inception rate (spells), 2.3, and a lower average number of days lost per person, 14.5, than females. Among the latter, part-time females had both a higher inception rate and average days lost per person than full-time females.

Nurses on the geriatric ward showed the highest number of days lost per person, 27.3, and those on the obstetric ward the lowest, 15.7. Surgical

and medical ward nurses were intermediate at 21.2 respectively.

INTRODUCTION:

The study of sickness absence may serve a number of uses. It can be a tool for monitoring people's health, an aid to preventive medicine¹ or used to control sickness absence².

Several factors affect sickness absence, not all of which may be directly related to illness³.

Before the 1816 report of the Select Committee on working conditions of children in mills, very little systematic recording of sickness absence had been made. The first genuine scientific approach to sickness absence was by Mather⁴, in Manchester, and included a study of the effect of hours of work on productivity. This showed that a reduction in hours of work from 54 to 48 hours per week caused an increase in production and a decrease in lost time. Similar findings^{5,6}, persuaded the government to reduce the weekly hours in arsenals to 48 hours, although industry as a whole did not follow suit.

Most studies of sickness absence have been concerned with various industrial populations and have examined the effects of a number of factors on sickness absence. These include:

- a) Personal factors:- sex⁷, family responsibility⁸ age⁹, length of service^{10,11}, distance from work¹², overtime^{8,13} and psychological factors^{10,14}.
- b) General factors: occupation¹⁵, wage rates¹⁶, local level of employment¹⁷, days of the week^{17,18} and season⁹.

Although the National Health Service (N.H.S.) is one of the largest employers in the United

Kingdom (employing approximately one person in every hundred of the population), relatively few studies have been made of sickness absence among its employees¹⁹⁻²¹. The Tunbridge Report²² indicated the need to increase both the scope and intensity of research into the causes of sickness absence in the N.H.S.

For the present study to be truly representative, it would have been preferable to study a random sample of all employees in the N.H.S. However, the difficulties of data collection limited the study to one Health Authority and to the time period 1974-1976. It was not possible to find an industrial population identical to the one under study for comparison or to compare the study population with the working population of the UK as a whole. However, the results have been compared with those of two large organisations (London Transport and the Post Office).

This paper examines:-

1. The sickness absence rates for all persons employed at any time in the two year period (1974-76) by age group, sex, marital status and type of job (i.e. full-time or part-time).
2. The sickness absence rates among the following types of employees after taking into account the effects of age group, sex, marital status and type of job by applying the indirect method of standardisation.
 - a- Stable employees, joiners, leavers and joiners/leavers.
 - b- Those working in different types of hospitals (psychiatric, children's and general).
 - c- Those working in different types of wards

(medical, surgical, geriatric and obstetric) irrespective of hospital.

d- Day workers compared with night workers.

e- Weekly paid employees compared with those paid monthly.

3. Comparisons are made with the statistics for the Post Office (1974-75 and 1975-76) and for London Transport (1971-75).

Definitions of terms are given in the Appendix.

MATERIALS AND METHODS:

The study population comprised all employees (7,995) who worked for the whole or part of the period 1.4.74 to 31.3.76 for the Area Health Authority (AHA). The employees worked in nine different hospitals of different sizes and speciality, several different clinics, a school of nursing and the area administration, providing medical services for 270,000 individuals living in an area of 24,000 acres.

Data on sickness absence was available on the personnel cards kept at the hospital department for only 4,700 of the 7,995 employees. Data for those employees who had no records held at hospital departments were obtained from records held at the area wages department. For some employees data was available from both sources. These were compared and where discrepancies were found the data used was that of the area wages department as it was expected that they would be more reliable²³.

The study population was classified by occupation into three main groups which were subdivided into nine categories of work, each of which was further subdivided into several grades (Fig. 1)

giving a total of 24 grades. Because it was not possible to fit 393 employees into one of the 24 grades, they were excluded and a further 30 employees were omitted because of incomplete data, leaving a total of 7,572 employees of whom 6,481 were employed in 1974-75 and 6,388 in 1975-76.

Each grade was further divided into five age groups and each age group divided into male and female. The female employees were further divided into Female Married Full-time, Female Single Full-time, Female Married Part-time, Female Single Part-time and Female Unknown. The male employees were all full-time and were not classified by marital status because the status of 568 (46.8%) of them was unknown.

