Weibull Accelerated Failure Time (AFT) Model for Time – To – Divorce Data with Cure Fraction

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ABSTRACT

We present the use of survival analysis to investigate divorce rate and marriage stability among ever married women in Kano metropolis. Specifically, Weibull Accelerated Failure Time Mixture Cure Model (Weibull AFT MCM) was used to analyze time-to-divorce data. We used the cure model because the Kaplan-Meier divorce survival curve has indicated the possibility of marriages that will forever remain without divorce (cure fraction). This is against the usual regression models used, because they do not incorporate the possibility of cure fraction. Also, comparing the Weibull homogeneous model with the Weibull AFT MCM indicates the superiority of the use of the cure model in terms of log-likelihood (-620.8 versus -323.6) and AIC (1245.6 versus 641.6). Therefore, the aim was to estimate the proportion of marriages that will forever survive divorce, divorce survival curve, as well as to ascertain the influence of some factors on the time-to-divorce as well as on the probability of remaining in marriage without divorce. The estimates of divorce fractions from Kaplan-Meier and Weibull AFT MCM are close to each other (73.4 versus 72.2). Factors that significantly cause divorce include Husband employment status, Domestic violence and Discussing family matters with spouse. While, level of education and Discussing family matters with the spouse significantly influences time-to-divorce. It is seen that, discussing family matters with the spouse is a factor that significantly influence both the incidence and latency sub models. Findings may benefit the government and other stakeholders in marriage stability planning policies.

Keywords: Cure fraction, mixture cure model, AFT, Kaplan-Meier, Divorce

INTRODUCTION

Nigeria is presently faced with intense security challenges such as banditry/kidnapping, Thuggery, phone snatching among others. Most of the suspects are young individuals in their teens. Some researches, media reports and interactional evidences have linked most of the suspects to broken homes as a result of divorce. According to UNICEF Nigeria (2018), street children, who frequently come from dysfunctional or abusive households, are the primary targets of violence and extremism. It is estimated that more than 45% of young people engaged in rural banditry had either lost parents or suffered family dissolution. This is because substance abuse, disobedience and early sexual activity and aggression are some of the behavioral issues associated with broken homes (Eke, 2013). These behaviors often result in conflict with authorities or the law as such street children from broken homes stand a high risk of being recruited into violent crime. Children from divorced families are more likely to struggle with trust and forming healthy relationships in their adolescence stage and even in adulthood (Adeyimi, 2011). This trust issue is considered as a high-risk factor leading to replicating patterns of divorce in their own marriages (Bashir, 2016).

A significant decline in academic performance and emotional instability has also been noticed in students from divorced homes (Okafor & Egenti,2021; Ehsan & Saeed, 2024; Eke, 2013; UNICEF, 2018)

Therefore, the rise in the insecurity is not surprising in Nigeria as the country has in recent years witnessed a growing prevalence of divorce with significant regional or state variation. For example, BBC News (2024) reports that about 32% of marriages in Kano state do not last more than 6 months. Also, Umar Yakubu of

counterFred center reports in his paper "Deciphering the high rate of divorce in Nigeria that, at the last count, Kano state had over 1 million registered divorces. This is in line with Al Jazeera report of 2009 that suggested a roughly 1 million divorcees in Kano state. This number is so disturbing considering the consequences on children and society at large especially when replicated across Nigeria as divorce homes negatively affects child development and social stability.

There is a general increase in the divorce rate globally over the past few decades. Many researchers have attributed the increase on the change in social norms, rising level of individualism, greater legal access to divorce among others. The rate differs significantly among countries with developed nations such as USA and UK having higher rates while lower rates are recorded among developing nations especially in Africa and Asia. But the lower rates in the developing nations are attributable to underreporting due to cultural and religious stigma.

Though, there is no official figure about the actual number of divorce cases in Nigeria, but some researches and interactional evidences have shown a disturbing increase in recent times. Ntoimo and Akokuwebe (2014) have estimated the crude divorce rate among ever married persons between the ages of 10 and 85 in Nigeria to be 13.4. AkweyaTV (October, 2023) have cited that between 4000 to 5000 divorce petitions are being filed in courts in Abuja with most marriages lasting less than 2 years. This is in line with magistrate judge Ayuba Abubakar who warned of a high and alarming divorce rate among young couples as many married just 2 – 3 years (Vanguard, April, 2023).

