Mortality Experience Of A Cohort Of Academic Staff Retirees Of University: A Case Study Of University Of Ibadan, Nigeria

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Abstract: The study arose out of the need to know the distribution of experience of mortality and survival pattern of University academic staff retirees. This is a follow up study of a cohort of retired university academic staff in retrospective in a well based record assessment. From total population of 302 of pensionable 60 to 65 years of age of service and 35 years in service as at year 2012 of retired academic staff retirees surveyed, 109 were randomly selected during the study dates "January 1977 to December 2012". Simple descriptive frequency and the Life Table analysis were identified as the most suitable approach to analyze the demographic characteristics and pattern of survival; this provides estimates of probabilities of surviving a given number of years after retirement. Since life table is non-parametric procedure for estimating life expectancy at different points and does not produce a measure of precision. We exploit the distribution of the survival and hazard functions to give a measure precision of life expectancy. The result shows that there is no significant difference in the survival probability of male and female Using Log rank test with p value of 0.72, there is significant different between mortality rate of those who retired early as a result of length of service and those who retired late as a result of age limit with p value of 0.02, there is no significant difference in the survival probability for male and female and their duration of service with Log rank test probability of 0.93 and Post Retirement Occupation (PRO) and the survival time of academic retirees are significant different with p value of 0.013. The median residual life time for male is 9.21 while for female is 8.48 years.

Index Terms: Academic; Retirement; Residual; Mortality; Survival; Occupation; Expectancy

1 INTRODUCTION

There is a great deal of interest, world-wide on retirement and old age issues. Many issues are dealt with from different perceptions. While governments are primarily concerned with policies relating to retirement age and pensions, financial ventures focus on the establishment and management of private pension funds and financial securities. From the perception of education, retirement issues moved from relative darkness in 1955 to level of academic discipline in many developed countries in the 80s (Adio-Moses, 2011)[1], Education for and about retirement and old age has since become so vibrant that institution, which specifically target at philosophical, social and economic issues started evolving (Samson 2006)[6]. Education as one of the primary factors of development, no country can achieve sustainable economic development without considerable investment in human resources. Education improves the quality of lives and leads to social benefits to individuals and society. Education raises people's productivity and creativity and promotes entrepreneurship and technological advances. In addition it plays a very crucial role in promoting economic (Jere at all 1999)[2]. Obviously, senior academic university staffs are the pivot in which economic development depend. They are responsible for the training and development of material resource such as technology and human resources for economic development (Ozturk 2001[5], Yvonne and Donna 2011[8]). Life expectancy is the expected in the statistical sense number of years of life remaining at a given age (Sullivan, et al 2012)[7]. In many occasions life expectancy varied significantly to class and gender. There are so many factors that can support the long life of retirees both natural and non-natural factors.

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The non-natural factors can be categorised into public health, medical care, and exposure after retirement while natural factors are peer groups, economic circumstances, and climate after retirement can have great influence on life expectation (Wikipedia 2009). Life expectancy estimations and factors that affect life expectation of university academic retirees are not different from other groups. To what level does life expectancy of university academic staff retirees differ by retirement level and Post retirement occupation status? Are there mortality differences between genders of retired university academic staff? Does length of service influence the survival of academic retiree, and if so, to what extent? In our opinion, a number of studies have been carried out from several professions on mortality, survival and life expectancy, among all, no researcher has ever carried out study on mortality trend of retired staff of Universities. This study aims at investigating the distribution of death and survival pattern of retired Universities academic staff. The research into causes of early retirement and post retirement occupation of senior academic staffs of universities retirees, how long can they survive and modelling of senior academic staffs of universities retirees' life expectancy could be of interest to the intellectuals and the government. This study will be first of its kind that consider mortality experience of academic staff of universities on early retirement as a result of length of service and legitimate age limit pensionable age of retirement in University of Ibadan (Nigeria).

