

Free Full Text from Publisher [Look Up Full Text](#) [Find PDF](#) [Full Text Options](#) [Export...](#) [Add to Marked List](#)

## Risk Factors for 3-Year-Mortality and a Tool to Screen Patient in Dialysis Population

By: [Bujang, MA](#) (Bujang, M. A.)<sup>[1]</sup>; [Kuan, PX](#) (Kuan, P. X.)<sup>[1]</sup>; [Sapri, FE](#) (Sapri, F. E.)<sup>[1]</sup>; [Liu, WJ](#) (Liu, W. J.)<sup>[2]</sup>; [Musa, R](#) (Musa, R.)<sup>[3]</sup>

INDIAN JOURNAL OF NEPHROLOGY  
 Volume: 29 Issue: 4 Pages: 235-241  
 DOI: 10.4103/ijn.IJN\_152\_18  
 Published: JUL-AUG 2019  
 Document Type: Article

### Abstract

Introduction: Clinical parameters especially co-morbidities among end stage renal disease (ESRD) patients are associated with mortality. This study aims to determine the risk factors that are associated with mortality within three years among prevalent patients with ESRD. Methods: This is a cohort study where prevalent ESRD patients' details were recorded between May 2012 and October 2012. Their records were matched with national death record at the end of year 2015 to identify the deceased patients within three years. Four models were formulated with two models were based on logistic regression models but with different number of predictors and two models were developed based on risk scoring technique. The preferred models were validated by using sensitivity and specificity analysis. Results: A total of 1332 patients were included in the study. Majority succumbed due to cardiovascular disease (48.3%) and sepsis (41.3%). The identified risk factors were mode of dialysis ( $P < 0.001$ ), diabetes mellitus ( $P < 0.001$ ), chronic heart disease ( $P < 0.001$ ) and leg amputation ( $P = 0.016$ ). The accuracy of four models was almost similar with AUC between 0.680 and 0.711. The predictive models from logistic regression model and risk scoring model were selected as the preferred models based on both accuracy and simplicity. Besides the mode of dialysis, diabetes mellitus and its complications are the important predictors for early mortality among prevalent ESRD patients. Conclusions: The models either based on logistic regression or risk scoring model can be used to screen high risk prevalent ESRD patients.

### Keywords

**Author Keywords:** End stage renal disease; mortality; risk factors; screening tool; sensitivity and specificity  
**KeyWords Plus:** QUALITY-OF-LIFE; CORONARY-HEART-DISEASE; UNITED-STATES; MORTALITY; ESRD; PREDICTION; ASSOCIATION; DEATH

### Author Information

**Reprint Address:** Bujang, MA (reprint author)

Sarawak Gen Hosp, Clin Res Ctr, Jalan Tun Ahmad Zaidi Adruce, Kuching, Sarawak, Malaysia.

### Addresses:

[ 1 ] Sarawak Gen Hosp, Clin Res Ctr, Jalan Tun Ahmad Zaidi Adruce, Kuching, Sarawak, Malaysia

[ 2 ] Hosp Sultanah Aminah, Haemodialysis Unit, Dept Med, Johor Baharu, Johor, Malaysia

[ 3 ] Int Islamic Univ, Kulliyah Med, Dept Psychiat, Kuantan, Pahang, Malaysia

**E-mail Addresses:** [adam@crc.gov.my](mailto:adam@crc.gov.my)

### Funding

Funding Agency	Show details	Grant Number
Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), Malaysia		06-01-08-SF0093

[View funding text](#)

### Publisher

WOLTERS KLUWER MEDKNOW PUBLICATIONS, WOLTERS KLUWER INDIA PVT LTD , A-202, 2ND FLR, QUBE, C T S NO 1498A-2 VILLAGE MAROL, ANDHERI EAST, MUMBAI, 400059, INDIA

### Categories / Classification

**Research Areas:** Urology & Nephrology

**Web of Science Categories:** Urology & Nephrology

[See more data fields](#)

### Citation Network

In Web of Science Core Collection

**0**  
Times Cited

[Create Citation Alert](#)

---

**30**  
Cited References

[View Related Records](#)

### Use in Web of Science

Web of Science Usage Count

**0** **1**  
Last 180 Days Since 2013

[Learn more](#)

This record is from:  
**Web of Science Core Collection**  
 - Emerging Sources Citation Index

---

**Suggest a correction**

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

## Cited References: 30

Showing 30 of 30 [View All in Cited References page](#)

(from Web of Science Core Collection)

1. **Trend analysis of medically certified death in Malaysia, 1995-2010**  
 By: Adnan, TH; Bujang, MA; Supramaniam, P.  
 J Health Inform Dev Ctries Volume: 6 Pages: 396-405 Published: 2012