Many factors contribute to divorce such as socio-economic, demographic, relationship and behavioral, cultural, legal, as well as psychological and emotional factors. For example, Okenwe, Essi & Wegbon (2025) reported that a family with a jobless husband stand a risk of divorce. Domestic violence is also a major cause of divorce in Nigeria as NPC (2019) reported a domestic violence in 1 out of every 3 marriages. Anyamu and Mohammed (2018) found early marriage to significantly increases divorce rate. A fab,ng summary claims that, over 80,000 divorce cases were recorded by hisbah in Kano between 2020 – 2021.

Researchers on divorce mainly focus on estimating divorce rates and factors that influence divorce as well as the consequences of divorce on children and society in general. While estimating the number of divorces is important, but the timing of the divorce (time–to–divorce) is equally important as it supplies information not only on divorce rate but also on the duration marriages take to fail. Going by this outrageous proportion of divorcees, one would even think of whether all recent marriages will experience divorce at long run, or only a negligeable proportion of marriages will eventually survive divorce. For a more promising future, with improved security that will also lead to economic development, it is time to curtail the growing rate of divorce in our society. One way to achieve this is to formulate and implement policies based on results obtained from appropriate statistical models used to describe the distribution of divorce data. Statistical techniques used to analyze divorce data cannot model time-to-event (time-to-divorce) data because of its peculiarity of censoring.

Therefore, this work intends to introduce the concept of survival analysis into the research of divorce rate. This is against the usual descriptive statistics, correlation analysis, t-test and regression analyses that are traditionally used to model such types of data. Cure survival models are used to estimate cure fraction as well as the survival function of the susceptible (uncure) sub-population (Cancho et al., 2019; Sreedevi and Sankaran, 2021; Zahraddeen et al., 2024). The concept of cure model was introduced by Boag (1949) and extended by Berkson and Gage (1952). Their concept is based on the assumption that, the population of time-to-event consists of a mixture of cure and uncure (susceptible) subjects as such the model is usually referred to as mixture cure model. Other cure models include the non-mixture cure model developed by Yakovlev, Asselain, Bardou, Hoang and Tsodikov (1993) and Defective models by Balka, Desmond and McNicholas (2019). Specifically, Mixture cure models (MCM) will be used to analyze time-to-divorce data of ever married women in Kano metropolis, Kano state, Nigeria. Therefore, time-to-divorce is modelled statistically as a response variable that depends on some couple's characteristics, therefore, emphasis is much on identifying those characteristics that either causes or influence the divorce. MCM will be used when the Kaplan- Meier divorce survival curve suggests a cure fraction in the data. Here Cure fraction refers to number of married women that will not experience the event divorce. Using the MCM, factors that causes divorce will be isolated from factors that either accelerates or decelerates timing of divorce among the sub-population of potential divorcees. Based on our knowledge, no research modelled divorce data with cure models.

The objectives of the paper are to estimate divorcee fraction, survival functions of the divorcee sub-group as well as effects of covariates on divorce probability and survival function of the divorcee sub-group from the time-to-divorce data.

To achieve the objectives, parametric and non-parametric techniques will be used. The rest of the paper is organized as follows; section 2 provides details on the statistical procedures and models used in the study. Results of the analysis and discussions are presented in section 3, while section 4 gives conclusion.

METHODOLOGY

In this section we provide the methodology used to conduct the analysis which includes description of the data used and important functions in survival analysis. We first used Kaplan-Meier Estimator (Kaplan and Meier, 1952) to graph the divorce survival curve and see visually if cure subjects possibly exists in the data. Further analysis such as the use of Parametric cure model follows based on the KM results.

