

## ► Using Personal Digital Assistants to improve self-care in oral health

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### Summary

We conducted a pilot project to evaluate the potential of Personal Digital Assistant (PDA) technologies to improve the oral health of people with mild to moderate intellectual disabilities, chronic health problems and a long-standing history of poor oral health self-care. Oral health video and audio materials were prepared and transferred to PDAs. Patients were trained in the use of the PDAs at a regular dental appointment and the utilization of the PDA and any change in oral health status was tracked over the next six months. More than half of the 36 patients reported problems in keeping the PDAs functioning properly (mainly problems of keeping the batteries charged) for the duration of the project and 11 patients dropped out of the study. Ten of the remainder (40%) achieved improvement in at least three areas of oral health. The pilot project potentially brings a range of health promotion activities within the reach of people with limited health literacy which may produce better self-management of chronic health conditions.

### Introduction

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One of the most obvious, yet critical areas of health self-care is the maintenance of good oral health. However, for many people with intellectual disabilities, achieving good oral health represents a significant health promotion challenge.<sup>1</sup> Preventable oral health conditions, such as gingivitis, are more common in those with intellectual disabilities than in the general population: 60–90% in the former and 28–75% in the general population. At least 25% of people with intellectual disabilities do not brush their teeth daily. Adults with mild intellectual disabilities have poorer oral hygiene than those with more severe disabilities.

A multimedia training program has been used on a palmtop PC to enhance the ability of adults with mental retardation to perform community-based vocational tasks.<sup>2</sup> We have studied the use of Personal Digital Assistants (PDAs) to improve oral health for people with mild to moderate intellectual disabilities, chronic health problems and a long-standing history of poor oral self-care.

### Methods

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The study population consisted of 36 individuals who had been receiving regular dental care from a single dental practice specializing in the care of people with intellectual disabilities and chronic health problems. Ethics permission was obtained from the appropriate committee. The study patients were all on recall dental visits every three months because of their poor oral health.

Oral health video and audio materials were prepared that demonstrated effective oral hygiene practices. These materials were edited, digitized and transferred to PDAs running a customized software application that controlled the standard features of the PDA so that the prompting and coaching features only were enabled. Patients were trained in the use of the PDAs at a regular dental appointment and the alarm and prompting features of the software were set to their individual specifications.

The utilization of the PDA and any change in oral health status were tracked by obtaining anecdotal information from direct care support staff when they brought patients in for dental appointments and when they telephoned for technical support. This information was gathered for a period of six months, which included two dental visits. Oral health status was measured on a 4-point scale along 12 dimensions including the overall gingival colour and

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texture, gingival inflammation, plaque accumulation, supra and subgingival calculus, mouth odour and extent of tongue coating. At each dental appointment the same dentist completed the multi-item oral health scale.

## Results

The training provided enabled almost all the patients to master the use of the technology and follow the oral hygiene instructions displayed on the PDAs. However, more than half of the patients reported problems in keeping the PDAs functioning properly (mainly problems of keeping the batteries charged) for the duration of the project and 11 patients dropped out of the study. Ten of the remainder (40%) achieved improvement in at least three areas of oral health.

## Discussion

The results of this small pilot project indicate the potential for customizable consumer technologies to improve self-care among groups with chronic health problems. In the present project the required study design precluded the use of many supportive strategies that might have improved the results. These include regular monitoring of, and communication between, the patient and the health-care provider as well as support for effective self-management of a chronic health condition – often seen as key factors in successful health promotion strategies. The results of this study have already led to other initiatives aimed at personalizing health care for individuals with intellectual disabilities and providing them with customizable and interactive tools and strategies designed to improve their ability to become more self-determined in achieving good health.<sup>3</sup> These tools include an online training curriculum that has been field tested with small groups of individuals with intellectual disabilities<sup>4</sup> and patient/provider health portals.

Our approach addressed the limitations of current health promotion strategies that result from poor health literacy<sup>5</sup> by providing alternative communication strategies and customized health education and health promotion instructions using telecommunications technologies. In the US it is estimated that nearly 50% of the population have limited health literacy, experience difficulty in understanding common health-care communications and

have poor health outcomes.<sup>6</sup> Telehealth strategies that directly address the consequences of limited health literacy and then lead to the more effective implementation of existing models of chronic disease care offer great potential for improving the health of all, but particularly the health of disadvantaged groups such as people with intellectual and/or communication disabilities.

The pilot project demonstrated that health promotion programmes can be adapted for use on PDAs. This potentially brings a range of health promotion activities within the reach of people with limited health literacy which may produce better self-management of chronic health conditions. This may be an important step in reducing the substantial health disparities that exist between individuals with intellectual disabilities and the general population.<sup>7,8</sup>

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