In order to compare one grade with another, it was necessary to remove the effect of age (A), sex (S), marital status (M) and types of job (T). This was done by applying the indirect method of standardisation in which the combined total of 24 grades was considered as the standard population.

RESULTS:

In 1974-75 the three groups of 6,481 employees (Administrative and Clerical, Ancillary and Nursing) comprised 4,748 person years (see Table 1). They had 12,910 spells of absence (67.5% uncertified spells and 32.5% certified spells), which accounted for 78,861 calendar days lost (16.1% lost through uncertified spells, 83.9% lost through certified spells). These spells were taken by 75% of the total population (inception rate persons).

Fig (1) Distribution of study population into groups, categories and grades as follows.

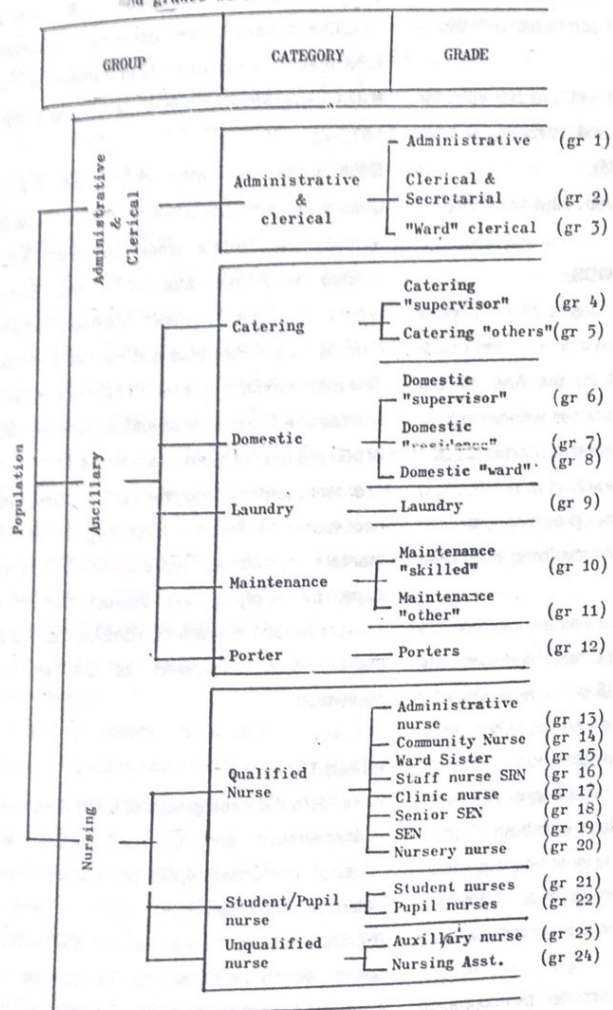


Table 1. Sickness absence statistics for the two years of the study 1974-75 and 1975-76.

	1974-75	1975-76
No. of employees	6,481	6,388
person years	4,748	5,341
No. of uncertified spells	8,710	9,394
No. of certified spells	4,200	4,821
Total no. of spells	12,910	14,215
Days lost from uncertified spells	12,717	13,845
Days lost from certified spells	66,144	71,694
Total days lost	78,861	85,539
Inception rate (persons)	75%	77%
Inception rate (spells)	2.7	2.7
Average days lost per spell	6.1	6.0
Average days lost per person	16.6	16.0
proportion of time lost	4.6	4.4
percentage of uncertified spells	67.5%	66.1%
percentage of certified spells	32.5%	33.9%

In 1975-76 the same three groups of 6,388 employees comprised 5,341 person years. They took 14,215 spells of absence (66.1% uncertified spells and 33.9% certified spells) which accounted for 85,539 calendar days lost (16.2% days lost through uncertified spells, 83.8% days lost through certified spells). These spells were taken by 77% of the total population (inception rate persons).

Table 2 shows the figures for the Post Office and London Transport for the purpose of comparison. The absence rates (inception rate - spells) and average days lost per person were standardised to remove the effect of all factors other than the one needed for a specific comparison; the factors being age, sex, marital status and type of job. As there was little difference between the actual rates and the standardised rates the following

tables show only the standardised rates.

From Table 3 it can be seen that the younger employees had a higher inception rate of spells of absence but a lower average number of days lost and average length of absence.

