Joinson, C., & Whale, K. (2020). URApp: smartphone app to aid bladder training in young people. *Journal of Community Nursing*, *34*(5). https://www.jcn.co.uk/resources/all/0/date/desc/topic/Continence

Peer reviewed version

Link to publication record in Explore Bristol Research
PDF-document

University of Bristol - Explore Bristol Research
General rights

URApp: A smartphone app to aid adherence to bladder training in young people

Dr Carol Joinson

Dr Katie Whale

Introductory paragraph

We developed a smartphone app (URApp) to aid adherence to bladder training in young people (aged 10-19 years) with urinary incontinence (UI). URApp provides discreet reminders for toilet visits and drinking; a diary function to record toileting and daily drinks; charts to track progress, and a reward system to aid motivation to adhere to bladder training. We co-designed URApp with young people with UI, expert clinicians, health psychologists, health technology design experts, and app developers. URApp's design is strongly based on empirical evidence about techniques to improve adherence to bladder training and on theories of behaviour change. The data collected by URApp can be used to inform clinical decision-making. The app functionality, appearance, and ease of navigation received positive feedback from young people and clinicians. We worked closely with clinicians to ensure that the app performs the functions needed to support bladder training. URApp has the potential to be a cost-effective self-management solution that can be personalised to the individual user.

Key sentences

- Urinary incontinence (UI) is relatively common in young people and has serious consequences for their quality of life.
- Bladder training is the first-line intervention for UI in young people, but treatment can be challenging due to low adherence.
- We co-designed a smartphone app (URApp) with young people with UI to aid adherence to bladder training.
- We were guided by the 'Person-Based Approach' to intervention development - an iterative optimisation approach that involves in-depth qualitative research with the user target population.
- URApp's design is grounded in behaviour change theory and incorporates 'behaviour change techniques' aimed at promoting a regular schedule of drinking and toileting.

Main article

Urinary incontinence (UI) is among the most common paediatric problems and it is commonly assumed to resolve with age. Consequently, parents and clinicians often adopt a 'wait and see' approach to childhood UI (Berry, 2006). A significant proportion of children, however, continue to suffer from persistent UI into adolescence (Heron et al. 2017; Yeung et al. 2006; Swithinbank et al. 1998; Hellstrom et al. 1995). For example, our research using data from a large birth cohort (Avon Longitudinal Study of Parents and Children- http://www.bristol.ac.uk/alspac/) found that 4.2% of females and 1.3% of males experienced UI at age 14 years (Heron et al. 2017).

The perceived stigma of UI in adolescence often leads to social isolation and can seriously undermine a young person's self-esteem and quality of life. Common problems reported by young people with UI include depressive symptoms, peer victimisation, problems with peer relationships, and adverse impacts on academic achievement (Whale et al. 2018; Grzeda et al 2017). Young people who are being treated for UI often report sub-optimal treatment experiences including poor continuity in care and high rates of relapse and treatment failure that can lead to feelings of hopelessness (Whale et al. 2017).

The majority of cases of UI in young people are not due to organic (structural, anatomical or neurological) causes but arise from functional impairments in the bladder (Hjälmas, 1992). Bladder training (standard urotherapy) is the first-line treatment for UI in children and adolescents (Chang et al. 2017) and is a behaviour modification intervention that aims to establish a regular schedule of drinking and toilet visits. The goal is to 'train' the bladder to hold more urine and to reduce the number of times patients need to pass urine per day. Bladder training also educates patients about how the bladder works and common causes of UI, as well as providing guidance on how to establish optimal voiding behaviour (e.g. relaxing the pelvic floor).

A meta-analysis provided evidence that bladder training is an effective intervention for UI in children and adolescents (Schafer et al. 2018). However, bladder training takes time to be effective and success strongly depends on adherence, self-motivation and clinician support, which our research shows is often lacking (Whale et al. 2017). Treatment failure results in increasing costs to the NHS for incontinence pads, more intensive interventions, medications, and sometimes surgery. Paediatric continence clinics are under-resourced, and patients often wait long periods between appointments. NICE recognise the need to improve paediatric continence services and recommend that a key component should be promoting management of long-term continence problems in children and young people.

Our research with young people with UI found that adherence to bladder training is often challenging, and young people need ongoing support tailored to their needs to enable them to effectively manage their bladder symptoms. In response to this need, we developed a smartphone app (URApp) to aid adherence to bladder training in young people with UI.