Data

The data used in this research is from the ever-married women in Kano metropolis. Lack of satisfactory sampling frame and the sensitivity of the data necessitate the use of accessibility sampling which is a non-probability sampling technique. Accessibility sampling allows one to collect information from the individuals the researcher has access to, provided they are eligible respondents. A total of 1000 questionnaires were distributed and 918 were retrieved representing about 92% response rate, but only 604 were subsequently used because of completion. The response variable (time-to-divorce) was measured in years and as such any marriage of less than 1 year old was not included. Other questionnaires were rejected based on incomplete information. Some of the information was obtained with the help of Kano State Hisbah board. The main information collected from the respondents is time-to-divorce after marriage. Any married woman that did not experience divorce at the time of collecting the information has a censored status. The information was collected from October to December 2025. Some of the information collected includes age at marriage, occupation of the respondents and her spouse, whether she has co-wives, highest educational level, whether the marriage is blessed with children, frequency of domestic violence, how often the couples communicate about family issues and whether social media affects their marriage.

Survival Data Analysis

Let T be a non-negative random variable ($T \geq 0$) describing the length of time between marriage and divorce. Therefore, $f(t), t \geq 0$ is the probability density of T. The survival function which is the probability of a woman to remain in marriage (without divorce) beyond time t, is giving by

$$S(t) = P(T > t) = \int_t^{\infty} f(x)dx = 1 - F(t) \qquad (1)$$

Where, $F(t)$ is the cumulative distribution function.

The hazard function defined for $t > 0$,

$$h(t) = \frac{f(t)}{S(t)} = \lim_{\delta t \to 0} \frac{\mathrm{P}(\mathrm{t} \leq \mathrm{T} < t + \delta t | \mathrm{T} \geq \mathrm{t})}{\delta \mathrm{t}}, \qquad (2)$$

represents the probability that a married woman at time t experiences the event (divorce) in the next period δt (Tibshirani, 1982). Here, hazard function is the conditional probability of becoming a divorcee in the next period given that the woman is married now.

The cumulative hazard function given by

$$H(t) = \int_0^{\mathrm{t}} h(x)dx \qquad (3)$$

$or\ H(t) = -logS(t), or$ quivalently, $S(t) = exp\big(-H(t)\big)$.

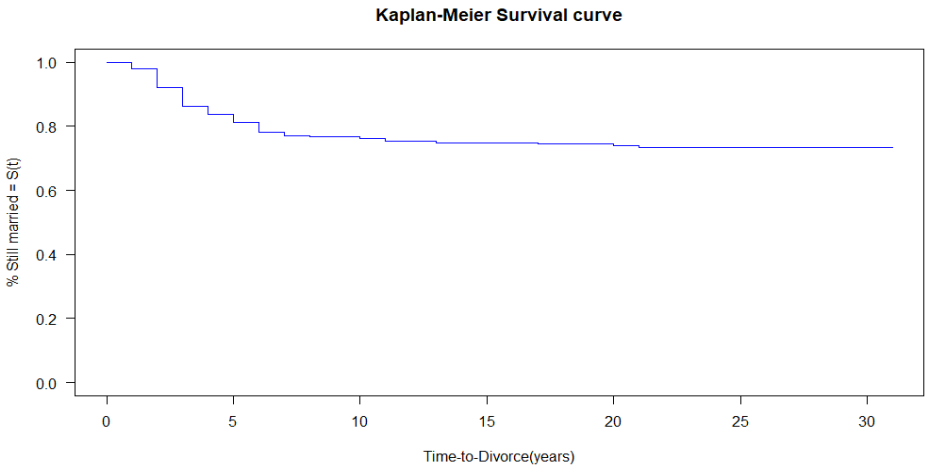
Survival models are built either using survival function or hazard function but the two functions describe the survival experience of a population in a different way which are equivalent..

Kaplan – Meier

Kaplan and Meier (1952) were the first to propose a non-parametric procedure of estimating baseline survival function in survival data. It is a step function curve, with each step representing the occurrence of the event of interest. Kaplan – Meier (KM) Estimator also known as Product Limit Estimator at time t is given by

$$\widehat{S_k}(t) = \prod_{i:t_i \leq t}^{n} \left(1 - \frac{d_i}{n_i}\right) \quad (4)$$

Where d_i represents the number of divorced women and n_i, the number of married women at risk of getting divorced at time t_i. $S_k(\lambda)$ is taken to be the married women fraction of the population of study where λ is the largest observed event (Maller and Zhao, 1996). The presence of cure subjects is portrayed in the KM curve by a long stable plateau at the right tail of the Kaplan meier curve.



