

Butterflies in my chest:
Investigating the physiological effects of a novel digital therapeutic intervention on critically ill patients with hyperactive delirium



PRESENTER:

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BACKGROUND: Delirium is a neuropsychiatric disorder that is associated with high rates of morbidity and mortality, affecting up to 87 percent of critically ill patients¹. Agitation is a common complication of delirium that increases the risk of harm to both patients and caregivers. Current strategies for managing delirium-associated agitation are worsen delirium and carry other significant risks of harm. The *MindfulGarden* is a behavioural modification platform that has been shown to reduce agitation in patients with delirium by displaying variable amounts of realistic animations of butterflies and flowers on a high-definition screen. This study aims to determine whether it has an effect on physiological variables in patients with critical illness with hyperactive delirium.

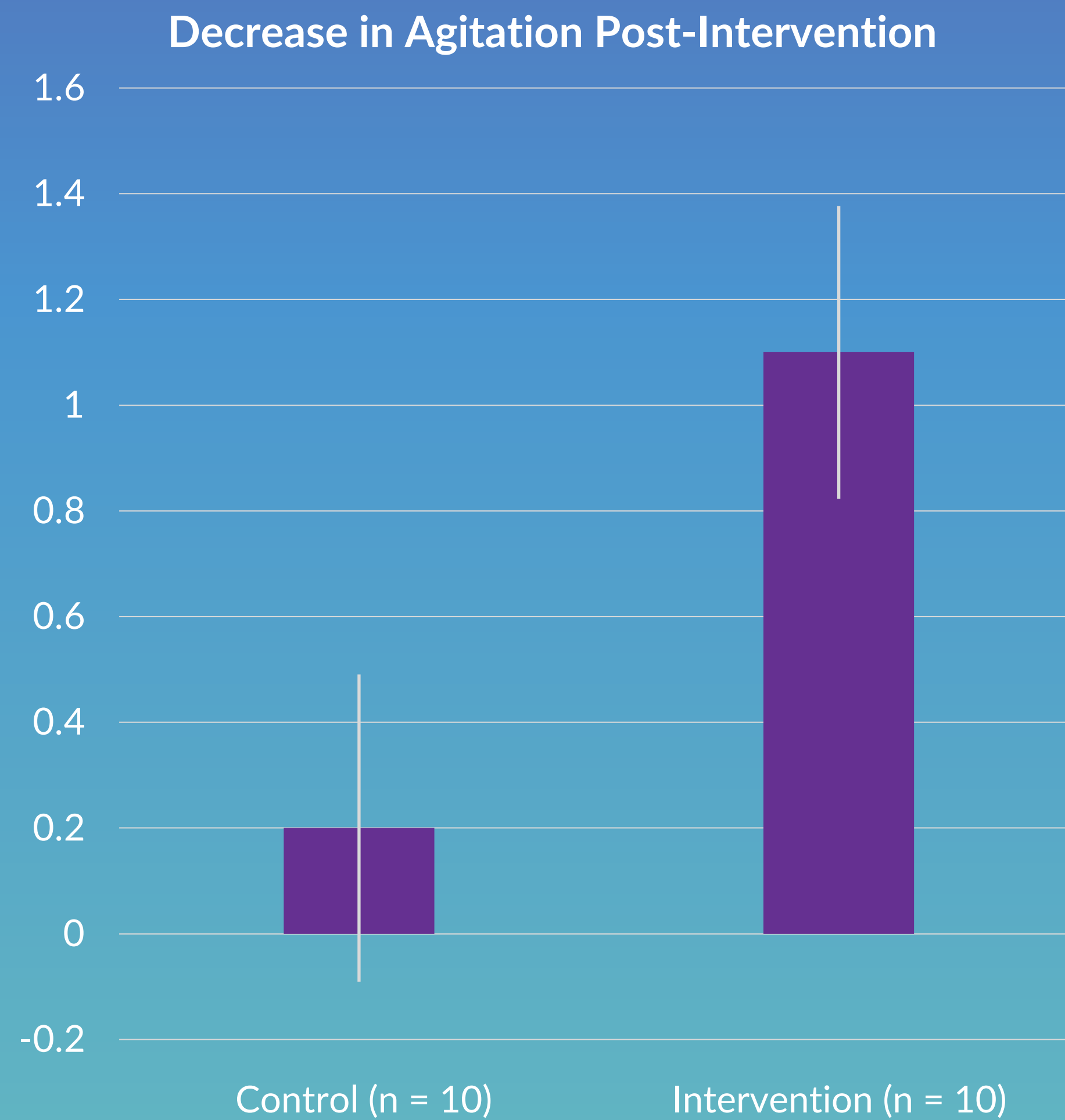
METHODS

1. Patients admitted to critical care at Royal Columbian Hospital were recruited and screened for enrolment.
2. Participants were randomly allocated to receive standard care alone or in conjunction with a four-hour exposure to the *MindfulGarden* treatment.
3. Heart rate and rate variability, blood pressure, and respiratory rate were measured continuously. Agitation and delirium were measured at regular intervals.

