



Information Technology to Accommodate Patients' Levels of Health Literacy

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Problem

- Behavior is a key part of healthcare problems and solutions
- Diet, exercise, smoking cessation
- Treatment adherence
 - Medication adherence estimates range from 30-80%
 - Nonadherence is a cause of medication errors and poor outcomes

Information and behavior

- Theory of reasoned action/theory of planned behavior (Ajzen & Fishbein)
- Individuals act rationally based on information available to them
- Healthcare interventions should provide information

Tailored Information

- Tailored information has a larger effect on behavior
- Important issues in tailoring:
 - Perceived personal relevance
 - Individualization
 - Interestingness
 - Oenema, Tan, & Brug (2005) Ann Behav Med

Goals

- Improve medication adherence
- Create an application that quickly and efficiently provides tailored information
- Make it user-friendly
- Make it work in outpatient settings

Context

- Study of adherence to cholinesterase inhibitors for patients with memory problems
- Promoting Adherence Through Computing and Information (PATCAI)
 - <http://www.patcai.org>
- Patients and caregivers need information about conditions, causes, and treatments

Development

- Questions and answers developed
- Simple Visual Basic interface
- Output via MS Office automation
- Pilot assessment procedures
- Two difficulty levels
- Spanish and English

Implementation

- Health literacy assessment
 - Current study: *Test of Functional Health Literacy (TOFHLA)*
- Preferred language
- Questionnaire on memory problems, dementia/Alzheimer's disease, and their treatment

User interface

The image shows a screenshot of a software window titled "PATCAI Tailored Information". The window has a blue title bar with standard minimize, maximize, and close buttons. The main area is light gray and contains several input fields and checkboxes. At the top, there are two text boxes: "Patient Name:" and "Date:". Below these are two rows of checkboxes. The first row is for "Output Language" with options for "Spanish" and "English". The second row is for "Literacy" with options for "High Literacy" and "Low Literacy". A large rectangular box contains a grid of 12 checkboxes for various topics. Two of these checkboxes, "How serious?" and "What will happen?", are checked. At the bottom right of the window is a button labeled "Print with Word".

PATCAI Tailored Information

Patient Name: Date:

Output Language: Spanish English

Literacy: High Literacy Low Literacy

Cause of problems? Diseases cause? Gingko? What if side effects?

Problems normal? How to treat? How serious? What are side effects?

Same as AD? Medicines used? What will happen?

What is dementia? Vitamin E? What if trouble?