2 METHODS AND DISCUSSION

The study dealt with subjects well-being based on record assessment. The target population of the study comprises all retirees from the University of Ibadan, Nigeria from 1977 to 2012. An important characteristic of the population is that the pensioners' either retired has voluntarily between ages 60 and 64 years or mandatory age 65 years in which case, they are elderly and more vulnerable to negative retirement conditions than employees who voluntarily retired earlier without pension. Two stage sampling technique was adopted for the study. At first stage, which is purposive sampling based on the

university with long history of establishment in the country and the voluntary age from ages 60 to 64 and mandatory age 65 with pension's condition of retirement of the participants. The second stage is simple random sampling techniques. The required number of academic universities staff retirees sample size for this study was based on Mark (2009), formula which yields a representative sample for epidemiological study. The sampling procedure for the selection of each retiree into the sample size is based on simple random sampling by drawing numbers that represent 109 retirees from a computer generated random numbers between 1 and 302 of total population of academic retirees as at 2012. Simple descriptive statistics of frequency counts and percentage were used to analyse the data obtained on the personal chacteristics of the respondents. Life table model was used to explain survival experience of academic retirees. Life table analysis provides approximation of probabilities of surviving beyond a given number of years after retirement and highlighting the advantage gained by including survival information on individuals entering the series late to have had the opportunity to survive the level of the period of the study. The life table estimates median residual lifetime or median remaining life expectancy year after retirement.

3 RESULTS AND DISCUSSION

Table 1 contains the distribution of academic retirees by their demographic characteristics in the period of 37 years of the study. It is observed that population of males' respondents was 76.1%, at inception of academic institution and for quite some time University academic staff was predominantly male. It is observed that 66.1% of the surveyed respondents have died according to the administrative record and among the respondents that are alive (33.9%), only 71.4% of them are married while 28.6% are widowed. Table 1 show the distribution of retirees by reasons for their retirement, those who retired based on the policies of retirement which are 35 years of service is 71.6% and age limit is 28.4%. From table 1, it is observed that those retired at age 60 is 24.9%. In this case, the respondents might have served 35 years, which is a condition for mandatory retirement. A period of 35 years is long enough to for the respondents to acquire valuable skills and experiences which may be of use to some other employers or themselves. Those who retired at age 65 are 45.9%, thus confirming the demographic projection of a large population of retirees for mandatory age of retirement.

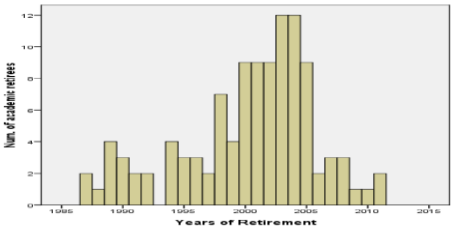
Table 1: DEMOGRAPHIC CHARACTERISTICS OF THE COHORT AND SAMPLE

$n = 109$

VARIABLES	FREQUENCY	PERCENTAGES
GENDER		
Males	83	76.1
Females	26	23.9
Total	109	100.0
CURRENT STATUS		
Censor	37	33.9
Fail	72	66.1
Total	109	100.0
MARITAL STATUS		
Married	25	71.4
Widow	10	28.6
Total	35	100
REASONS FOR RETIREMENT		
RETIREMENT	78	71.6
Length of service	31	28.4
Age Limit	109	100
Total		
RETIREMENT AGE		
60	32	29.4
61	7	6.4
62	4	3.7
63	4	3.7
64	3	2.8
65	59	45.9
Total	109	100.0

Figure 1 below shows the distribution of new academic retirees for each year in the 35 years study period. All sampled academic retirees were represented. It shows that at later of the surveyed years, the annual number of retirees was much lower than in the early years, whereas it was as much higher at middle years of the study than the later and early years of the study periods. This may be as a result of younger's ages that are joining the academic service.

Figure 1 showing the distribution of new academic retirees for each year in the 35 years study period



