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A Case Study on Psychiatric Patient in Assam Medical College, India

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Abstract: ***This paper attempts to see whether proportion of male and female patients is equal or not and to study the survival pattern of psychiatric patients. Simple random sampling without replacement (SRSWOR) has been used to collect information on Psychiatric patients and other related variables using a pre-tested questionnaire from the Assam medical college and hospital, Assam, India. At first, the testing equality of proportion between male and female patient with respect to discharge, we seen that the proportion of female patient released on request from the hospital is significantly higher than male patient. The highest numbers of patients are in the age group (20-30) years with. In this context, the Kaplan-Meier method has been applied to estimate the median duration of stay in the hospital for the patient. The Kaplan Meier curve for male and female shows that there is not much difference in recovery time for male and female patients. Again, the Cox proportional hazard model has been used to shows that risk of staying in the hospital. These shows, that is almost identical for both the male and female patients. Thus, it can be concluded that prevalence of Schizophrenia is highest in this population alarmingly it is highest among the youth aged (20-30) years.***

Keywords: Testing equality of proportion, Kaplan-Meier method, Cox proportional hazard model, odds ratio, risk factor.

I. INTRODUCTION

In a review article on Oliver James book Britain on the Couch, Simon Jenkins wrote in the "Time", London: A generation that is most comfortable in history is also the most depressed. In today's world depression has become a very general cause for mood disorder. Now a day's depression is in 4th position in mental illness but WHO say that the problem of depression among people is increase so rapidly that in 2020 it will be at 2nd position. Psychiatric patients are those who are suffer from mental- illness. A mental disorder or mental-illness is a psychological pattern, potentially reflected in behavior, that is generally associated with distress or disability, and which is not considered part of normal development of a person's culture. Mental disorders are generally defined by a combination of how a person feels acts, thinks or perceives. This may be associated with particular regions or functions of the brain or rest of the nervous system, often in a social context. The recognition and understanding of mental health condition have changed over time and across cultures and there are still variation definition, assessment and classification, although standard guideline criteria are widely used. In many cases, there appears to be a continuum between mental health and mental illness, making diagnosis complex. According to the world health organization (WHO) ,over a third of people in most countries report problem at some time in their life which meet criteria for diagnosis of one or more of the common types mental disorder.

A. Classifications: Classification Of Mental Disorders

There are currently two widely established systems that classify mental disorders- ICD-10 chapter V: Mental and behavioural disorder, since 1949 part of the International Classification of Diseases produced by the WHO, and the diagnostic and Statistical Manual of Mental Disorders (DSM-IV) produced by the American Psychiatric Association (APA) since 1952.
International classification of Diseases (ICD)-10 was endorsed by the forty third world health assembly in May 1990 and came into use in WHO members states as from 1994. Under the ICD-10 mental and behavioural disorders are included in the chapter V and coded as F00-F99.

B. Contents Of Disease Categories

1) F00-F09 – Organic is including symptomatic mental disorder.
2) F10-F19 – Mental and behavioural due to psychoactive substance use.
3) F20-F29 – Schizophrenia, schizotypal delusional disorder.
4) F30-F39 –Mood (affective0 disorder.

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5) F40-F49 – Neurotic, stress related and somatoform disorder.
6) F50-F59 – Behavioural syndromes associated with physiological disturbances and physical factors.
7) F60-F69 – Disorder of adult personality and behavioural.
8) F70-F79 – Mental retardation.
9) F80-F89 – Disorder of psychological development.
10) F90-F99 – Behavioural and emotional disorders with onset usually occurring in childhood and adolescence.

II. OBJECTIVE OF THE PRESENT STUDY

The objectives of the present study are

A. To see sexwise discharge patterns of the patients.
B. To see whether the disease is in assumed proportion.
C. To see what is the chance of a patient to be in a particular category and lastly
D. To study the survival pattern of psychiatric patients.

