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COMPARING MECHANICAL PUMP AND MANUAL PUSH FOR SHORT-DURATION SUBCUTANEOUS INFUSIONS: A NURSING PREFERENCE SURVEY STUDY

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INTRODUCTION AND AIMS

Subcutaneous administration of medications is increasingly favored in clinical and home settings due to its cost-efficiency, ease of use, and ability to reduce reliance on intravenous access. However, manual push technique for short-duration infusions can present challenges such as inconsistent flow rates, increased patient discomfort, and physical strain for healthcare providers.

This study evaluated nurse satisfaction and usability of a non-electronic, spring-driven mechanical infusion pump (e.g., the FreedomEDGE® Infusion System) compared to manual push technique during inpatient administration of a short-duration subcutaneous therapy.

RESULTS

A total of 33 nurses completed the survey. Of these, 91% (30 nurses) found the non-electronic, spring-driven mechanical infusion system easy to use, and an equal proportion (91%, 30 nurses) reported that the setup time was faster compared to manual push administration. In terms of functionality, 64% (21) reported no issues, while24% (8) experienced at least one malfunction. An additional 12% (4) observed a temporary slowdown in infusion, consistent with the device's adaptive flow mechanism, which automatically reduces flow in response to increased pressure at the infusion site and resumes normal flow once pressure decreases. Among nurses who encountered issues, 59% (19) felt confident in their ability to troubleshoot.

Notably, 97% (29) of respondents reported having more time to engage with patients during the infusion process. Furthermore, 73% (22) perceived a reduction in patient discomfort, and 81% (26) experienced less hand strain compared to manual administration. Overall, 97% (32) of nurses recommended the mechanical infusion system for short-duration subcutaneous infusions.

METHODS

A retrospective, multicenter survey study was conducted across nine hospitals in Denmark. Participating nurses regularly administered subcutaneous infusions and received standardized training on the non-electronic, spring-driven mechanical infusion system before using it multiple times in clinical practice. Following use, they completed a survey evaluating ease of use, training clarity, troubleshooting confidence, nurse-patient interaction, and physical comfort for both providers and patients. Responses were reported descriptively without further statistical analysis.

MEASURE	RESULT % (N)
Found the infusion system easy to use	**91% (30)**
Said setup time was faster than manual push	**91% (30)**
Reported no functionality issues	**64% (21)**
Had more time for patient interaction	**97% (29)**
Observed reduced patient discomfort	**73% (22)**
Experienced less hand strain	**81% (26)**
Would recommend mechanical infusion system	**97% (32)**

CONCLUSIONS

The non-electronic, spring-driven mechanical infusion system was well received by nurses in inpatient settings, offering a user-friendly, efficient alternative to manual push for short-duration subcutaneous administration. The device improved workflow, enhanced patient-provider interaction, and reduced physical discomfort for both parties. While 24% (8 nurses) of users experienced malfunctions, the rate was comparable to that of electronic pumps, and most nurses felt capable of resolving issues independently. These findings support the mechanical infusion system's integration into hospital practice for subcutaneous medication delivery where short infusion times are required. Future research may explore broader use across different clinical contexts and assess design enhancements to further improve functionality.

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