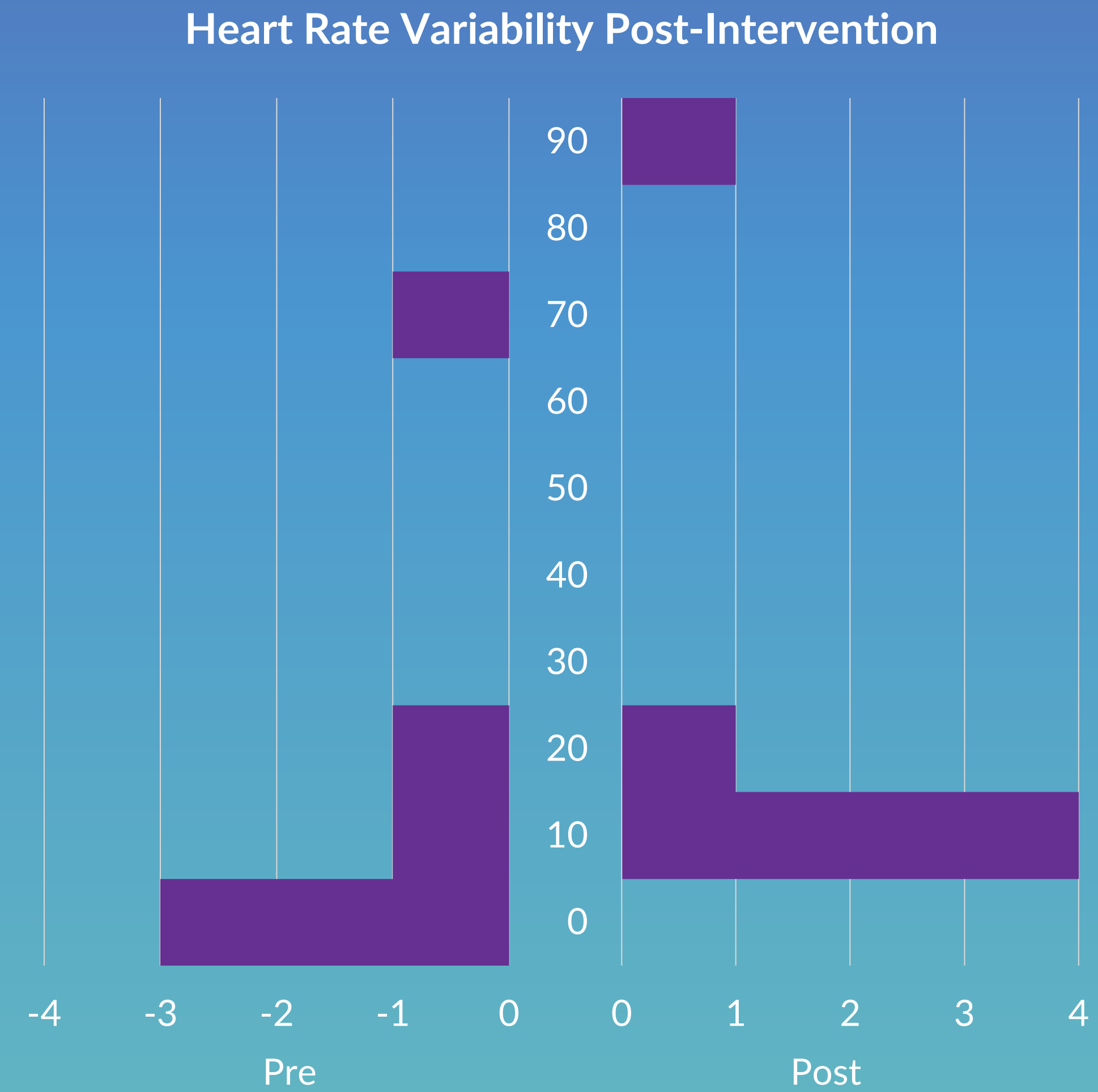
RESULTS

- 80 percent of participants in the intervention arm showed reduced agitation ($p < 0.01$).
- There were no significant changes in vital signs post-intervention in either study arm.

MindfulGarden reduces agitation in critically ill patients without adversely affecting the “rest-and-digest” system



Decreases in agitation post-intervention compared to the pre-intervention period measured in RASS score changes. Two-sample t-test was conducted to compare changes in agitation between groups. There was a significant difference between intervention (M = 1.1, SD = 0.88) and control groups (M = 0.2, SD = 0.92); $t(18) = 2.242$, $p = 0.019$. Error bars represent standard error of the mean.



Histogram of the intervention group pre-intervention (left) and post-intervention (right) heart rate variability measured in milliseconds. Mann-Whitney U test was conducted to compare post-intervention HRV between intervention and control groups. There was no significant difference between groups ($U = 34.00$, $p = .197$).