The Kaplan Meier in fig 1 has shown the possibility of a cure fraction as such cure models are the appropriate models to use in analyzing the data. In this paper, Mixture Cure Model will be employed.

Log – Rank Test

This test is used to find out if survival is significantly different in a categorical variable. For example, if occupation of the spouse significantly influences marriage survival.

Mixture Cure Model (MCM)

Mixture cure model consists of two types of subjects, the cure and the uncured subjects mostly referred to as susceptible. Here, the cure subjects are the number of married women that will forever remain in marriage without divorce, here refers as marriage fraction while susceptible refers to potential divorcees. MCM described by survival function can be given by the following unconditional population survival function

$$S(t) = P(T > t) = pS_m(t) + (1 - p)S_d(t) \quad (5)$$

where $S_d(t)$ is the survival function of the potential divorcees (susceptible)

$S_m(t)$ is the survival function of the married women fraction.

P is the probability of being in marriage

T is the Time – to – divorce

t any specific time

Given Y as a marriage indicator (Y = 0, for married women and Y = 1 for being a divorcee), $S_m(t) = P(T > t/Y = 0) = 1$, is a degenerate survival function (Peng and Yu, 2021). Since it is known that, all cured (married women that will not experience divorce) subjects will survive beyond any time t. Therefore,

$$S(t) = p + (1 - p)S_d(t) \quad (6)$$

This shows that, the MCM is a two-parts model, the part describing the probability of being in marriage called Incidence, and the part that describes the distribution of the survival times of the potential divorcees called Latency. Therefore, MCM analysis harmonizes the two models representing the two parts. These two parts can be influenced by similar or different covariates.

Bernoulli distribution is always used to describe the incidence, since the random variable Y is binary. Logit function will be used to link the effect of covariates (z) to the being in marriage probability (p). Therefore, $logit[p(z)] = Z'\gamma$ where $Z'\gamma$ are linear predictors and γ is the vector of the coefficients of z (Farewell, 1982), therefore,

$$p(z) = \left(\frac{\exp(Z'\gamma)}{1+\exp(Z'\gamma)}\right) \quad (7)$$

In this paper, the latency part will be described using Accelerated failure time assumptions. The resulting Mixture Cure Models would be called AFT MCM.

Accelerated Failure Time (AFT) Model

In this model, a covariate effect either accelerates or decelerates the time-to-failure by some constants. It allows measuring the direct effect of the covariates on the survival time, and that makes interpretation of effect of covariate on the mean survival time easier unlike in the popular Cox Proportional Hazard (CPH) model. Here, a Weibull function will be used as the baseline distribution as being used by many researchers, hence the model would be called Weibull AFT Mixture Cure Model.

An AFT model as a function of explanatory variables X's can be given by the following equation

$$\ln(T) = \mu + \beta' x + \sigma\epsilon \quad (8)$$

Where μ is the intercept, $\beta' = (\beta_1, \cdots, \beta_p)$ a vector of regression coefficients, σ a scale parameter and ϵ, an error term which follows a particular distribution, which give rise to a specific AFT regression model.

Weibull Accelerated Failure Time Mixture Cure Model (Weibull AFT MCM)

Supposing X is a vector of covariates that influence the survival time of the divorcees (uncured sub-population) and β is the vector of the coefficients in X. According to Cox and Oakes (1984), the latency sub model ($S_d(t/x)$) is given as the function of the survival function of a baseline distribution ($S_{d0}(t)$) and linear predictors ($\beta' x$), that is

$$S_d(t/x) = S_{d0}(te^{-x'\beta}) \quad (9)$$

Then, according to Peng and Yu (2021),

$$\text{If } Log(T/Y = 1) = x'\beta + \sigma\epsilon \quad (10)$$

With σ as a scale parameter and ϵ an error term satisfying $P(e^{\sigma\epsilon} > t) = S_{d0}(t)$, then $T/Y = 1$ will follow the model (9).