We co-designed URApp with extensive input from young people and a team including expert clinicians, health psychologists, health technology design experts, and app developers. Co-designing URApp with young people will help to ensure it is age appropriate, acceptable and usable. In developing URApp, we were guided by the Person-Based Approach (PBA) to planning, optimising, evaluating and implementing behavioural health interventions (Yardley et al. 2015). This 'iterative optimisation approach' involves in-depth qualitative research with the user target population at every stage of the development process to understand and accommodate their needs. These aspects of URApp's design increase the chance that they will be motivated to use it in the longer term and, therefore, improve their adherence to bladder training.

We identified user requirements for URApp at three participatory co-design workshops with young people with UI. The goals of the workshops were to define the desired behaviour changes (e.g. regular drinking and toilet visits) and to identify processes/beliefs that influence these behaviours (e.g. restricted access to toilets and drinks during class). We also identified behaviour change techniques - strategies aimed at changing behaviours (e.g. goal setting and reviewing, action planning, reminders, rewards) to include in URApp that could promote adherence to bladder training (figure 1). There is evidence that embedding behaviour change techniques into digital interventions increases their effectiveness (Webb et al. 2010).

URApp allows users to set goals for their daily drinking and provides discreet reminders to help them to establish a regular schedule of drinking and toilet visits. The app provides a diary function to record daily drinking and toileting and provides personalised feedback to enable users to track progress towards their drinking goals. 'Rewards' (stars and trophies) are given in URApp for changes in behaviour that are aimed at supporting bladder training. For instance, users are rewarded for entering data on their daily drinks and toilet visits, and for achieving their daily drinking goals.

We investigated the usability and acceptability of URApp through in-depth qualitative research with young people who tested URApp in real life. We also interviewed clinicians who treat young people with UI to gain an in-depth understanding of their views of URApp to ensure that they will have confidence in it and will want to use it in clinical practice. We aim to release URApp in autumn 2020 and plan to evaluate it in paediatric continence clinics to test whether it is effective in improving adherence to bladder training.

Figure 1.

Behaviour change techniques used in URApp
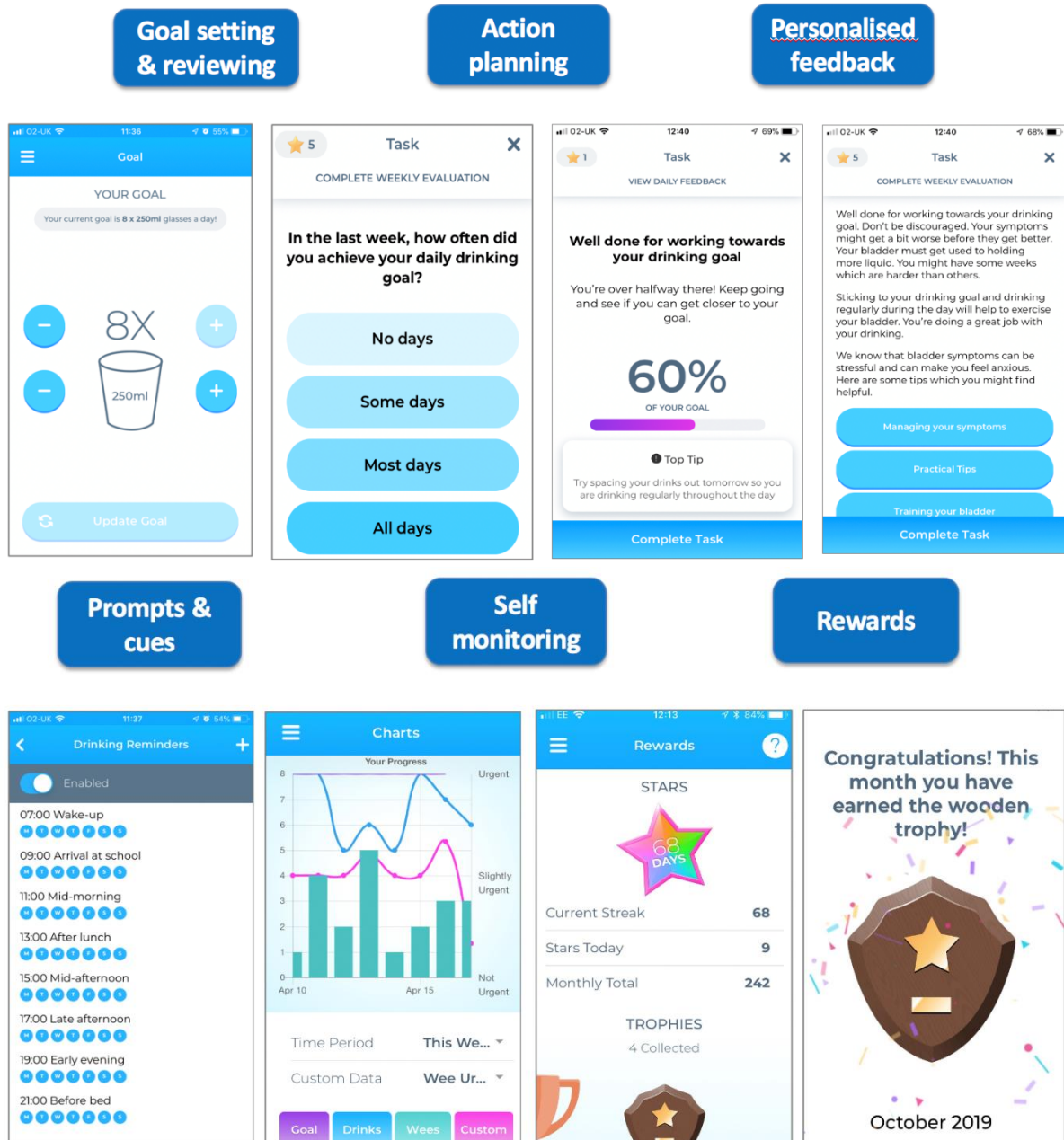
References