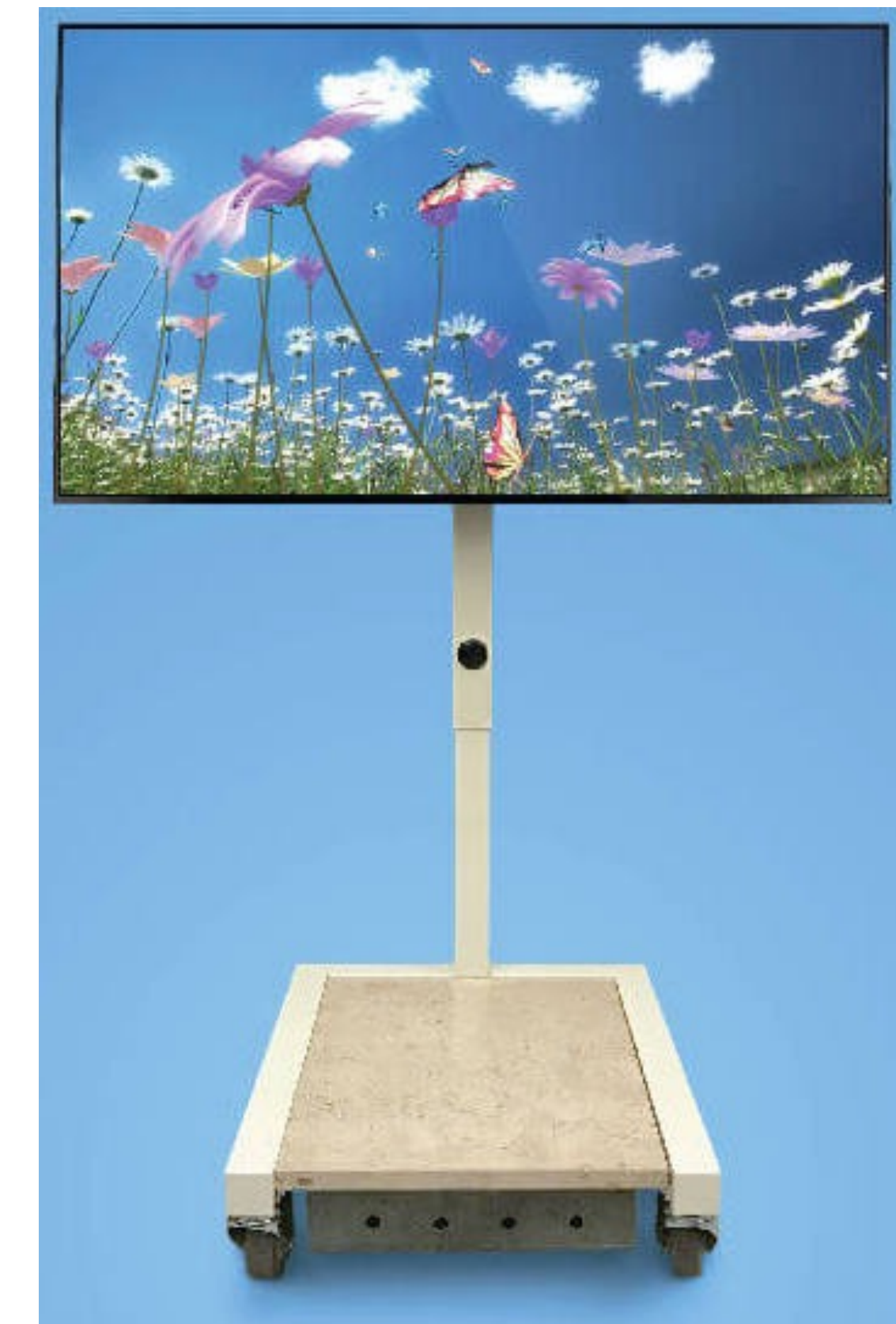


Image of the *MindfulGarden* platform²

DISCUSSION

- Current medications commonly used to manage delirium-associated agitation can cause serious adverse effects.
- *MindfulGarden* reduces agitation in critically ill patients with delirium without harmful physiological effects.
- By reducing the need for toxic medications to control agitation, *MindfulGarden* may improve outcomes for patients with delirium.

REFERENCES

1. Ely, E. W., Margolin, R., Francis, J., May, L., Truman, B., Dittus, R., Speroff, T., Gautam, S., Bernard, G. R., & Inouye, S. K. (2001). Evaluation of delirium in critically ill patients: Validation of the Confusion Assessment Model for the Intensive Care Unit (CAM-ICU). *Critical Care Medicine*, 29(7), 1370-1379. <https://doi.org/10.1097/00003246-200107000-00012>
2. MindfulGarden Digital Health Inc. Retrieved from https://mindfulgarden.com/update-summer-2018/background_artboard-2-copy-7/

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