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Feasibility Test of the MedaCube

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Abstract

Poor adherence is a significant barrier to achieve better patient outcomes. Rates of non-adherence approach 40% resulting in 10% of all emergency department visits and 23% of admissions into skilled nursing facilities. Many factors contribute to medication non-adherence including psychological and memory disorders, aging and pill burden. The MedaCube is a medication management system intended to help solve unintentional medication non-adherence. The device is designed to dispense scheduled and as-needed oral medications. The MedaCube provides audio and visual prompts alerting subjects to administer their medications. Caregivers receive notification of missed doses, late doses and refill requests. The null hypothesis is that use of the MedaCube results in no difference in medication adherence when compared with six month prior adherence in individual subjects.

Disciplines

Pharmacy and Pharmaceutical Sciences

Comments

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Feasibility Test of the MedaCube

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Introduction

- Poor adherence is a substantial barrier to achieve better outcomes for patients
- Non-adherence results in more than \$100 billion spent annually on avoidable hospitalizations¹
- MedaCube**
 - Bulk-loaded, vacuum-driven, single-patient medication management system programmed to dispense scheduled and as-needed medications
 - Can hold up to 16 medications
 - Audio and visual reminders to alert patients of dispensed doses
 - Adherence-tracking with caregiver alerts
 - Availability of online portal
 - Adherence percentage
 - As-needed medication usage
 - Days supply remaining report
 - Expiring medications report
 - Missed pill report
 - Pill taken report
 - Date and timestamp

Purpose

- Determine if use of MedaCube results in increased medication adherence

Results

Table 1: Patient Demographics	n = 21
Age, mean (SD)	75.10 (11.41)
Female; n (%)	15 (71.4)
Race; n (%)	
▪ White	20 (95.2)
▪ Black	1 (4.8)
Insurance; n (%)	
▪ Medicare	12 (57.1)
▪ Private	4 (19.1)
▪ Medicaid	3 (14.3)
▪ Other	2 (9.5)
Marital status; n (%)	
▪ Separated/divorced/widowed	11 (52.4)
▪ Married	8 (38.1)
▪ Domestic partner/couple	2 (9.5)
Education; n (%)	
▪ ≥ HS	16 (76.2)
Comorbidities; n (%)	
▪ Hypertension	16 (76.2)
▪ Memory disorder	13 (61.9)
▪ Dyslipidemia	11 (52.4)
▪ Depression	8 (38.1)
▪ Type 2 diabetes mellitus	7 (33.3)
▪ Anxiety	5 (23.8)
▪ CHF	2 (9.5)
▪ Multiple sclerosis	1 (4.8)
▪ Parkinson's Disease	1 (4.8)
▪ History of pulmonary embolisms	1 (4.8)

Table 2: Caregiver Demographics	n = 21
Female; n (%)	8 (38.1)
Race; n (%)	
▪ White	20 (95.2)
▪ Black	1 (4.8)
Relation to patient; n (%)	
▪ Child of patient	13 (61.9)
▪ Spouse of patient	4 (19.1)
▪ Friend/neighbor of patient	2 (9.5)
▪ Other	2 (9.5)
Live with patient; n (%)	
▪ Yes	10 (47.6)
Education; n (%)	
▪ ≥ HS	21 (100)

Table 3: Health Surveys	Baseline	6 mo.
MOCA (median)	16	16.5
GDS (median)	4	3.09
▪ Depressed (%)	33	16
Lawton-Brody IADL (median)	5	5
KPS (median)	80	65
Caregiver burden (median)	2	2

MOCA: Montreal Cognitive Assessment; GDS: Geriatric Depression Scale; Lawton-Brody IADL: Lawton-Brody Instrumental Activities of Daily Living; KPS: Karnofsky Performance Status