With Weibull as the baseline distribution describing time-to-divorce data, the error term (ϵ) is assumed to follow an extreme value distribution, as such the resulting AFT will be Weibull. Therefore, the survival function of the divorcee sub population following Weibull distribution given covariates Xs is given by

$$S_d(t|x) = \exp\left[-(te^{-x'\beta})^{\frac{1}{\sigma}}\right] \quad (11)$$

Therefore, our corresponding MCM is a Weibull AFT MCM given by

$$S(t/x) = p(x) + (1 - p(x))\exp\left[-(te^{-x'\beta})^{\frac{1}{\sigma}}\right] \quad (12)$$

Here, the still married fraction, $p(x) = \lim_{t\to\infty} S(t/x)$, while the divorcee fraction is obtained as $1 - p(x)$.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 shows demographic variables used. Majority of the respondents have at least completed secondary school while about 78.6% of the respondents are still without divorce. Number of respondents that lived or are still living with co-wives is slightly lower than those that are alone with their spouse. Respondents have also reported that none of their spouse is unemployed with self employed having highest proportion (54%). About 85.1% of the respondents do not live with the husband's relatives. Only about 4.8% of the women never experience some form of domestic violence, with about 40% of them experienced domestic violence occasionally. Most of the respondents discuss with their spouse about family matters.

Table 1 Demographic variables

Covariates	Sample size (n)	Divorced (%)	Log-Rank (p)
Highest Educational Qualification			
No formal Education	37	6.1	0.00005
Primary	48	7.9	
Secondary	258 261	42.7	
Tertiary		43.2	
Marital Status			
Married	475	78.6	
Divorced	129	21.4	
Do you have co-wives?			
Yes	273	45.2	0.70000
No	331	54.8	
Husband Employment status	326	54	4e-05
Self employed			
Employed	278	46	
Unemployed	0	0	
Do you live with husband relatives?			
Yes	90	14.9	0.40000
No	414	85.1	
Domestic violence			
Often	167	27.6	1e08
Occasionally	241	39.9	
Rarely	167	27.6	
Never	29	4.8	

Discussion about family matters with spouse			
Often	46	7.6	3e07
Occasionally	241	39.9	
Rarely	266	44	
Never	51	8.4	

Kaplan Meier

Figure 1 has shown the possibility of "staying ever in marriage". The estimated fraction is 73.4%% with a divorce fraction estimated at 26.6%. Based on the log-rank test from table 1, qualification, husband employment status, frequency of domestic violence and how often couples discuss family matters were found to be statistically significant at 5% level of significant ($P < 0.05$). This means they tend to influence time-to-divorce. While, living with cowives or relatives are not significantly influencing time – to – divorce at 5% level of significance ($P > 0.05$).

Since researchers used to considers only non-cure survival regression models such as Accelerated Failure Time (AFT) model to analyze time-to-event data, we would also construct AFTM for comparison with its MCM counterpart, that is AFT MCM.

Table 2 has shown the estimate of cure fraction based on Kaplan-Meier and Weibull AFT MCM, the estimates are close to each other (73.4% versus 72.2%), which shows the appropriateness of the parametric model (Weibull AFT MCM) in estimating the cure fraction reliably. In comparing between Weibull Homogeneous model with Weibull AFT MCM, it is shown that, incorporating the cure fraction has greatly improve on the fit of the model based on AIC and Log-likelihood where the cure model has the lower AIC (614.6 versus 1245.6) and higher loglikelihood (-323.6 versus -620.8).

Table 2 Analysis of the Models

		Model	
	Kaplan-Meier	Weibull Homogeneous Model	Weibull AFT MCM
Cure Fraction	73.4		72.2
Log-Likelihood		-620.8	-323.6
AIC		1245.6	641.6

Analysis of Weibull AFT MCM

Table 4 presents results of analysis of Weibull AFT MCM. Based on the regression coefficients and p-values of both latency and incidence models, the following is deduced

Incidence sub – model

Husband employment status, domestic violence and discussing family matters with the spouse are factors that significantly causes divorce. Women married to self-employed husbands have significant probability of getting divorce than those married to husbands that are either public or private employees. Women that experience more domestic violence as well as those that do not discuss family matters with their spouse have significant probability of getting divorce.