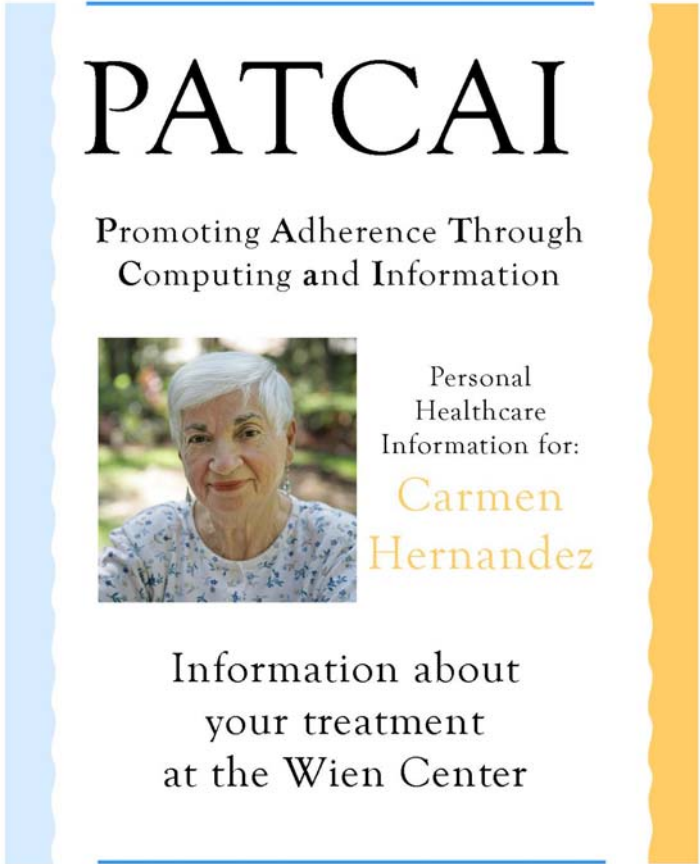
Print with Word

Output

- *Is dementia the same thing as Alzheimer's disease?*
 - “Dementia is a word for many things that cause people to have problems with remembering. . . .”
- *¿Es normal tener problemas de la memoria a mi edad?*
 - “Algunos expertos creen que los problemas de memoria menores son normales”

Output

- Title page has the patient's name and digital photo
- Text with answers includes patient's name
- “Especially prepared for [patient name].”



The image shows a patient information card for PATCAI. The card has a white background with a blue wavy border on the left and a yellow wavy border on the right. At the top, the word "PATCAI" is written in a large, black, serif font. Below it, the text "Promoting Adherence Through Computing and Information" is written in a smaller, black, sans-serif font. In the center, there is a small, square, color photograph of an elderly woman with short, white hair, wearing a light-colored, patterned top. To the right of the photo, the text "Personal Healthcare Information for:" is written in a small, black, sans-serif font, followed by the name "Carmen Hernandez" in a larger, yellow, sans-serif font. At the bottom, the text "Information about your treatment at the Wien Center" is written in a black, sans-serif font.

PATCAI

Promoting Adherence Through
Computing and Information

Personal
Healthcare
Information for:
**Carmen
Hernandez**

Information about
your treatment
at the Wien Center

Effectiveness

Group ^a	Coef.	Robust Std. Err. ^b	z	P> z	[95% Conf. Interval]	
Reminding						
% Taken	4.713271	2.104249	2.24	0.025	.5890185	8.837524
ADAS-Cog	-1.881205	.9280069	-2.03	0.043	-3.700065	-.062345
Caregiver	5057.605	2268.106	2.23	0.026	612.1988	9503.011
Age	44.90419	19.01085	2.36	0.018	7.643609	82.16478
Age X CG	-66.3094	29.7045	-2.23	0.026	-124.5292	-8.089645
_cons	-3744.731	1585.687	-2.36	0.018	-6852.62	-636.8416

Tailored Information

% Taken	4.687405	2.104389	2.23	0.026	.5628785	8.811931
ADAS-Cog	-1.475154	.9619669	-1.53	0.125	-3.360575	.4102661
Caregiver	-3171.414	1599.295	-1.98	0.047	-6305.975	-36.85378
Age	45.42027	19.01229	2.39	0.017	8.156856	82.68368
Age X CG	32.77652	16.9322	1.94	0.053	-.4099785	65.96302
_cons	-3789.112	1585.999	-2.39	0.017	-6897.613	-680.6109

^aControl group is the comparison; ^bstandard errors adjusted for clustering on ID

Cost

- Total time for intervention is 20 minutes
- Cost per intervention is \$13.50 to \$23.50
- Staff time is the largest part of the cost
- Staff time can be further reduced with additional automation

Cost effectiveness

- Previous cost-effectiveness analysis
- Increasing medication adherence by 2-5% reduces total costs for AD by \$400
 - John V & Ownby RL (2004). Paper presented at the annual meeting of the American Association for Geriatric Psychiatry
- Preliminary PATCAI data show 10% increase in adherence

Conclusions

- Preliminary data show that tailored information improves adherence
- Information technologies help to provide an otherwise time-consuming intervention
- Tailored information interventions can be cost effective

Development

- Integrate health literacy level assessment into application
- Touch screen responding
- Expand information on a variety of diseases and conditions
- Web-based to increase accessibility and decrease costs

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