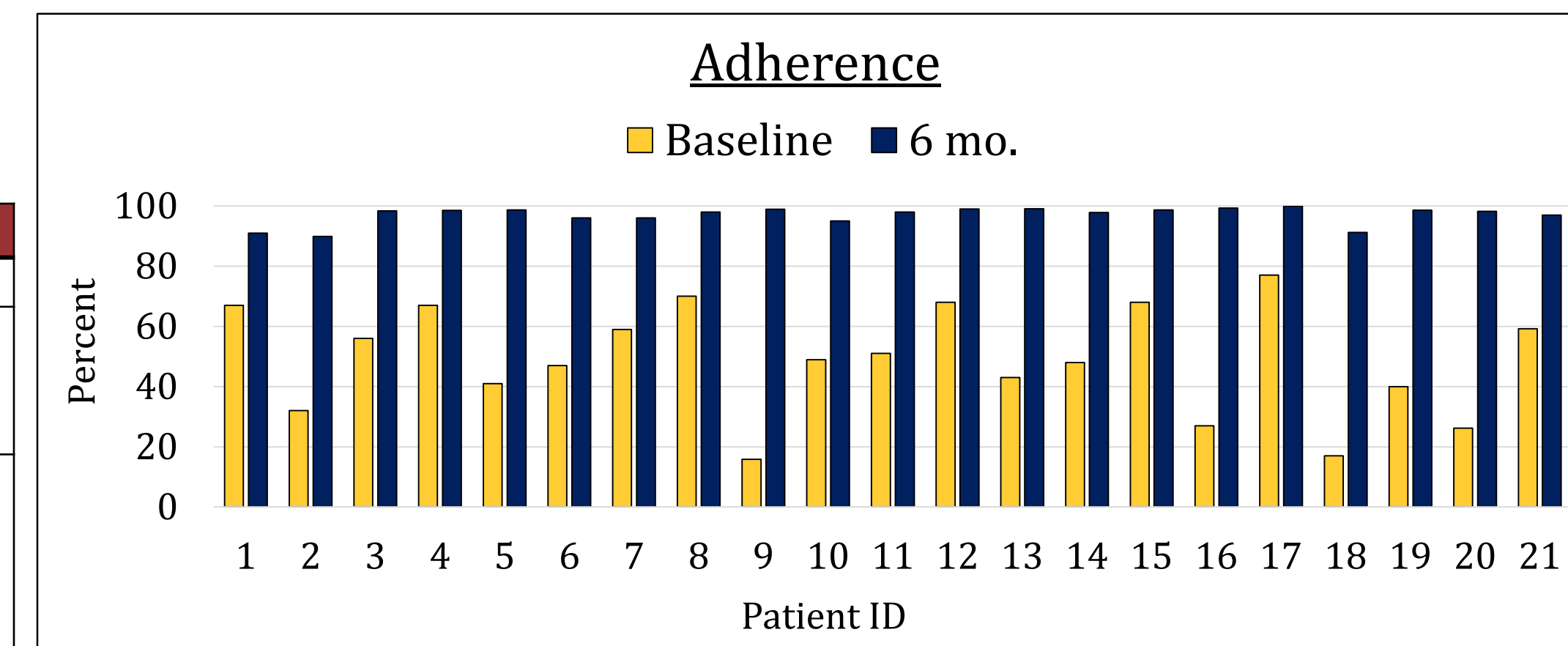
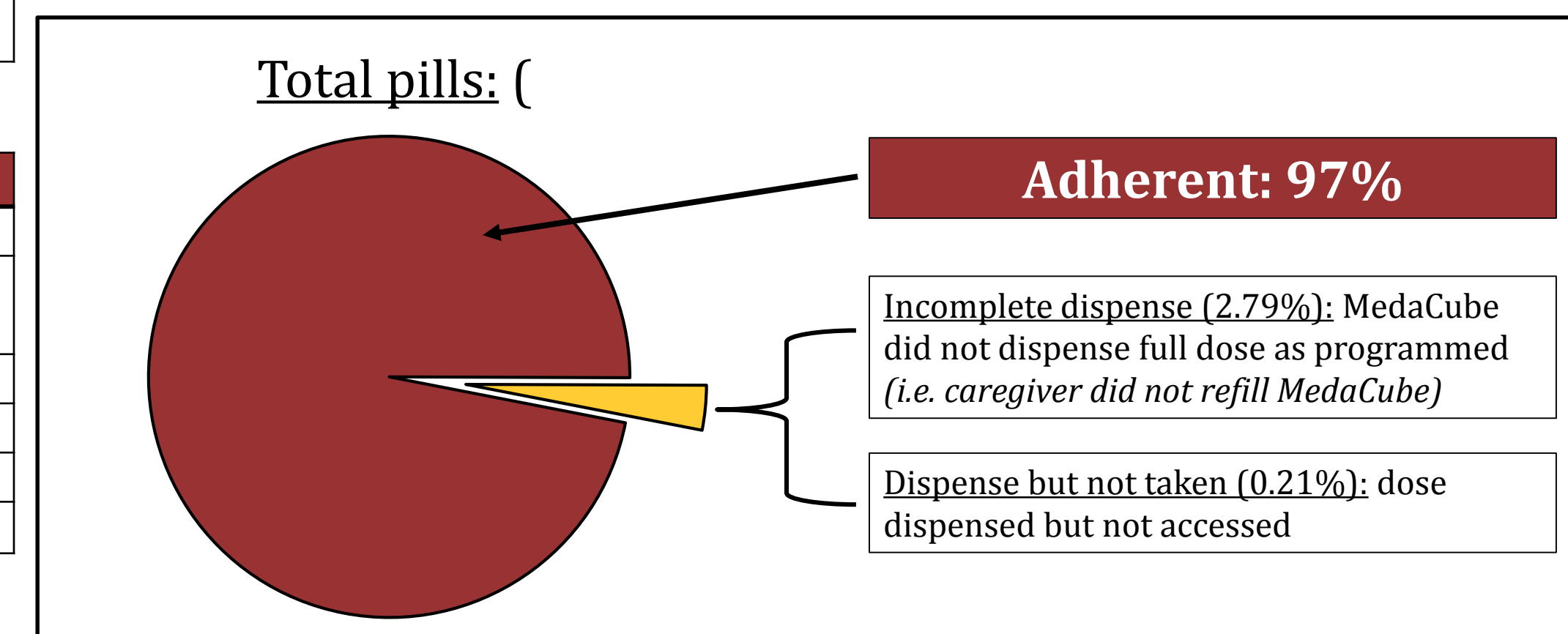


Table 4: Adherence	Baseline	6 mo.	p-value
Mean (SD)	0.49 (0.18)	0.97 (0.03)	0.0001



Methods

- Prospective feasibility study analyzing medication adherence in 21 subject-caregiver dyads over six months
- Inclusion criteria**
 - Referred by their physician due to poor medication adherence
 - On ≥ two medications
 - Spoke and understood English
 - Located in the Greater Rochester, NY Area
- Pharmacy records were reviewed and pill counts performed at study enrollment to assess prior adherence
- Prospective medication adherence was assessed using the MedaCube recorded dispensing information
- Paired t-test was used to compare prior and prospective adherence

Conclusions

- Use of the MedaCube significantly improved medication adherence rates
- Missed doses were rare and were most commonly due to the medications not being refilled
 - Patient's did not access a dispensed dose on only a few occasions

Limitations

- Small sample size
- Baseline adherence assessed via pharmacy record and pill count at study enrollment

References

1. Cutler DM, Evertt W. Thinking outside the pillbox-- medication adherence as a priority for health care reform. N Engl J Med. 2010;362:1553-5.