Life expectancy was estimated using survival analysis procedure in SPSS (Kaplan-Meier and life table) for the cohort. Survival life table is produced, using 1 year intervals of time since retirement as the basis for the tables. The 1 year interval is chosen to ensure adequate cell frequencies for the age expectancy analysis to follow. This analysis invokes the assumption that mortality rates were stable over the 1 year time intervals, and the survival rates were similar over the 35 year period. A summary life table based on 109 individuals, of whom 72 died, total number of individuals not identified as dead from record is 35 were considered alive (right-censored) at the time of the study. Gender life table is constructed, 83 and 26 were male and female respectively as shown in Table 2 In table 2 (Appendix I and II), we have the results of the life table analysis for 83 male and 26 female academic retirees from retirement age for both voluntary and compulsory ages respectively. Column 1 (x to $x+1$) i.e. age group 60-61 refers to the first year after retirement age, age group 61-62 refers to second year, (e.t.c). Each interval is a cohort for the survival function. Column 2 (l_x) is the number of cases that have survived to the beginning of the current interval i.e those who are alive at beginning of Interval. 83 male and 26 female were alive at their age group 60-61 age group and 80 male and 24 female at their age group 62-63 after retirement while only 21 male and 3 female were alive at age group 70-71 respectively. Successive entries in this column are obtained using this formula: $l_{x+1} = l_x - (d_x + w_x)$. Number withdrawn alive during Interval is in column 3(w_x). These are the academic retirees who were known to be alive at the close of the study. During this study, there is record of respondents withdrawing from the study at different numbers. The highest withdrawal (censor) was recorded in the age group 67-68 of

the study with 7 respondents of the male while female has 2. Column 4 shows the number exposed to risk of dying. It is assumed that academic retirees withdraw from observation during an interval were exposed to the risk of dying, on the average, for one-half the interval. Those who were exposed to the risk of dying in the age group 60-61 and age group 61-62 is 83 and 82 for male consecutively while those who are exposed to risk of dying from female is 26 respectively. It is obtained by $l_{x+1} = l_x - \{d_x + (w_x \div 2)\}$ Number of Retirees died during Interval (d_x) i.e Column 5, gives the number of academic retirees who died at the interval. For example 12 died at age group 65-66 of male after retirement and 3 die at age group 66-67 of female e.t.c. The proportion dying during interval in column 6 (q_x), is an estimate of the probability of dying during the interval. The proportion of dying in the 60-61 is 0.00 for both male and female while for the age group 65-66 of male is 0.17 and for female is 0.05. It is obtained by dividing the number of deaths by the effective number of exposed to risk $(col5 \div col4)$ or $q_x = d_x \div l_x$. Proportion of surviving in column 7 (p_x) is the alternatively to the probability of surviving in the age group, or the surviving rate. It is obtained by subtracting the proportion dying during the interval from unity; $(1 - col6)$ or $p_x = 1 - q_x$. Cumulative Proportion Surviving at end of age group Column 8 is generally referred to as the cumulative survival rate, and gives the probability of a academic retirees surviving to the end of the end of specified age group after retirement. Calculated by cumulatively multiplying the proportion surviving each interval: $\sum_{\max.i}^{\min.i} \pi p_i$ where i = 1, 2 ... indicate that the probability of an academic retirees surviving at age group 62-63 after retirement is 0.98 of male and 0.92 of female. For age group 69-70 of male is 0.44 and female is 0.47 of their survival probability. Standard error of survival probability and hazard rate columns 9 and 11, provide measures of confidence with which one may interpret the statistical result. Column 10, this column gives the instantaneous potential in an interval year for the death of academic retirees in given interval giving that individual have survived up to the following interval year. The academic retirees' median residual life time for male is 9.21 while for female is 8.48 years. The survival probability curves for the two groups of retirees, the Voluntary retirement ages 60 to 64 years and the Compulsory retirement age at 65 years conditions is shown in figure 2 below. The academic retirees were divided into two groups: those who retired voluntarily before age 65 and those who retired at compulsory age 65 of retirement. This was done to determine if there is different in mortality experiences between the academic retirees who retired early and later years. The outcome shows that there is significant difference in the survival probability for the two groups using Log rank (Mantel cox) test with p equals 0.02

Figure 2: Showing survival distribution of academic retiree who retired under different conditions

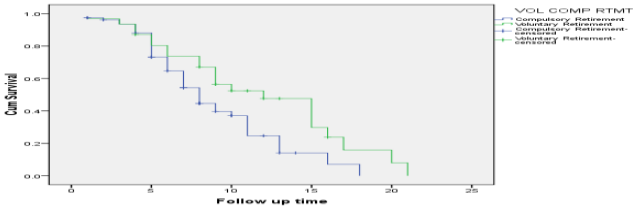
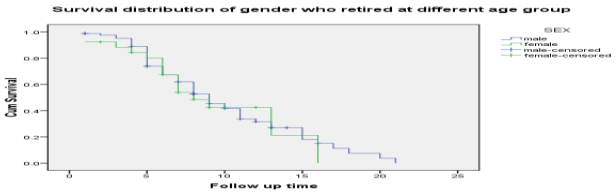
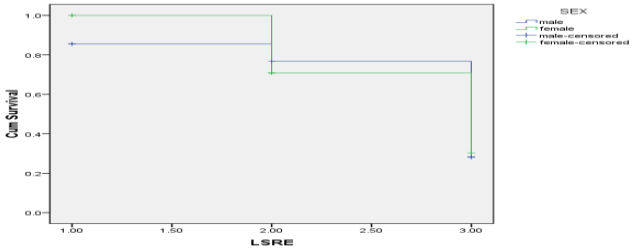


