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THE EFFECT OF INSULIN INFUSION PROTOCOL UTILIZING A SPREADSHEET PROGRAM ON GLYCEMIC CONTROL OF PATIENTS WITH DIABETIC KETOACIDOSIS IN THE INTENSIVE CARE UNITS

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INTRODUCTION
Diabetic Ketoacidosis (DKA) is the most common and potentially life-threatening complication of diabetes mellitus. A lack of prompt and accurate management can lead to morbidity and mortality. Therefore, an insulin infusion protocol was developed to help reduce human errors by adjusting the insulin infusion rate and warning doctors about correctable fatal complications during the DKA crisis.

METHODOLOGY
The protocol was developed using a spreadsheet program based on the treatment guidelines of DKA. After the protocol development, a randomized controlled trial was performed to compare 22 patients with DKA treated with insulin infusion protocol to 22 patients with DKA treated with conventional protocol. The treatment time was defined as the time to switch from intravenous insulin to intermediate-acting subcutaneous insulin. We compared the treatment time and adverse events between groups. Moreover, the nurses' satisfaction score of the protocol was collected using a Likert scale. This study was conducted at intensive care units, at Maharat Nakhon Ratchasima Hospital, and data were collected from December 1, 2021 to October 31, 2022.

RESULTS
Forty-four patients were included in the study. The mean age of the patients was 51.2 ± 16.9 and 42.8 ± 13.7 years in the intervention group and the control group, respectively. Approximately 60% of the patients in both groups had severe DKA. The treatment time was 21.5 ± 11.01 hours in the intervention group, which is significantly lower compared to 28.5 ± 18.26 hours in the control group ($p = 0.047$). Also, the rates of hypoglycemia ($p = 0.607$) and hypokalemia ($p = 0.531$) were not significantly different between the groups. The nurses' satisfaction in using the protocol was moderate to high.

CONCLUSION
The insulin infusion protocol is easy to use and is effective in reducing the time to switch from intravenous insulin to subcutaneous intermediate-acting insulin. This protocol should be employed in hospitals that have large numbers of patients to prevent medical errors. It may also be considered for use in non-intensive care settings in the future.

KEYWORDS
diabetic ketoacidosis, insulin infusion protocol, Time to switch forms of insulin