Times Cited: 6

2. **The TIMI risk score for unstable angina/non-ST elevation MI - A method for prognostication and therapeutic decision making** Times Cited: 1,906  
By: Antman, EM; Cohen, M; Bernink, PJLM; et al.  
JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION Volume: 284 Issue: 7 Pages: 835-842 Published: AUG 16 2000
3. **Association of Race and Body Mass Index With ESRD and Mortality in CKD Stages 3-4: Results From the Kidney Early Evaluation Program (KEEP)** Times Cited: 28  
By: Babayev, Revekka; Whaley-Connell, Adam; Kshirsagar, Abhijit; et al.  
Group Author(s): KEEP Investigators  
AMERICAN JOURNAL OF KIDNEY DISEASES Volume: 61 Issue: 3 Pages: 404-412 Published: MAR 2013
4. **Prediction of early death in end-stage renal disease patients starting dialysis** Times Cited: 122  
By: Barrett, BJ; Parfrey, PS; Morgan, J; et al.  
AMERICAN JOURNAL OF KIDNEY DISEASES Volume: 29 Issue: 2 Pages: 214-222 Published: FEB 1997
5. **A COMPARISON OF CAUSE OF DEATH BETWEEN PATIENTS TREATED WITH HEMODIALYSIS AND PERITONEAL-DIALYSIS** Times Cited: 107  
By: BLOEMBERGEN, WE; PORT, FK; MAUGER, EA; et al.  
JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY Volume: 6 Issue: 2 Pages: 184-191 Published: AUG 1995
6. **A comparison between convenience sampling versus systematic sampling in getting the true parameter in a population: Explore from a clinical database: The Audit Diabetes Control Management (ADCM) registry in 2009** Times Cited: 1  
By: Bujang, MA; Ghani, PA; Zolkepli, NA; et al.  
P INT C STAT SCI BUS Published: 2012  
[\[Show additional data\]](#)
7. **Depression, anxiety and stress among patients with dialysis and the association with quality of life** Times Cited: 16  
By: Bujang, Mohamad A.; Musa, Ramli; Liu, Wen J.; et al.  
ASIAN JOURNAL OF PSYCHIATRY Volume: 18 Pages: 49-52 Published: DEC 2015
8. **An Audit of the Statistics and the Comparison with the Parameter in the Population** Times Cited: 8  
By: Bujang, Mohamad Adam; Sa'at, Nadiah; Joys, A. Reena; et al.  
22ND NATIONAL SYMPOSIUM ON MATHEMATICAL SCIENCES (SKSM22) Book Series: AIP Conference Proceedings Volume: 1682 Article Number: 050019 Published: 2015
9. **Requirements for Minimum Sample Size for Sensitivity and Specificity Analysis** Times Cited: 72  
By: Bujang, Mohamad Adam; Adnan, Tassha Hilda  
JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH Volume: 10 Issue: 10 Pages: YE1-YE6 Published: OCT 2016
10. **Predicting Six-Month Mortality for Patients Who Are on Maintenance Hemodialysis** Times Cited: 230  
By: Cohen, Lewis M.; Ruthazer, Robin; Moss, Alvin H.; et al.  
CLINICAL JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY Volume: 5 Issue: 1 Pages: 72-79 Published: JAN 2010
11. **Filtration Markers as Predictors of ESRD and Mortality in Southwestern American Indians With Type 2 Diabetes** Times Cited: 20  
By: Foster, Meredith C.; Inker, Lesley A.; Hsu, Chi-yuan; et al.  
Group Author(s): CKD Biomarkers Consortium  
AMERICAN JOURNAL OF KIDNEY DISEASES Volume: 66 Issue: 1 Pages: 75-83 Published: JUL 2015
12. **5-YEAR SURVIVAL FOR END-STAGE RENAL-DISEASE PATIENTS IN THE UNITED-STATES, EUROPE, AND JAPAN, 1982 TO 1987** Times Cited: 275  
By: HELD, PJ; BRUNNER, F; ODAKA, M; et al.  
AMERICAN JOURNAL OF KIDNEY DISEASES Volume: 15 Issue: 5 Pages: 451-457 Published: MAY 1990
13. **Why most published research findings are false** Times Cited: 4,249  
By: Ioannidis, JPA  
PLOS MEDICINE Volume: 2 Issue: 8 Pages: 696-701 Article Number: e124 Published: AUG 2005
14. **BP Control and Long-Term Risk of ESRD and Mortality** Times Cited: 36  
By: Ku, Elaine; Gassman, Jennifer; Appel, Lawrence J.; et al.  
JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY Volume: 28 Issue: 2 Pages: 671-677 Published: FEB 2017
15. **Quality of life in dialysis: A Malaysian perspective** Times Cited: 9  
By: Liu, Wen J.; Musa, Ramli; Chew, Thian F.; et al.  
HEMODIALYSIS INTERNATIONAL Volume: 18 Issue: 2 Pages: 495-506 Published: APR 2014
16. **The prevalence of nontraditional risk factors for coronary heart disease in patients with chronic kidney disease** Times Cited: 292  
By: Muntner, P; Hamm, LL; Kusek, JW; et al.  
ANNALS OF INTERNAL MEDICINE Volume: 140 Issue: 1 Pages: 9-17 Published: JAN 6 2004
17. **Cardiovascular Risk Factors in CKD Associate with Both ESRD and Mortality** Times Cited: 42  
By: Muntner, Paul; Judd, Suzanne E.; Gao, Liyan; et al.  
JOURNAL OF THE AMERICAN SOCIETY OF NEPHROLOGY Volume: 24 Issue: 7 Pages: 1159-1165 Published: JUL 2013