Berry AK. Helping children with nocturnal enuresis: the wait-and-see approach may not be in anyone's best interests. Am J Nurs 2006;106:56–63.

Chang SJ, Van Laecke E, Bauer SB, von Gontard A, Bagli D, Bower WF, Renson C, Kawauchi A, Yang SS. Treatment of daytime urinary incontinence: A standardization document from the International Children's Continence Society. Neurourol Urodyn. 2017 Jan;36(1):43-50.

Grzeda MT, Heron J, von Gontard A, Joinson C. Effects of urinary incontinence on psychosocial outcomes in adolescence. Eur Child Adolesc Psychiatry. 2017 Jun;26(6):649-658.

Hellström AL, Hanson E, Hansson S, et al. Micturition habits and incontinence at age 17—reinvestigation of a cohort studied at age 7. Br J Urol 1995;76:231–4.

Heron J, Grzeda MT, von Gontard A, Wright A, Joinson C. Trajectories of urinary incontinence in childhood and bladder and bowel symptoms in adolescence: prospective cohort study. BMJ Open. 2017 Mar 14;7(3):e014238.

Hjälmas K. Functional daytime incontinence: definitions and epidemiology. Scand J Urol Nephrol Suppl 1992; 141: 39–46

Schäfer SK, Niemczyk J, von Gontard A, et al. Standard urotherapy as first-line intervention for daytime incontinence: a meta-analysis. Eur Child Adolesc Psychiatry. 2018 Aug;27(8):949-964.

Swithinbank LV, Brookes ST, Shepherd AM, et al. The natural history of urinary symptoms during adolescence. Br J Urol 1998;81(Suppl 3):90–3.

Web T, Joseph J, Yardley L, Michie, S. Using the Internet to Promote Health Behavior Change: A Systematic Review and Meta-analysis of the Impact of Theoretical Basis, Use of Behavior Change Techniques, and Mode of Delivery on Efficacy. J Med Internet Res. 2010 Jan-Mar; 12(1): e4.

Whale K, Cramer H, Joinson C. Left behind and left out: The impact of the school environment on young people with continence problems. Br J Health Psychol. 2018 May;23(2):253-277.

Whale K, Cramer H, Wright A, Sanders C, Joinson C. 'What does that mean?': a qualitative exploration of the primary and secondary clinical care experiences of young people with continence problems in the UK. BMJ Open. 2017 Oct 16;7(10):e015544.

Yeung CK, Sreedhar B, Sihoe JD, et al. Differences in characteristics of nighttime enuresis between children and adolescents: a critical appraisal from a large epidemiological study. BJU Int 2006;97:1069–73.

Yardley L, Morrison L, Bradbury K, Muller I. The person-based approach to intervention development: application to digital health-related behavior change interventions. J Med Internet Res. 2015 Jan 30;17(1):e30.