Latency sub – model

Among potential divorces, level of education and discussing family matters with the spouse significantly influence time-to-divorce. Here, women with lower level of education are more likely to stay longer in marriage than those with higher level. Also, the more women discuss family matters with their husbands, the higher probability of staying longer in marriage.

Table 3 Weibull AFT Mcm With Covariates

Sub-model			Latency			Incidence
		Coefficients	TR	SE(Coeff)	P-Value	P-Value
	Wife Qualification RG=No formal education Primary Secondary Tertiary	 2.7468 -0.3859 -0.3779	 15.59 0.6798 0.6853	 5.0937 0.1288 0.1567	 0.5897 0.0027 0.0158	 0.4077 0.5906 0.2370
	Co-wives RG=YES NO	 -0.0706	 0.9318	 0.1955	 0.7182	 0.7006
Covariates	Husband Employment Status RG=Self employed Employed	 0.1693	 1.18	 0.2214	 0.4446	 0.0002
	Living with Husband Relatives RG=YES NO	 -0.0507	 0.9506	 0.1765	 0.7738	 0.4739
	Domestic violence RG=Often Occasionally Rarely Never	 -0.1738 -0.2127 3.1571	 0.8405 0.8084 23.5023	 0.1455 0.2537 6.0562	 0.2322 0.4019 0.6022	 0.0000 0.0000 0.8597
	Discussing family matters RG=Often Occasionally Rarely Never	 -13.7984 -13.2626 -13.2129	 1.0173 1.7383 1.8690	 0.8459 0.8775 0.8566	 0.0000 0.0000 0.0000	 0.0002 0.0073 0.0041

CONCLUSION

Introducing the use of mixture cure model was able to estimate divorce fraction as well as separate factors that causes divorce from factors that delay or speed up divorce among potential divorcees. Factors that significantly caused divorce include Husband employment status, Domestic violence and Discussing family matters with spouse. While, level of education and Discussing family matters with the spouse significantly influences timeto-divorce. It is seen that, a factor can both be significant in incidence and latency sub model, such as the covariate "Discussing family matters with the spouse" where it significantly causes divorce among married women as well as significantly influence time-to-divorce among potential divorcees.