18. **Psychosocial variables, quality of life, and religious beliefs in ESRD patients treated with hemodialysis** Times Cited: 148  
By: Patel, SS; Shah, VS; Peterson, RA; et al.  
AMERICAN JOURNAL OF KIDNEY DISEASES Volume: 40 Issue: 5 Pages: 1013-1022 Published: NOV 2002
19. **Evaluation of creatine kinase and liver enzymes in identification of severe dengue** Times Cited: 3  
By: Sani, Saiful Safuan Md; Han, Winn Hui; Bujang, Mohamad Adam; et al.  
BMC INFECTIOUS DISEASES Volume: 17 Article Number: 505 Published: JUL 21 2017
20. **Mortality caused by sepsis in patients with end-stage renal disease compared with the general population** Times Cited: 352  
By: Sarnak, MJ; Jaber, BL  
KIDNEY INTERNATIONAL Volume: 58 Issue: 4 Pages: 1758-1764 Published: OCT 2000
21. **Risk Factors and Prediction Models for Retinopathy of Prematurity** Times Cited: 7  
By: Senthil, Mallika Prem; Salowi, Mohamad Aziz; Bujang, Mohamad Adam; et al.  
MALAYSIAN JOURNAL OF MEDICAL SCIENCES Volume: 22 Issue: 5 Pages: 57-63 Published: SEP 2015
22. **Projecting the United States ESRD population: Issues regarding treatment of patients with ESRD** Times Cited: 61  
By: Szczech, LA; Lazar, IL  
KIDNEY INTERNATIONAL Volume: 66 Supplement: 90 Pages: S3-S7 Published: SEP 2004
23. **Validation of the Malay version of children's depression inventory** Times Cited: 7  
By: Tan, S. M.; Loh, S. F.; Bujnag, M. A.; et al.  
International Medical Journal Volume: 20 Issue: 2 Pages: 188- 191 Published: 2013  
[\[Show additional data\]](#)
24. Title: [not available] Times Cited: 3  
Group Author(s): The National Renal Registry  
22ndReport of the Malaysian Dialysis and Transplant Registry 2014 Published: 2015  
Publisher: Malaysian Society of Nephrology, Kuala Lumpur
25. **Quality of life in end-stage renal disease patients** Times Cited: 303  
By: Valderrabano, F; Jofre, R; Lopez-Gomez, JM  
AMERICAN JOURNAL OF KIDNEY DISEASES Volume: 38 Issue: 3 Pages: 443-464 Published: SEP 2001
26. **Predicting Mortality in Incident Dialysis Patients: An Analysis of the United Kingdom Renal Registry** Times Cited: 76  
By: Wagner, Martin; Ansell, David; Kent, David M.; et al.  
AMERICAN JOURNAL OF KIDNEY DISEASES Volume: 57 Issue: 6 Pages: 894-902 Published: JUN 2011
27. **Hypertension as a risk factor for renal disease. Review of clinical and epidemiological evidence** Times Cited: 79  
By: Whelton, PK; Klag, MJ.  
Hypertension Volume: 13 Pages: 119-27 Published: 1989
28. **Prediction of coronary heart disease using risk factor categories** Times Cited: 5,922  
By: Wilson, PWF; D'Agostino, RB; Levy, D; et al.  
CIRCULATION Volume: 97 Issue: 18 Pages: 1837-1847 Published: MAY 12 1998
29. **Validation of the Malay version of Berlin questionnaire to identify Malaysian patients for obstructive sleep apnea** Times Cited: 2  
By: Yunus, A; Seet, W; Adam, B Mohamad; et al.  
Malaysian Family Physician Volume: 8 Issue: 1 Pages: 03-09 Published: 2013  
[\[Show additional data\]](#)
30. **Validation of the Malay version of Berlin questionnaire to identify Malaysian patients for obstructive sleep apnea.** Times Cited: 8  
By: Yunus, A; Seet, W; Mohamad Adam, B; et al.  
Malaysian family physician : the official journal of the Academy of Family Physicians of Malaysia Volume: 8 Issue: 1 Pages: 5-11 Published: 2013

Showing 30 of 30 [View All in Cited References page](#)