Table 4 shows that males had a lower inception rate (spells) and average days lost per person than females. Married had a similar inception rate to single females but had higher average days lost per person and average length of spell. The part-time females had a higher inception rate and average days lost per person than full-time females.

Further sickness absence rates are only presented for certain individual grades and for certain combinations of grades containing a large number of employees. They are all nurses. Stable employees had a lower inception rate (spells) and

Table 2. Sickness absence statistics for the Post Office employees (1974-75 & 1975-76⁽¹⁾) and the London Transport Executive employees (average 1971-75⁽²⁾) derived from their reports.

Sickness Absence Statistics	Post Office Employees						London Transport Executive
	1974 - 75			1975 - 76			1971-1975
	Male	Female	Total	Male	Female	Total	All Males
Total No. of Employees	326315	105218	431533	331656	104863	436519	80051
Total No. of Spells	723572	320509	1044081	731932	309138	1041070	141141
Total no. of days lost	4199687	1861279	6060966	4319789	1782106	6101893	1399442
Percentage of Uncertified Spells	-	-	61.0	-	-	62.4	61.6
Inception Rate (spells)	2.2	3.0	2.4	2.2	2.9	2.4	1.8
Average length of spell (days)	5.8	5.8	5.8	5.9	5.8	5.8	9.9
Average days lost per person	12.9	17.7	14.1	13.0	17.0	14.0	17.5
Proportion of time lost percent ⁽³⁾	3.5	4.8	3.8	3.6	4.7	3.8	4.8

(1) Post Office - Annual report on sickness absence and medical wastage 1974-75 and 1975-76.

(2) London Transport Executive reference 916/A700, 17th February, 1977.

(3) These figures were calculated using calendar days - 365 days per year.

Table 3. The sickness absence rates by age group for all employees (7,572) employed for part or all of the two years 1974-76. Standardised for sex, marital status and type of job.

Sickness Absence Rate	Age Group				
	16-24	25-34	35-44	45-54	55+
Inception rate (spells)	3.8	3.1	2.6	2.4	1.8
Average days lost per person	16.5	15.9	17.3	17.0	17.8
Average length of spell (days)	4.1	5.2	6.9	8.0	10.0

Table 4. The sickness absence rates by Sex, Marital Status and Type of Job for all employees (7,572) employed for part or all of the two years 1974-76 standardised for age.

Sickness Absence Rate	Male	Female	Female	Female	Female	Female
		Married	Single	Married	Single	Unknown
		Full-time	Full-time	Part-time	Part-time	
Inception rate (spells)	2.3	2.7	2.6	3.0	3.1	2.5
Average days lost per person	14.5	16.5	14.8	18.3	16.6	16.2
Average length of spell	6.3	7.1	4.4	6.4	5.2	6.4

average days lost per person than those classified as joiners, leavers or joiners/leavers with the highest rates among the joiners/leavers (Table 5). Nurses working in different hospitals or different wards (Table 6 & 7) had different absence rates. In the main, the more senior the grade of nurse the lower the inception rate for spells and average days lost per person. The geriatric ward showed the highest number of days lost per person and the obstetric ward the lowest. Night nurses showed lower absence rates than day nurses (Table 8) but a longer average length of spell for both SRN and SEN nurses.

Employees paid weekly had lower absence rates than those paid monthly but again a longer average length of spell for both SRN and SEN (Table 9).

DISCUSSION:

The unstandardised absence rates remained constant over the two years (Table 1), falling between the values for the Post Office and those for London Transport. There was a 2% increase in the inception rate (persons) from 1974-75 to 1975-76 which might be explained by the epidemic of influenza which came early in 1976²⁴

Table 5. Annual sickness absence rates for selected grades by other variables for employees (person years) employed for part or all of the two years April 1974-76.

		Grade	Stable employees	Joiners	Leavers	Joiners/Leavers
Person Years	Ward Sister		574.8	119.7	90.2	10.5
	SRN		240.3	146.7	73.1	41.7
	SEN		520.7	137.3	70.7	63.6
Inception rate (spells)	Ward Sister		2.0	2.4	2.5	3.8
	SRN		2.2	2.5	2.8	3.6
	SEN		2.5	2.9	3.4	3.5
Standardised for ASMT*	Ward Sister		15.0	15.4	19.0	28.9
	SRN		15.5	16.5	15.8	18.7
	SEN		19.8	21.6	42.4	30.3
Average days lost per person	Ward Sister		7.8	5.3	6.9	6.3
	SRN		6.8	5.2	4.7	4.1
	SEN		8.7	6.5	11.6	6.8

*ASMT = Age, Sex, Marital Status, Type of Job.