III. METHODS AND ANALYSIS

A sample is a part of universe. More specifically is a group of item selected from the population for the purpose of getting information about the characteristics of the items of the population. It is known that if the sampling is not done using a standard statistical procedure, then the statistical techniques cannot be used to infer about the population. We have to use that technique which is relevant to our study. After going through the literature and preliminary investigation we have decided to use SRSWOR. We have to take our sample from psychiatric department of Assam Medical College and Hospital, Assam, India for the period 2014(January) – 2015(March). There is total 1532 number of registered of cases and we have to draw a sample of size 341 from this 1532 which is our population size N. We can use random number table or we can generate random numbers between 0 to 1 using calculators or computer software. We have used random number table edited by, Rao, Metra and Matthai. Using column 17-20 we get the random numbers as (after arranging in order) 0012, 0027, 0045, …, 1344. Accordingly, we have chosen those serial numbers from the RNTCP psychiatric register books, 2014 (January)- 2015 (March) of the psychiatric department, Assam Medical College and Hospital, Assam, India.

For the study, we collect information regarding the total number of patients registered during the year 2014-2015 (randomly), age of the patients, sex of the patients, and entry and discharge date of the patients, diagnosis of the patients. The study subjects are presented in Table-1 and Table-2.

Table 1:- Distribution of patients by category and sex

Sex / Category		Male	Female	Total
I	F00-F09	0	2	2(.59)
II	F10-F19	117	18	135(39.59)
III	F20-F29	103	51	154(45.16)
IV	F30-F39	19	7	26(7.62)
V	F40-F49	16	8	24(7.04)
Total		255(74.78)	86(25.22)	341

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Table 2:- Distribution of patients by category and age

Category	Age of the patients								Total
	1-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	
I	0	0	1	0	0	1	0	0	2(.59)
II	3	5	38	37	35	11	5	1	135(39.59)
III	0	24	57	38	23	9	2	0	150(44.87)
IV	1	2	9	5	7	2	0	1	27(7.92)
V	0	7	7	5	5	0	0	0	24(7.04)
Total	4(1.73)	38(11.14)	112(32.85)	85(24.93)	70(20.53)	23(6.75)	7(2.05)	2(.59)	341

A. Statistical Modeling

Testing equality of proportion between Male and Female w.r.t. type of discharge:

Odds Ratio(OR): Odds ratio is defined with the help of cross table:

Table 3: Odds ratio

	Y = 1 (Case)	Y = 0 (Control)	Total
X = 1(Exposed)	A	C	A+C
X = 0(Non-exposed)	B	D	B+D
Total	A+B	C+D	N

$$OR = \frac{\{\frac{A}{A+C}/\frac{C}{A+C}\}}{\{\frac{B}{B+D}/\frac{B}{C+D}\}} = \frac{AD}{BC}$$

In the present study, our hypotheses are,

H_0 : OR = 1, against H_1 : OR ≠ 1

Again, define X =1, if female (Risk)

= 0, otherwise

Y =1, If discharged on request

= 0, otherwise

Table 4 : Odds ratio table

	Y = 1	Y = 0	Total
X = 1	19	67	86
X =0	68	187	255
Total	87	255	341

Using formula we get, OR = .7799 with p- value = .007

So, we can conclude that discharge on request is 23% higher for female than male.

1) *Survival Pattern Of Patients:* Statistical techniques of survival analysis are developed to analyze time-to-event data. In the present study, we have to study the duration of stay for the psychiatric patients in the AMC. But we have found that some of the patients were released from the ward on request. So we could not get complete duration of stay for those patients and thus we have complete and as well as right censored information regarding this duration of stay. As censoring is present, so we use Kaplan-Meier method (Kaplan & Meier, 1958) for analyzing our survival data.

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Here, random variable T represents the duration of stay of the psychiatric patients in the hospital which is the difference between the initial event (the day of admission) and the final event (the day of release). Using Kaplan-Meier method, we get the K-M curve given in Fig.1.

