# STUDY OF RELAPSES IN SCHIZOPHRENIA USING THE LIFE TABLE METHOD

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## SUMMARY

The life table has been used to study mortality and survival in a population and also the pattern of course of various chronic medical illnesses. In this study, the life table has been applied to a cohort of well defined Schizophrenic patients undergoing a long term followup. The probability of occurence of relapses, time of maximum risk for occurence of relapses, are estimated using the life table technique. The life table shows a steep fall in the percentage of Non-relapsers from 85% at the end of first year to 35% at the end of the third year. Projected survival rate at the end of 5 years, using the second degree parabola curve, is only 2% which needs to be tested by further followup.

## Introduction

The course of Schizophrenia has been well studied and it has emerged that remissions and relapses punctuate the course of illness of a majority of Schizophrenic patients. Long term followup studies of patients in Europe have highlighted a change in the nature of Schizophrenia from chronicity to an episodic course with a favourable outcome (Zubin et al 1983). This fact has been established trans-culturally also in the IPSS study (WHO 1975). In 70-80% of the cases the course of the illness is characterised by remissions and relapses (Ciompi 1980). Bleuler (1968) has shown that 1/3rd of his patients have such relapsing courses. The occurence of relapse has been shown to be related to lack of maintenance medication (Lehmann et al 1983) and to high expressed emotions in the family (Vaughn and Leff 1976).

In the past 2 decades relapse in the course of Schizophrenia has become the pre-eminant measure of the success of community treatment programmes of Schizophrenia (Falloon et al 1983). But the definition of relapse has varied among different researchers (Falloon et al 1983) that lead to a difference in understanding the factors leading to occurence and prevention of relapses. Hence there is a growing need to define and study relapse by standard methods which can help in planning intervention programmes that can prevent relapses. This study is an offshoot of the ICMR multicentred project on 'Factors affecting the

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course and outcome of Schizophrenia' going on at Madras, Vellore and Lucknow.

## Life Table Method

It is a standard statistical method which is employed to study and predict death and survival in a population. Its applications have been extended to study clinical phenomena like relapse in the course of chronic medical illnesses like sickle cell disease (Oyejide et al 1984) and to study life time prevalence of mental disorders (Kramer et al 1980). The life table can thus be used to study and predict the occurence of any clearly defined event like death, relapse or hospital admission during one's life.

The life table has been used in this study, with the following aims.

1. To study the probability of occurence of relapse in a group of schizophrenic patients on followup.

2. To predict their rate of survival from relapse in the next two years.

## Material and Methods

*Sample:* 100 consecutive patients diagnosed to be suffering from Schizophrenia (using Feighner's criteria) who attended the outpatient section of the Department of Psychiatry, Government General Hospital, Madras from October 1981 to October 1982 are being followed up for a period of five years. Using the Interim followup schedule detailed records are maintained of the monthly progress of this cohort. The Present State Examination (Wing et al. 1982) and the modified Psychiatric and Personal History Schedule of WHO are administered at the end of every year of followup (Verghese et al. 1985).

10 Patients of the original cohort of 100 were continuously ill for 3 years and have

been excluded from this life table. Out of the 90 included cases, 22 Patients who dropped out have been considered for the construction of this life table since information on their clinical course till the point of dropout was available.

Male and females are almost equal in number (46 and 44 respectively) and are between the ages 15 and 45 years. They are all residents of Madras City and its Suburbs.

## Relapses

Relapse for the purpose of this study is defined as the presence of an episode during the course of the illness characterised by the emergence and presence or acute exacerbation of symptoms that could be considered psychotic; like. hallucinations, delusions, characteristic thought disorder, catatonia, Marked fear or bizzare behaviour suggestive of underlying psychosis. To qualify for a relapse such an episode should be preceeded by a 4 week or longer interval period during which the patient is symptom free or has non-psychotic symptoms like headache, insommia, psychosomatic complaints or mild personality change like diminished initiative, some flattening of affect etc. (WHO 1975).

### LIFE TABLE

This table consists of the following columns

| | |
|---|---|
| $X$ | Period of followup (in months) |
| $l_x$ | No. of cases escaping relapses |
| $d_o$ | No. of drop-outs |
| $d_p$ | No. of cases observed for only part of the period |
| $N_e$ | No. exposed to risk of relapse |
| $d_x$ | No. of cases relapsing |
| $P_x$ | Proportion of cases escaping relapse (survival rate) in the time interval |
| $q_x$ | Risk of having a relapse |
| $P_x$ | Proportion of cases escaping relapse since inclusion |

The constituents of the Life Table are calculated as follows:

$$N_e = l_x - \frac{(do + dp)}{2}$$

$$q_x = \frac{dx}{N_e}$$

$p_x = 1 - q_x$

$P_X$ = Product of probablities (i.e.) product of $p_x$)

The no. of patients entering the 7th month of follow-up (6-12) is the original 90 less all those who have dropped out and those who have relapsed during that period i.e., 90-3-0-2 = 85 and so on (Col. $l_x$). Other values (do, dp, dx) are actual figures from the data.