Table 6. Annual sickness absence rates for selected grades by type of hospital for part or all of the two years 1974-76.

Grade	Psychiatric Hospital	General Hospital	Children's Hospital
Person years	230.5	262.6	84.5
Ward Sister	139.0	200.1	66.8
S.R.N.	343.1	103.5	23.5
S.E.N.			
Inception Rate (Spells)			
Standardised for ASMT*			
Ward Sister	1.9	2.3	2.0
S.R.N.	2.4	2.8	2.1
S.E.N.	2.4	3.2	2.5
Average days lost per person standardised for ASMT*			
Ward Sister	13.4	16.5	14.7
S.R.N.	15.9	14.7	12.5
S.E.N.	13.6	27.3	20.3
Average length of spell			
Ward Sister	7.9	6.7	6.2
S.R.N.	5.9	4.6	5.4
S.E.N.	8.6	8.2	6.4

* ASMT = Age, Sex, Marital Status, Type of Job.

Table 7. Annual sickness absence rates for nurses in different types of ward (person years) employed for part or all of the two years April 1974-76.

Ward	Person Years	Standardised rate for ASMT* Rate (spells)	lost per person	Average length of spell
Medical	172.0	2.4	21.2	8.2
Geriatric	165.4	3.3	27.3	8.0
Surgical	132.8	2.8	22.4	7.0
Gynaecological	287.5	2.5	15.7	6.1

* ASMT = Age, Sex, Marital, type of job.

Table 8. Annual sickness absence rates for selected grades by day/night work for nurses employed for part or all of the two years 1974-76.

Grade	Person years	Standardised rates for ASMT* Inception Rate (Spells)	Average days lost per person	Average length of Spell
Ward Sister				
Day Shift	450.2	2.4	17.7	6.9
Night Shift	165.6	1.9	14.1	6.9
S.R.N.				
Day Shift	262.6	2.7	17.6	5.7
Night Shift	158.1	2.3	15.2	6.0
S.E.N.				
Day Shift	321.1	3.1	25.1	7.7
Night Shift	239.3	2.6	23.2	9.6

*ASMT = Age, Sex, Marital Status, Type of Job.

Table 9. Annual sickness absence rates for selected grades by method of payment for nurses employed for part or all of the two years 1974-76.

Grade	Person Years	Standardised rates for ASMT* Inception Rate (Spells)	Average days lost per person	Average Length of Spells
Ward Sister				
Weekly Paid	339.3	2.1	13.5	6.8
Monthly Paid	396.9	2.3	18.6	7.4
S.R.N.				
Weekly Paid	335.6	2.4	16.0	6.2
Monthly Paid	169.6	2.8	16.3	4.4
S.E.N.				
Weekly Paid	539.8	2.6	20.8	8.7
Monthly Paid	183.0	3.5	28.4	7.6

*ASMT = Age, Sex Marital Status, Type of Job.

Fig (1) Distribution of study population into groups, categories and grades as follows.

In this study there were differences in the absence rates between the three groups, with a tendency for the administrative and clerical groups to show the lowest rates and the ancillary group the highest, while the nursing group fell between the two. This suggests that the type of occupation is an important factor in sickness absence rates, a finding which follows previous studies both in industrial populations¹⁷ and in hospital staff²⁵.

In general, the absence rates for each group showed that the younger employees had a higher inception rate and a lower average days absent per person than older employees and that the average days per spell increased as age advanced. These patterns were similar to those found in other studies^{26,27}. When absence rates between the sexes were compared, these were found to be generally higher among female employees. This parallels the finding in most other studies^{13,28}.

The lower inception rate and average days lost per person for female full-time employees compared with other female employees agrees with other studies on nursing groups which showed the persistence of a lower absence rate among full-time compared with part-time employees when the population is subdivided into Ward Sister, SRN and SEN.

The inception rate (spells) and average days lost per person vary inversely with the responsibility of the employees while the average days lost per spell varied directly^{19,29}.