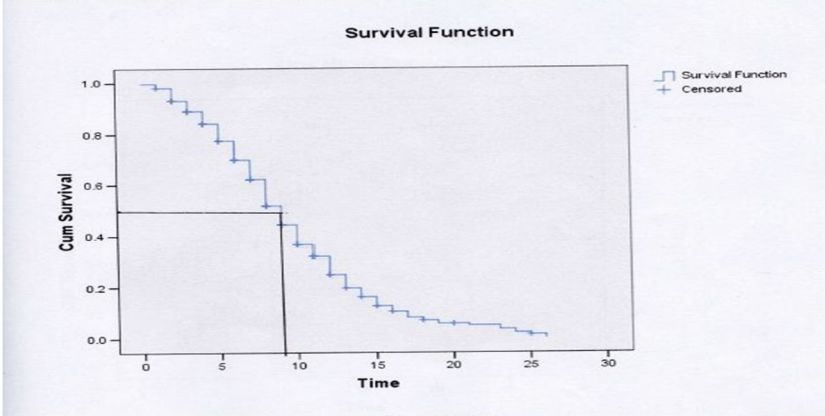

Fig. 1 Kaplan-Meier curve for survival time

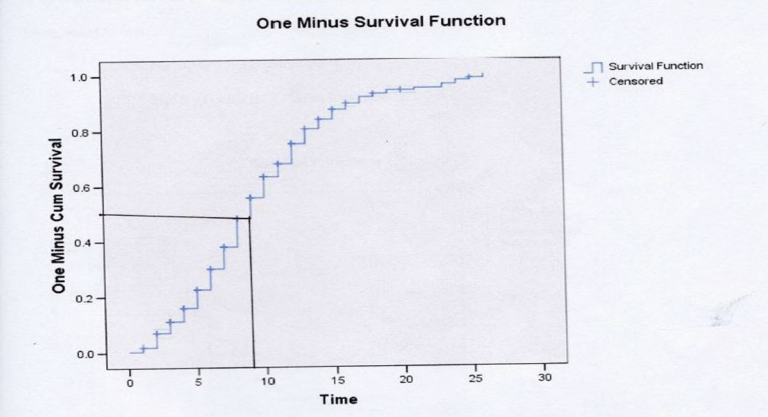

Fig. 2 Incidence curve for survival time

From the K-M curve, we have found that the median duration of stay is found to be 9 days which means that 50% of patients have to stay in the hospital for than 9 days.

2) Comparison Of Survival Patterns

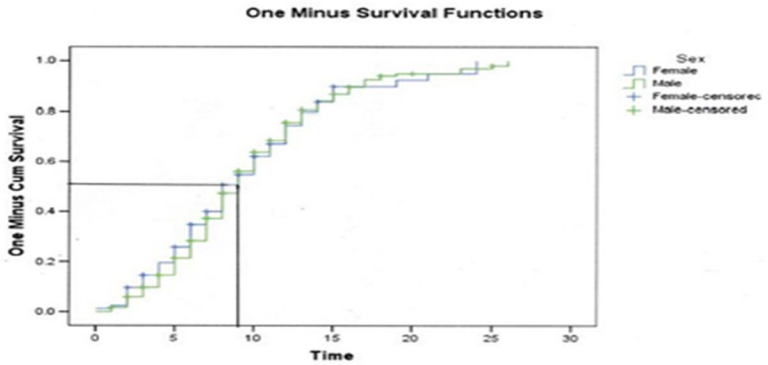

Fig. 3 Incidence curve for comparison of survival time

From the K-M curve, we have found that the median duration of stay is found to be 9 days which means that 50% of patients have to stay in the hospital for more than 9 days.

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B. Cox Proportional Hazard Model

For fitting the Cox proportional hazard model,first we have to see whether Cox proportional hazard model is suitable or not. A guide to whether or not the hazard rate can be regarded as constant is to plot the complementary log transformation, which is log{-log{S(t)]} against log t. If the hazard rate does not change with time then the resulting plot will be approximately linear. Departures from linearity indicate that the hazard rate is changing with time.

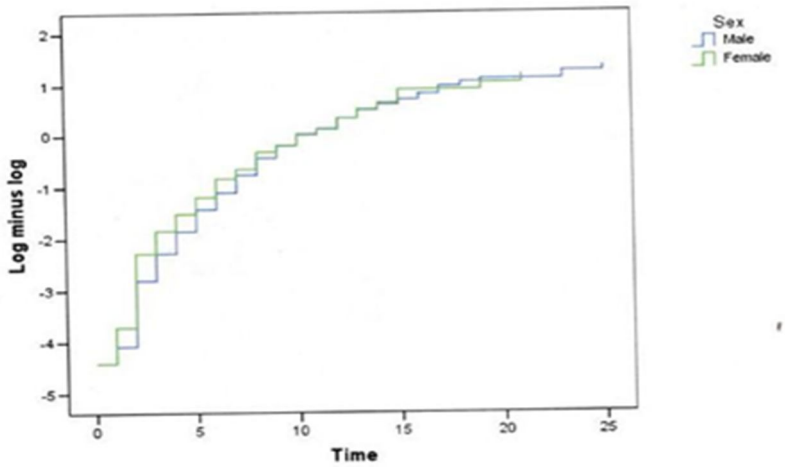

Fig. 4 Log Minus Log curve

Figure (4) shows that Cox PH model is suitable here. We can use Cox's model for analysing our data.