Figure 3 below compares the survival distribution of gender during the study period. The survival probability curves for the males and females respondents shows that there is no significant difference in the survival probability for the two groups. Using Log rank (Mantel-cox) test with p equals to 0.720, the difference between the gender survival functions was not significant.



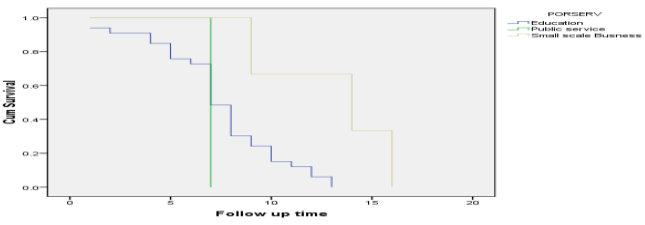
The figure 4 below shows the survival distribution by gender and their length of service during the study period. The figure shows that there is significant difference in the survival probability for the two Groups and length of their service retirement. Estimation using Log rank (Mantel-Cox) test with p equals 0.93; the difference between gender survival functions and their length of service before retirement was not significant.

Figure 4: Showing survival distribution of gender by length of service of ritered academic staff before retirement



The survival probability curves for the Post Retirement Occupation (PRO) and the survival time of academic retirees are shown in figure 5. The figure shows that there is significant different between PRO (Educational service, public service and small scale business) of interest and survival time of academic retirees using Log rank (Mantel-cox) test with p value is 0.013.

Figure 2: Showing Post Retirement Occupation (PRO) and the survival time of academic retirees



4 CONCLUSION

The survival probability curves for the males and females respondents as shown in the figure 3 indicate that there is no significant difference in the survival probability for the two groups and their survival period. Using Log rank (Mantel-cox) test with p equals to 0.720, the difference between the gender and survival functions was not significant. We can also claim that there is significant different between mortality experience of those retired early as a result of length of service and late retirement as a result of age limit during the period of study of retired academic staff of universities as it was supported by the data in the study (figure 2). The survival probability of age limit retirement of academic retirees is higher than length of service retirement (35 years) and voluntary retirement of academic retirees, the p value of 0.02 of Long rank (Mantel-cox) test. The survival probability curves for the gender and there length of service before retirement as shown in figure 4. It indicates that there is no significant difference in the survival probability for the two Groups. Estimation using Log rank (Mantel-cox) test with probability of 0.93, the difference between male and female survival functions was not significant. More so, one could infer that duration of service before retirement does not have effect on longevity of retired academic staff of university this was supported by argument put forward by Ujiwal (2011) that the longer you work and the longer you handle work related to stress in your life, the less are your chances of survival after retirement. The academic retirees' median residual life time for male is 9.21 while for female is 8.48 years. The median residual life time is the remaining lifetimes among survivors beyond that particular point. This means that 9.21 for male and 8.84 year is the time by which half of the academic retirees are expected to have died after retirement. The new Nigerian academic retirement policy approved by president Good Luck Jonathan in 2012 implies that university academic staffs of male and female in Nigeria who retire at age 70 years would have 9+ and 8+ years respectively to enjoy retirement pension benefit.

