Evaluation of a Novel Medication Device for Divided or Single Methadone Dosing

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BACKGROUND

In recent years, rates of Opioid Use Disorder (OUD) have escalated rapidly, despite current available treatments. Methadone remains a primary treatment option for persons with OUD and is expected to increase in use in upcoming years[1].

In addition, the COVID-19 pandemic negatively impacted OUD treatment outcomes and posed a significant barrier to methadone-maintained persons (MMP)[2].

A troubling clinical finding is that reports of clinically-significant pain in MMP is considerably higher than the general population, which is detrimental to OUD-related outcomes. Specifically, recent studies discovered that between 42-60% of MMP experience chronic pain compared to 31% in the general population[3].

The pharmacokinetics of methadone support BID or TID dosing for the management of opioid withdrawal and analgesia. However, methadone guidelines have previously made such a dosing regimen not feasible.

Despite this discovery, clinical treatment options remain limited to treat pain within MMP. Therefore, uncovering novel regimens specifically designed to treat comorbid chronic pain and OUD is vital for the health and well-being of this patient population.

METHODS

Remote methadone dosing was managed with a cellularly-enabled electronic pillbox, as pictured below.

N=25 participants transitioned from liquid to tablet methadone, and then were randomized into a 12-week, within-subject trial.

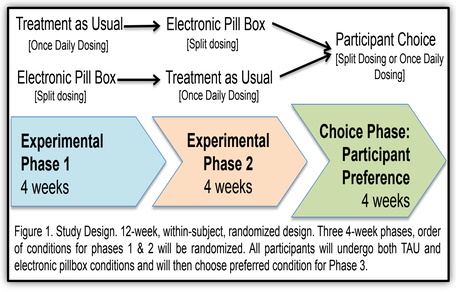

Figure 1. Study Design. 12-week, within-subject, randomized design. Three 4-week phases, order of conditions for phases 1 & 2 will be randomized. All participants will undergo both TAU and electronic pillbox conditions and will then choose preferred condition for Phase 3.

RESULTS

Use of electronic pillbox for methadone treatment was feasible, acceptable, and satisfactory.

Table 1. Primary Outcomes from R34	N=25
Feasibility	
Completed ≥1 study visit (%)	96%
Completed 13-week study (%)	84%
Methadone dispensed	
Doses (#)	1974
Grams (total milligrams)	167.92
Acceptability	
Would use again (%)	86.3%
Would recommend to others (%)	95.4%
Satisfaction	
Adoption of Pillbox for Routine Care	Yes
Twice Daily Dosing	
Liked twice-daily dosing (%)	85.7%
Felt it changed withdrawal (%)	43%
Withdrawal was improved (%)	100%
Withdrawal became worse	0
Medication Compliance	
Total Patient-related Events (#)	2852
Routine Care Events (n,%)	2683 (94.0%)
Medication cup returned to unit	1359 (45.0%)
Medication cup removed from unit	1324 (43.8%)
Non-Routine Events (n,%)	169 (5.6%)
Empty medication cup removed	89 (3.1%)
Medication cup not returned	40 (1.4%)
Failure to remove cup on schedule	27 (0.9%)
Unscheduled cup removal	13 (0.5%)

Table 1. Primary outcomes.

Twice-daily methadone dosing led to reductions in staff-rated illness.

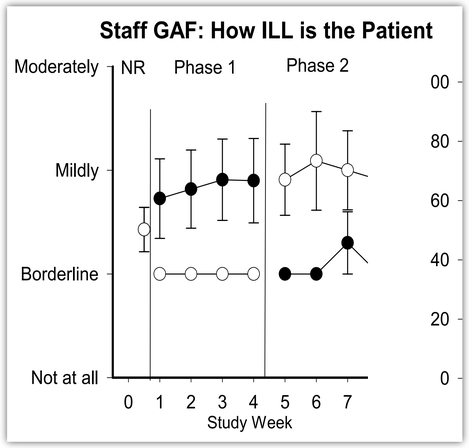

Figure 2. Staff ratings from the Observer Global Assessment of Functioning (GAF).

Twice-daily methadone dosing decreased self-reported pain and pain severity.

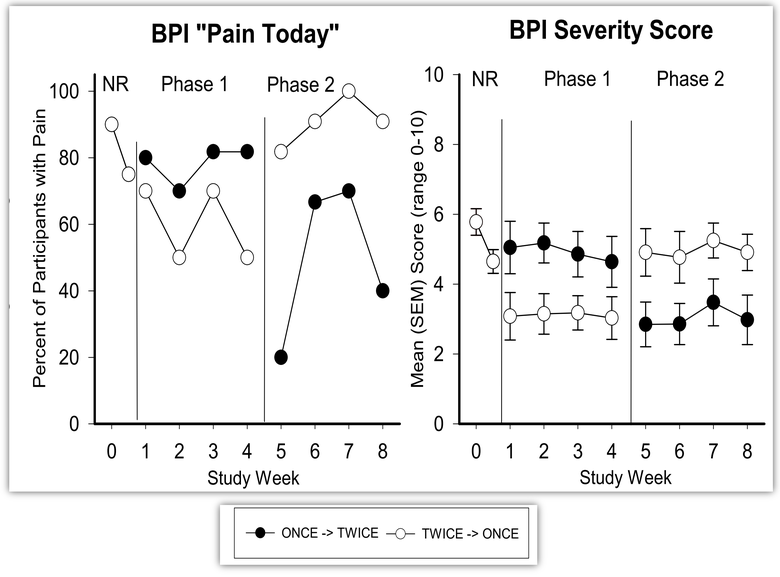

Figure 3. Percent of participants reporting "Pain Today" on the Brief Pain Inventory (BPI) and mean BPI severity score.

CONCLUSIONS

In this pilot project, our initial findings observed a positive impact of split methadone dosing on pain in MMP.

Importantly, it appeared that the split dose-induced reduction of pain did not have an impact on opioid withdrawal.

This small, within-subject study identifies the feasibility of split methadone dosing using an electronic pillbox. Use of the pillbox for medication management was acceptable and satisfactory with minimal non-routine events.

Dispensing take-home methadone doses can improve patient retention and compliance, as well as offer alternate approaches to classic methadone dispensing procedures.

The findings uncovered in this pilot study illustrate the potential for split methadone dosing for the treatment of OUD and clinically-significant pain.

FUTURE DIRECTIONS

Another multi-site trial has begun, investigating split methadone dosing in MMP using the electronic pillboxes.

This double-blind study will directly examine split dosing on pain-related severity, pain-related function, and OUD-related metrics in participants with comorbid chronic pain and OUD.

DISCLOSURES

This study was supported by a grant funded by the National Institute on Drug Abuse (NIDA) grant R34DA042926 (PI Dunn); NCT03254043. The authors report no relevant conflicts of interest and have no conflicts related to the pillbox described in this study.

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