Table 5: Results of Cox proportional Hazard Model

	B	SE	Wald	d.f.	P-value	Exp(B)
Caste(reference)			3.820	3.00	0.282	
Caste(1)	-0.136	0.265	0.262	1.00	0.608	0.873
Caste(2)	0.149	0.249	0.360	1.00	0.549	1.161
Caste(3)	-0.071	0.295	0.057	1.00	0.811	0.932
History(reference)			0.328	3.00	0.955	
History(1)	-0.054	0.469	0.013	1.00	0.909	0.948
History(2)	-0.147	0.483	0.092	1.00	0.761	0.864
History(3)	-0.068	0.512	0.018	1.00	0.894	0.934
Age	0.002	0.005	0.087	1.00	0.768	1.002
Sex	-0.086	0.147	0.346	1.00	0.557	0.917

From Table 5, it is observed that we compare survival time of patients with different risk factors. Let us illustrate some of them.

A) To compare survival time of male with a female. Using the proportional hazard model,

$\boldsymbol{\lambda}(t ; \boldsymbol{x}) = e^{\boldsymbol{\beta x}}\boldsymbol{\lambda}_0(t)$,

where, $\boldsymbol{\beta} = (\boldsymbol{\beta}_1 \ldots \boldsymbol{\beta}_p)$

Here,

$\boldsymbol{\lambda}(t ; \boldsymbol{x}) = \boldsymbol{\lambda}(t ;$ sex), other factors kept at fix

$= \lambda_0(t)\, e^{\boldsymbol{\beta} x}$

$= \lambda_0(t)\, e^{\boldsymbol{\beta}}$, for male

$= \lambda_0(t)$, for female

Now, Hazard rate (HR) $= e^{\boldsymbol{\beta}}$

$= 0.9176$

This means that risk of staying in the hospital is almost same for male and female patient.

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C. To Compare Survival Time For A Male Of Age 50 With A Male Of Age 20

$$\lambda(t,x) = \lambda(t, age, sex)$$

$$= \lambda_0(t)\, e^{50\beta_7 + \beta_8}, \text{ For a male of age 50}$$

$$= \lambda_0(t)\, e^{20\beta_7 + \beta_8}, \text{ For a female of age 20}$$

$$\text{Now, HR} = e^{30\beta_7}$$
$$= e^{.06}$$
$$= 1.062$$

Where, shows that risk of staying in the hospital is (6%) more for patients with a male of age 50 than a male of age 20.

IV. CONCLUSION

In this paper an attempt has been made to analyze the data regarding the psychiatric patients of AMCH, Assam, India. The study was based on the data on psychiatric patients as recorded by the psychiatric department of Assam Medical College and Hospital during January 2014 to January 2015. Our study was based on a random sample of size 341 drawn by SRSWOR technique. For analyzing our data we have used statistical techniques like test for OR, Kaplan-Meier Method and Cox regression model.

Though there are ten categories of psychiatric patient, we have found that the patients of our study belonged to only five categories viz. (i) Organic, including symptomatic mental disorder, (ii) Mental and behavioural due to psychoactive substance use, (iii) Schizophrenia, schizotypal and delusion disorder, (iv) Mood (affective) disorder, (v) Neurotic, stress related and somatoform disorder. And disease categories are found to be related with the sex of the patients. The total number of patient is 341 out of which 255(74.78%) for male and 86(25.22%) for female. The proportion of female patient (27%) released on request from the hospital is significantly higher than male patient (22%). The patients distributed among five categories-the category F20-F29 has highest number (45.16%) of patients. The highest number of patients is in the age group (20-30) years with 32.85%. The Kaplan-Meier method of analysis shows that the median duration of stay in the hospital for the patient in general is 9 days. Whereas it is 9 days for male patient and 8 days for female patient. The Kaplan-Meier curve for male and female shows that there is not much difference in recovery time for male and female patients. We have found that 15% of the patients were released on request. And these types of patients were found to be significantly higher for female than male. The Cox analysis shows that risk of staying in the hospital is almost identical for both the male and female patients.