There were differences in all three of the absence rates among employees when they were grouped by stability of employment, in that stable employees showed a lower absence rate than other groups. This may reflect a degree of job satisfaction among stable employees, whereas the higher absence rates among leavers and joiners/leavers may reflect job dissatisfaction or a desire to use up all their sickness entitlement. This is similar to the findings of Carter³⁰ on merchant seamen that leavers have a higher inception rate (spells) than stable employees, but dissimilar to Lokander's study¹³ on an industrial population which found that joiners/leavers had a lower inception rate (spells) than stable employees.

Differences in the three absence rates exist for the grades of Ward Sister, SRN and SEN within each grade working in different hospitals. These findings are supported by other studies among hospital employees^{19,21,29}. Qualified nurses in the geriatric ward have more spells of absence and more days absent per person than their colleagues in other wards (Medical, Surgical and Obstetric). The existence of a difference in sickness absence rate among qualified nurses working in different wards is supported by other studies among nursing groups²⁶. The lower rates among night workers may be explained by the fact that these employees choose their job, and that they may be able to arrange their social life and deal with problems during the day when they are at home. This finding is similar to that of Brook's study²⁹.

NOTE:

This paper is based on a thesis submitted by one of us (H.J.) for the degree of Ph.D. of the University of Manchester.

APPENDIX**Definitions**

1. **Spell:** a spell of sickness is a period of absence attributed to illness of one complete day or a series of consecutive calendar days from the initial day (the first full day a person is away from work) to the final day which may be (a) the day preceding the day on which the person resumed work, (b) the day preceding the day of dismissal, (c) the day before taking a pension, (d) the day on which the person who is absent died, or (e) the 182nd day of a spell.
2. **Person years:** the total number of calendar days on which an employee was employed during the period of the study divided by 365.
3. **Inception rate persons:** the total number of employees (expressed as person years) who start at least one spell of sickness during a defined period divided by the total number of employees (expressed as person years) at work during that period.
4. **Inception rate spells:** the total number of spells of sickness absence which start during a defined period divided by the total number of employees (expressed as person years) at work during that period.
5. **Average days lost per person:** within a defined period the total number of calendar days lost from all spells of sickness absence that occurred wholly or partly within that period divided by the total number of employees (expressed as person years) at work during that period.
6. **Average length of spell:** the total number of calendar days lost from all spells of sickness ending in a defined period divided by the total number of spells ending during that period.
7. **Proportion of time lost:** within a defined period the total number of calendar days lost from all spells of sickness that occurred wholly or partly within that period divided by the total number of days (in calendar days) in that period.
8. **Stable employees:** employees in continuous employment for the whole of the two years 1974-76.
9. **Leavers:** employees leaving the Area Health Authority (AHA) employment at any time during the two years April 1974 to March 1976, and not joining within that period.
10. **Joiners:** employees joining the AHA's employment at any time during the two years 1974-76 and not leaving within that period.
11. **Joiners/Leavers:** employees joining the AHA's employment at any time during the two years 1974-76 and leaving within the same period.
12. **Ward:** for some qualified nurses it was possible to copy information on place of work (ward) from the personnel card. This was understood to be the permanent place of work for the period of the study.
13. **Day nurses:** these were qualified nurses working between 6.00 am and 6.00 pm irrespective of hospital or wards as recorded on

their personnel cards.

14. **Night nurses:** as day nurses but working between 6.00 pm and 6.00 am.

15. **Weekly employed employees:** this included all employees who were paid each week on the basis of the number of hours worked.

16. **Monthly paid employees:** this included all employees who received their salary every month irrespective of whether they worked full or part-time.

17. **S.R.N.:** State Registered Nurse - nurse who has passed three years general training.

18. **S.E.N.:** State Enrolled Nurse - nurse who has passed two years general training.

19. **Ward Sister** - senior S.R.N. in charge of a ward.

ACKNOWLEDGEMENT:

We should like to thank Mr. Roberts, the Chairman of SAHA (Teaching), for his permission to undertake the study and Mr. Ward, the Area Personnel Officer, together with the occupational physicians, Drs Anne Wright, Gately and Scholsberg, for the provision of facilities and for their support. We should like to thank all those in the SAHA (Teaching) and those in the Department of Occupational Health in Manchester University who kindly gave their time and help during the period of this study. We would also like to thank Dr. P.J. Taylor, lately of the Post Office and Dr. P.A.B. Raffle, lately of London Transport, for making available the data for Figure 2.

REFERENCES:

1. Guilliani, K.K., et al. An epidemiological study

into sickness absence in a textile mill in Delhi.