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Table 2: Combined life table and survival estimate of academic Retirees age 60 to 65 and 35 years of service from 1977 to 2012 for male respondents

Years after Retirement interval X to $x+1$ (1)	Number alive at beginning of Interval l_x (2)	Number Withdrawing during Interval w_x (3)	Number Exposed to Risk of dying $l_{x+1} = l_x - \{d_x + (w_x \div 2)\}$ (4)	Number of Retirees died during interval d_x (5)	Proportion Dying $(col5 \div col4)$ q_x (6)	Proportion Surviving $(1-col6)$ p_x (7)	Cumulative Proportion Surviving at end of Interval πP_x (8)	Std. Error of Probability (9)	Hazard Rate (10)	Std. Error of Hazard Rate (11)
0-1	83	0	83.000	0	.00	1.00	1.00	.000	.00	.00
1-2	83	2	82.000	1	.01	.99	.99	.017	.01	.01
2-3	80	0	80.000	1	.01	.99	.98	.021	.01	.01
3-4	79	0	79.000	2	.03	.97	.95	.046	.03	.02
4-5	77	1	76.500	5	.07	.93	.89	.119	.07	.03
5-6	71	3	69.500	12	.17	.83	.74	.296	.19	.05
6-7	56	0	56.000	5	.09	.91	.67	.130	.09	.04
7-8	51	7	47.500	4	.08	.92	.61	.115	.09	.04
8-9	40	5	37.500	6	.16	.84	.52	.203	.17	.07
9-10	29	1	28.500	4	.14	.86	.44	.153	.15	.08
10-11	24	1	23.500	2	.09	.91	.41	.084	.09	.06
11-12	21	1	20.500	4	.20	.80	.33	.179	.22	.11
12-13	16	1	15.500	1	.06	.94	.31	.052	.07	.07
13-14	14	2	13.000	2	.15	.85	.26	.120	.17	.12
14-15	10	1	9.500	0	.00	1.00	.26	.000	.00	.00
15-16	9	0	9.000	3	.33	.67	.17	.230	.40	.23
16-17	6	1	5.500	1	.18	.82	.14	.088	.20	.20
17-18	4	0	4.000	1	.25	.75	.11	.104	.29	.28
18-19	3	0	3.000	1	.33	.67	.07	.108	.40	.39
19-20	2	0	2.000	0	.00	1.00	.07	.000	.00	.00
20-21	2	0	2.000	1	.50	.50	.04	.114	.67	.63
21-22	1	0	1.000	1	1.00	.00	.00	.114	2.00	.00

The median survival time is

9.21

Table 2: Combined life table and survival estimate of academic Retirees age 60 to 65 and 35 years of service from 1977 to 2012 for female respondents

Years after Retirement interval X to $x+1$ (1)	Number alive at beginning of Interval l_x (2)	Number Withdrawing during Interval w_x (3)	Number Exposed to Risk of dying $l_{x+1} = l_x - \{d_x + (w_x \div 2)\}$ (4)	Number of Retirees died during interval d_x (5)	Proportion Dying $(col5 \div col4)$ q_x (6)	Proportion Surviving $(1 - col6)$ p_x (7)	Cumulative Proportion Surviving at end of Interval πP_x (8)	Std. Error of Probability (9)	Hazard Rate (10)	Std. Error of Hazard Rate (11)
0-1	26	0	26.000	0	.00	1.00	1.00	.000	.00	.00
1-2	26	0	26.000	2	.08	.92	.92	.093	.08	.06
2-3	24	1	23.500	0	.00	1.00	.92	.000	.00	.00
3-4	23	0	23.000	1	.04	.96	.88	.068	.04	.04
4-5	22	1	21.500	1	.05	.95	.84	.080	.05	.05
5-6	20	0	20.000	1	.05	.95	.80	.092	.05	.05
6-7	19	1	18.500	3	.16	.84	.67	.292	.18	.10
7-8	15	2	14.000	3	.21	.79	.53	.331	.24	.14
8-9	10	1	9.500	1	.11	.89	.47	.138	.11	.11
9-10	8	2	7.000	1	.14	.86	.40	.179	.15	.15
10-11	5	2	4.000	0	.00	1.00	.40	.000	.00	.00
11-12	3	0	3.000	0	.00	1.00	.40	.000	.00	.00
12-13	3	1	2.500	0	.00	1.00	.40	.000	.00	.00
13-14	2	0	2.000	1	.50	.50	.20	.643	.67	.63
14-15	1	0	1.000	0	.00	1.00	.20	.000	.00	.00
15-16	1	0	1.000	0	.00	1.00	.20	.000	.00	.00
16-17	1	0	1.000	1	1.00	.00	.00	.674	2.00	.00

The median survival time is

8.48