Background

- Suboptimal medication self-management and persistence with required medical therapy are key barriers to achieving the full population health potential of new therapeutic innovations (1).
- The cause of suboptimal active engagement in own disease and poor adherence is multi-factorial, and interventions must consider system, disease, treatment and individual patient factors (1).
- Most patient adherence and support programs struggle to demonstrate impact on patient-important parameters including higher order patient autonomy and self-efficacy constructs and 2) achieve scalable population health impact due to regulatory, commercial, health system and consumer outreach challenges.
- DrugStars is a first-of-its-kind generic patient app innovation aiming to improve patient-important behaviors and outcomes related to medication use. Its fully-automated, low cost adaptable generic intervention amenable for broad consumer outreach is hypothesized to provide a potential for high public health impact.

The DrugStars app provides users with positive reminders for taking medicines and rewards in the form of opportunities to do good by donating earned starts to patient charities.

The DrugStars app aims to improve motivation and attitudes related to medicine use, adherence related to forgetting, and overall perceived well-being or quality of life related to a therapy.

Study objectives

To explore changes over 2 months in first time users with diabetes of the MVP version of the DrugStars app on:

- Self-reported adherence to medical treatment
- Motivation to follow medical treatment
- Active engagement in own treatment
- Active engagement in doing good
- Patient important diabetes outcome endpoints (PROs)

2. To examine associations between actual app usage and achieved benefits during the study period.

This study also included the collection of MIA data for all users and assessment of user value experiences and health motivation preferences reported elsewhere.

Methods (1) Intervention

The first MVP version of the DrugStars App was the intervention in this pilot study. The MVP used did not include the DrugStars personalized feedback feature linked to the user’s MIA or key flexibility features developed for diabetes users after the study.

The DrugStars app is free to use and available in Scandinavia, US and UK. Its main features are shown below (see also figure 1):

1. Users download the app and sign up by registering their medicines, including name, schedule and dosage.
2. Users receive positive audible reminders to take their medicine at the scheduled times by default.
3. Users earn ‘stars’ for each dose of medicine they are registered to take. Users earn extra stars for completing the 10 question MIA® index for each medicine. In the study version, no feedback was provided to users based on their responses.
4. Users then use their earned stars to donate to a patient charity of their own choice listed in the app. The DrugStars company converts star donations into real money donations to the charity at no cost to the user. Positive feedback is provided back to users about the benefits that their donations help create.
5. Users then use their earned stars to donate to a patient charity of their own choice listed in the app. The DrugStars company converts star donations into real money donations to the charity at no cost to the user. Positive feedback is provided back to users about the benefits that their donations help create.

Results (2) Improvements at 2 months follow-up.

Table 1. Characteristics of the study population.

| Characteristics | n | %
|-----------------|---|---
| Patient adherence | 1495 | 6.0 (4.9) |
| Perceived changes at month 2 (2x3 indicates improvement) | 1495 | 0.99 (0.96) |
| Diabetes related emotional distress | 1495 | 0.92 (0.93) |
| Perceived benefits of donation | 1495 | 0.92 (0.93) |

Results (3) Association between app use and benefits

Table 2. Odds ratio for reported benefits by comparison of PROs and MEA scores in a large scale RW set to model its full cross-disease public health impact potential.

Table 3. Odds ratio for reported benefit of donation frequency. Regression analysis. Greater donation activity was associated with slightly greater likelihood of benefit at follow up.

Conclusions

- The DrugStars MVP app resulted in statistically significant improvements (small/modest) in adherence, motivation, active engagement and OQL indicators in 1st time users with diabetes.
- Specific bi-app behaviors were significantly associated with user engagement and QOL improvements.
- Our data suggests that the charity donation feature of the DrugStars app may have unique motivational benefits.
- To our knowledge this is the first study to support multiple PRO and MEA domains of a generic donation feature for medicine.

Limitations

- The pilot study was done using a MVP app version in 2017 which did not have key convenience features considered key to insulin users today. Repeating the study in English speaking countries is proposed.
- Effect sizes ranged from very small to moderate and it was not a randomised controlled study design. Further research is therefore required to further assess clinical relevance and causal relationships.

Abbreviations


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References