Indian J. Med. Res. 1970, 58, (6), 758-771.

2- McMaster, I.H. Controlling absenteeism. supervision 1973, 35 (2) 30-32.

3- Chiesman, W.E., Absenteeism in Industry (c) Clinical aspect of absenteeism. Roy. Soc. Hlth. J. 1957 77, 681-689.

4- Mather, W. The forty hour week. A year's experiment and its results at the Salford Iron Works, Manchester. The 'Guardian' Printing Works. 1894.

5- Campbell, J.M., An enquiry into the health of women munition workers. Appendix to interim Report of the Health of Munition Workers Committee. 1917. London.

6- Campbell, J.M. A future enquiry into the health of women munition workers. Appendix into Final Report of the health of munition workers committee. 1918. London.

7- Wyatt, S. Study of absence from work among women in a war factory. Brit. J. Industr. Med. 1954, 2, 86-91.

8- Shepherd, R.D. et al. Absence from work in relation to age level and family responsibility. Brit. J. Industr. Med. 1958, 15, 52-61.

9- Gordon C, et al. Patterns of sickness absence: A railway population. Brit. J. Industr. Med. 1959, 16, 230-243.

10- Behrend, H. Voluntary absence from work. Intern. Lab. Rev., 1959, 79, 109-140.

11- British Institute of Management. Absence from work. Brit. Inst. of Management. England 1961.

12. Taylor, P.J. and Pocock, S.J., Commuter travel sickness absence of London University

- workers, *Brit. J. prev. Soc. Med.* 1972, 26, (3), 165-172.
- 13- Lokander, S. Sick absence in Swedish Company: A socio-medical study. *Acta. Med. Scand.*, 1962, 171, Suppl. 337, 1-172.
- 14- Taylor, P.J., Personal factors associated with sickness absence, *Brit. J. Industr. Med.* 1968, 25, 106-118.
- 15- Raffle, P.A.B., Stress as factor in disease. *Lancet*, 1959, ii, 839-843.
- 16- Liddell, F.D.K., Coal miners morbidity. *J.I. R. Statist. Soc. A.*, 1962, 125, 4-29.
- 17- Behrend, H., Absence under full employment. University of Birmingham. Studies in economics and society. 1951, Monograph. A 3.
- 18- Liddell, P.D.K., The measurement of daily variation in absence. *Appl. Statist.*, 1954 a, 2, 104-111.
- 19- Barr, A., Absenteeism among hospital nursing staff, *The Hospital* 1967, 63, (1), 9-12.
- 20- Brown, I.M., Hospital staff sickness absence. *The Hospital*, 1968, 64, (3), 94-97.
- 21- Clark, J., Time out? A study of absenteeism among nurses. Royal College of nursing of the United Kingdom, 1975, Published by the Royal College of Nursing and National Council of Nurses of the United Kingdom.
- 22- Tunbridge, R., Ministry of Health, Central Health Services Council and Scottish Home and Health department. The case of the health of hospital staff. Report of the joint committee. 1968, chairman, Professor Sir Ronald Tunbridge. H.M.S.O. London.
- 23- Jamil H. Sickness absence among employees of an area health authority. PhD thesis, 1978, University of Manchester, England.
- 24- Post Office - Annual Report on sickness absence and medical wastage 1974-75 and 1975-76.
- 25- Meats, D., Nursing staff sickness and absenteeism in the medical paediatrics unit, *Nursing Times*, 1971, 67, (50), 197-200.
- 26- Nart, J.Y., An investigation of sickness absence data of public elementary school teachers in London, 1904-1919, *J.I. R. Statist. Soc.*, 1922, 85, 349-411.
- 27- Tunbridge, R.D. and Shaw, W.J., An analysis of absence under a scheme of paid sick leave. *Brit. J. Industr. Med.* 1950, 9, 282-295.
- 28- Smith, M. and Leiper, M.A., Sickness absence and labour wastage: Med. Res. Coun. Industr. Hlth. Board., 1936, Report No 75, London, H.M.S.O.
- 29- Brookes, R.G. and Gardiner, J.C., Sickness absence levels of nursing. *Nursing Times* 1972, 68, (3), 9-12.
- 30- Carter, J.T., Absence attributed to sickness in oil tanker crews. *Brit. J. Industr. Med.*, 1976, 33, 9-12.