



Document details

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)[Full Text](#) [View at Publisher](#)International Journal of Engineering and Technology(UAE) [Open Access](#)
Volume 7, Issue 4, 2018, Pages 54-58


Virtual trial of glycaemic control performance and nursing workload assessment in diabetic critically ill patients (Article)

Razak, A.A.^a  Abu-Samah, A.^a Razak, N.N.^a Baharudin, S.^a Suhaimi, F.^b Jamaludin, U.^c Ralib, A.^d Mat-Nor, M.B.^d ^aInstitute of Engineering Infrastructure, College of Engineering, Universiti Tenaga Nasional, Kajang, Selangor, 43000, Malaysia^bAdvanced Medical and Dental Institute, USM, Bertam, Kepala Batas Penang, 13200, Malaysia^cHuman Energy Focus Group (HPEG), Universiti Malaysia Pahang, Pekan, Pahang, 26600, Malaysia[View additional affiliations](#) 

Abstract

[View references \(27\)](#)

Tight glycaemic control in critically ill patients is used to reduce mortality in intensive care units. However, its usage is debatable in reducing hypoglycaemia or accurately maintain normoglycaemia level. This paper presents the assessment for two 'wider' Stochastic TARgeted (STAR) glycemc controllers, namely Controller A (blood glucose (BG) target 4.4-8.0 mmol/L) and Controller B (BG target 4.4-10.0 mmol/L) with 1 to 3 hour nursing interventions. These controllers were assessed to determine the better control on diabetic and non-diabetic patients. 66 diabetic and 66 non-diabetic critically ill patient's data from Hospital Tunku Ampuan Afzan (HTAA) were employed for virtual trial simulations with a clinically validated physiological model. Performance metrics were assessed within the percentage time in band (TIB) of 4.4 to 8.0 mmol/L, 4.4 to 10.0 mmol/L, and 6.0 to 10.0 mmol/L. Controller A shows better performance in normoglycaemic TIB of 4.4 to 10.0 mmol/L where non-diabetic and diabetic patients achieved 92.5% and 83.8% respectively. In conclusion, Controller A is higher in efficiency and safer to be used for both patients cohorts. However, higher clinical interventions in diabetic patients within this control raise the alarm to reduce nursing workload. This is believed to improve clinical interventions burnout and ensure patient's comfortability. © 2018 Authors.

SciVal Topic Prominence Topic: [Insulin](#) | [Insulin Resistance](#) | [intravenous glucose](#)Prominence percentile: 79.791 

Author keywords

[Blood Glucose](#) [Diabetes](#) [Glycaemic control](#) [Model-based virtual trial](#) [STAR Protocol](#)

ISSN: 2227524X

Source Type: Journal

Original language: English

DOI: 10.14419/ijet.v7i4.35.22322

Document Type: Article

Publisher: Science Publishing Corporation Inc

References (27)

[View in search results format >](#)[All](#) [Export](#) [Print](#) [E-mail](#) [Save to PDF](#) [Create bibliography](#)Metrics 

0 Citations in Scopus

0 Field-Weighted
Citation ImpactPlumX Metrics Usage, Captures, Mentions,
Social Media and Citations
beyond Scopus.

Cited by 0 documents

Inform me when this document
is cited in Scopus:[Set citation alert >](#)[Set citation feed >](#)

Related documents

Efficacy and safety of SPRINT and STAR protocol on Malaysian critically-ill patients

Ahamad, N. , Razak, N. , Jamaluddin, U. (2016) *IECBES 2016 - IEEE-EMBS Conference on Biomedical Engineering and Sciences*

Decision support for parenteral nutrition supplementation in ICU using model-based glycemc control protocol

Abu-Samah, A. , Razak, N.N. , Suhaimi, F.M. (2018) *IFMBE Proceedings*

In silico assessment of a computerized model-based glycaemic control approach in a Belgian medical intensive care unit

Penning, S. , Lambermont, B. , Desai, T. (2014) *IFAC Proceedings Volumes (IFAC-PapersOnline)*

- 1 Silva-Perez, L.J., Benitez-Lopez, M.A., Varon, J., Surani, S. 'Management of critically ill patients with diabetes' (2017) *World J. Diabetes*, 8 (3), p. 89. Cited 5 times.

Find more related documents in Scopus based on:

Authors > Keywords >

- 2 Krinsley, J.S., Maurer, P., Holewinski, S., Hayes, R., McComsey, D., Umpierrez, G.E., Nasraway, S.A. Glucose Control, Diabetes Status, and Mortality in Critically Ill Patients: The Continuum From Intensive Care Unit Admission to Hospital Discharge

(2017) *Mayo Clinic Proceedings*, 92 (7), pp. 1019-1029. Cited 8 times.

<http://www.journals.elsevier.com/mayo-clinic-proceedings>

doi: 10.1016/j.mayocp.2017.04.015

[View at Publisher](#)

- 3 Classification and diagnosis of diabetes

(2017) *Diabetes Care*, 40, pp. S11-S24. Cited 440 times.

http://care.diabetesjournals.org/content/40/Supplement_1/S11.full-text.pdf

doi: 10.2337/dc17-S005

[View at Publisher](#)

- 4 Van Den Berghe, G., Wouters, P., Weekers, F., Verwaest, C., Bruyninckx, F., Schetz, M., Vlasselaers, D., (...), Bouillon, R. Intensive insulin therapy in critically ill patients

(2001) *New England Journal of Medicine*, 345 (19), pp. 1359-1367. Cited 7351 times.

doi: 10.1056/NEJMoa011300

[View at Publisher](#)

- 5 Suhaimi, F., Le Compte, A., Preiser, J.-C., Shaw, G.M., Massion, P., Radermecker, R., Pretty, C.G., (...), Chase, J.G. What makes tight glycemic control tight? The impact of variability and nutrition in two clinical studies

(2010) *Journal of Diabetes Science and Technology*, 4 (2), pp. 284-298. Cited 35 times.

<http://dst.sagepub.com/content/by/year>

doi: 10.1177/193229681000400208

[View at Publisher](#)

- 6 Malesker, M.A., Foral, P.A., Christensen, K.J., Hilleman, D.E., Chang, J.A., McPhillips, A.C. An Efficiency Evaluation of Protocols for Tight Glycemic Control in Intensive Care Units

(2007) *American Journal of Critical Care*, 16 (6), pp. 589-598. Cited 37 times.

<http://ajcc.aacnjournals.org/cgi/content/full/16/6/589>

[View at Publisher](#)

- 7 Krinsley, J.S., Preiser, J.-C. Time in blood glucose range 70 to 140 mg/dl >80% is strongly associated with increased survival in non-diabetic critically ill adults ([Open Access](#))

(2015) *Critical Care*, 19 (1), art. no. 179. Cited 52 times.

<http://ccforum.com/content/17>

doi: 10.1186/s13054-015-0908-7

[View at Publisher](#)