Psychiatric is a social disease with medical aspect. It has also been describe as a barometer of social welfare. Our survey shows that prevalence of Schizophrenia is highest in this population and alarmingly it is highest among the youth aged (20-30) years. So we can think that young generation should think positively and grow up with positive attitude. At last, we feel that we should cultivate a healthy lifestyle, make yoga as part of our life from our childhood so that we can control this menace up to some extent and get a healthy society.

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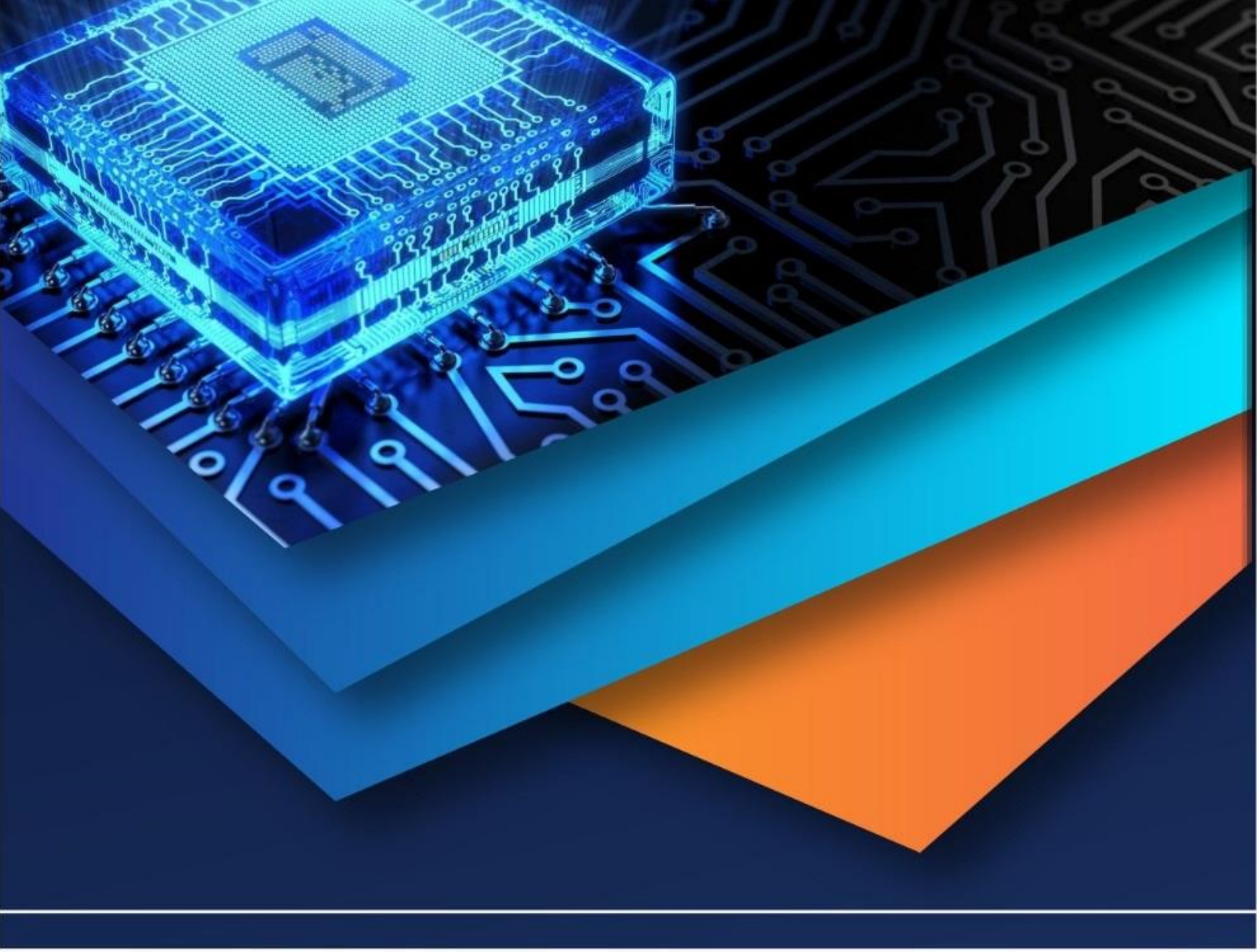

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