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Conflict Of Interest

No conflict of interested reported by the authors

REFERENCES

1. Adeyemi, B. A. (2011). The impact of broken homes on children. Ibadan: University Press.
2. AkweyaTV (Oct 2023). Cited 4,000–5,000 divorce petitions filed in "courts in Abuja," with most marriages lasting less than two years. By Idajor Ajah, Program manager, November 16, 2023, 12:16am.
3. Aljazeera (2012). Nigeria's Kano shakes off divorce capital, by Mohammed Adow. Published on i. July, 16, 2012.
4. Anyama, S. C., & Mohammed, T. A. (2018). Impact of girl-child early marriage on the level of divorce among some northerners in Kano State, Nigeria. International Journal of Educational Research, 5(1). https://doi.org/10.4314/ijer.v5i1.1
kubanni.abu.edu.ngkubanni.abu.edu.ng+4ajol.info+4ir.unilag.edu.ng+4
5. Balka, J., Desmond, A. F. & McNicholas, P. D. 2009. Review and implementation of cure models based on first hitting times for Wiener processes. Lifetime Data Anal. 15: 147 – 176.
6. Bashir, S. (2016). The impact of divorce on parents and their children in Nasarawa LGA, Kano i. State (Unpublished undergraduate project). Bayero University, Kano, Nigeria.
7. BBC News. (2024, March 15). Kano: Nigeria's divorce capital where 32% of marriages end i. within six months. https://www.bbc.com/news/articles/cgl7rm70gv3o
8. Berkson, A. J & Gage, R. P. (1952). Survival Curve for Cancer Patients Following i. Treatment. Journal of the American Statistical Association. 47: 501 – 515.
9. Boag, J.W. (1949). Maximum likelihood estimates of the proportion of patients cured by a. cancer therapy. Journal of Royal Statistical Society-Series B. 11(1): 15-53.
10. Cancho, V., Barriga, G. Leao, J. & Saulo, H. (2019b). Survival model induced by discrete a. frailty for modeling of lifetime data with long-term survivors and change-point. Communication in Statistics-Theory and Methods. DOI:10.1080/03610926.2019.1648826
11. Cox D. R. & Oakes D. (1984). Analysis of Survival Data. New York, NY Chapman and i. Hall Ltd.
12. Ehsan, U. I. H. & Saeed, K. (2024). The Influence of Broken Homes on Students' Academic i. Performance in Schools. Journal of Political Stability Archive, 2(4): 340 – 361.
13. Eke, M. (2013). The role of broken homes in juvenile delinquency in Nigeria. International a. Journal of Social Sciences, 5(2), 54–67.
14. Fab.ng. (2024, July). Why is Kano State the divorce capital of Nigeria? Fab.ng. Retrieved June a. 4, 2025, from https://fab.ng/2024/07/why-is-kano-state-the-divorce-capital-of-nigeria- b. fab-ng/
15. Farewell, V. T. 1982. The use of mixture models for the analysis of survival data with long- a. term survivors. Biometrics. 38: 1041–1046.
16. Kaplan, E. L. & P. Meier, P. 1958. Nonparametric estimation from incomplete a. observations. Journal of the American Statistical Association. 53 (282): 457–481.
17. Maller, R., & X, Zhao. 1996. Survival Analysis with Long-Term Survivors. Wiley, New a. York.
18. National Population Commission (Nigeria) & ICF. (2019). Nigeria Demographic and Health Survey 2018 (Final Report No. FR359). Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF. https://dhsprogram.com/pubs/pdf/FR359/FR359.pdf
19. Ntoimo, L. F. C. & Akokuwebe, M. E. (2014). Prevalence and Patterns of Marital Dissolution a. in Nigeria. The Nigerian Journal of Sociology and Anthropology, 12(2), 1 – 15.
20. Okafor,.O. J., & Egenti, U. P. (2021). Influence of Broken Homes on Academic Achievement of Secondary Schools Students in Nsukka Education Zone of Enugu State. Journal of Educational Research and Development, 4(1): 144 – 152.
21. Okenwe, I., Essi, I. D., & Wegbom, A. I. (2025). Comparison Between Cox and Weibull Survival Models in Estimating the Determinants of Divorce in Rivers State, Nigeria. African Journal of Mathematics and Statistics Studies 8(1): 84-96. DOI:10.52589/AJMSSCCAWOUGC
22. Peng, Y. & Yu, B. (2021). Cure Models: Methods, Applications and Implementation. a. Chapman & Hall/CRC Biostatistics Series, CRC Press, Taylor and Francia Group.
23. Sreedevi, E. P. & Sankaran, P. G. 2021. Statistical methods for estimating cure fraction of a. COVID-19 patients in India. Model Assisted Statistics and Applications 16: 59 – 64.
24. Tibshirani, R. 1982. A Plain Man's Guide to the Proportional Hazards Model. Clinical a. Investigative Medicine. 5: 63 – 68.
25. UNICEF Nigeria. (2017). The state of the Nigerian child: Challenges and opportunities. Abuja: a. UNICEF Nigeria. https://www.unicef.org/nigeria/reports/state-nigerian-child

26. Yakovlev, A.Y., Asselain, B., Bardou, V. J., Fourquet, A., Hoang, R., Rochefediere, A. & Tsodikov, A. D. 1993. A simple stochastic model of tumor recurrence and its Applications to data on premenopausal breast cancer as cited in Balka, J., Desmond, A. F. & McNicholas, P. D. 2009. Review and implementation of cure models based on first hitting times for Wiener processes. Lifetime Data Anal. 15: 147–176.
27. Abdullahi , Khalid, Abd Rahman & Kamisan (2024). CPH and AFT Models for Time-To- Employment Data in the Presence of Cure Fraction. International Journal of Research and Innovation in Social Science. VIII(XII), 38 – 49. DOI : https://dx.doi.org/10.47772/IJRISS.2024.8120004