## Results

The Life Table (Table 1) showed the following finding:

1.  The drop-outs during the first 3 years of follow-up are 4, 11 and 6 respectively (Col. $d_o$).

2.  One patient who dropped out from the study during the 13th month was reincluded at the 34th month in a state of relapse (Col. $d_p$).

3.  Maximum number of relapses (20) occurred during the 2nd year of follow-up (Col. $d_x$).

4.  The percentage risk for relapse (34%) is more between 2½ - 3 years (Col. $q_x$).

5.  There is decrease in the survival rate after the first 6 months of follow-up (Col. $P_x$).

6.  The overall survival rate at the end of 3 years is 35% i.e., only 35% of the cohort escaped relapses. The corresponding figures at the end of 1st and 2nd years are 85% and 60% respectively. This shows the number of survivors falls steeply at 2 stages

in the course of follow-up. i.e., during the later halves of 2nd and 3rd years (Col. $P_x$).

Using the value of $p_x$ (Survival rate in the time interval) the future course of illness was predicted by the second degree parabola curve (Table 2).

1.  By the end of 4 years only 13% would have escaped relapse.

2.  By the end of 5 years 98% of patients would have experienced relapse.

## Discussion

Relapses occuring in the course of a schizophrenic patient is a clinical event which indicates an increase in severity of the illness and a set back in his progress towards recovery. The gains made due to treatment, rehabilitative measures and the degree to which the family has adapted itself to the patient's illness are disturbed severely as a result of the relapse. Hence ability to predict relapse and to have an insight into the factors related to the occurence and prevention of relapse would help in proper planning of treatment, rehabilitation and after care measures for the schizophrenic patients. Whether the relapse is in itself an inevitable characteristic of the illness or due to an avoidable factor like drug compliance, adverse family environment thus become the focus of importance.

Application of the life table done in this study is the first step in analysing the occurence of relapse in the course of schizophrenia.

The study has shown that the number of relapses starts increasing by 2nd year of the illness and continues into the 3rd year at the end of which only 35% are seen to maintain

Table 1

Construction of modified life table of schizophrenic patients undergoing long-term follow-up

| Period of Follow-up (in Months) | Number of cases escaping relapse | Number of drop-outs | Number of cases observed for only part of the period | No. exposed to the risk of relapse | Number of cases relapsing | Risk of having a relapse | Proportion of cases escaping relapse in the time of interval | Proportion of cases escaping since inclusion |
|---|---|---|---|---|---|---|---|---|
| $x$ | $l_x$ | $d_o$ | $d_p$ | *$N_e$ | $d_x$ | $q_x$ | $P_x$ | †$P_x$ |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 0 – 6 | 90 | 3 | 0 | 88.5 | 2 | 0.0226 | 0.9774 | 0.9774 |
| 6 – 12 | 85 | 1 | 0 | 84.5 | 11 | 0.1302 | 0.8698 | 0.8501 |
| 12 – 18 | 73 | 6 | 1 | 69.5 | 12 | 0.1727 | 0.8273 | 0.7033 |
| 18 – 24 | 54 | 5 | 0 | 52.5 | 8 | 0.1524 | 0.8476 | 0.5961 |
| 24 – 30 | 41 | 4 | 0 | 39 | 4 | 0.1026 | 0.8974 | 0.5349 |
| 30 – 36 | 33 | 2 | 0 | 32 | 11 | 0.3438 | 0.6562 | 0.3510 |

* Column No. 5 = Column No. 2 minus half columns 3 and 5.
+ Column No. 9 = The produce of the values of column 8 i.e. $p_1 \times p_2 \times p_3 \ldots$

Table 2

* Projection using the Second degree parabola $V_t = a + bt + ct^2$

| Period of Follow-up (in months) | Risk of having a relapse | Proporation of cases escaping relapse in the time of interval | Proportion of cases escaping relapse since inclusion |
|---|---|---|---|
| $x$ | $q_x$ | $P_x$ | $P_x$ |
| 36 – 42 | 0.3527 | 0.6473 | 0.2272 |
| 42 – 48 | 0.4373 | 0.5627 | 0.1278 |
| 48 – 54 | 0.5323 | 0.4677 | 0.0598 |
| 54 – 60 | 0.6377 | 0.3623 | 0.0217 |

* Many projection curves were tried for curve fitting but only the above curve fitted well to the observed data

their remission without relapsing. Whether this is due to fall in drug compliance or whether it indicates that the illness becomes more severe in course of time needs to be studied. Predicting for the future, of course, shows that only 2% will maintain their remissions by the end of 5 years. Bleuler's study as well as the IPSS indicate that the course of the illness stabilises generally 5 years after the onset. If this is so the predictions made in this study would mean that relapse is inevitable in the first 5 years in the life of schizophrenic patients. Though the low expected survival rate needs to be tested during the follow up, the prediction raises important and interesting enquiries about relapse which need answering.

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