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HealthLine: Speech-based Access to Health Information by Low-literate Users

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Introduction

- Health care shortage in developing countries
- Community health workers receive basic training
- “Providing access to reliable health information for health workers in developing countries is potentially the single most cost effective and achievable strategy for sustainable improvement in health care”

Related Work

System	Health	Speech interface	Data access	Designed for low literate users
Carnegie Mellon University's Communicator travel information system		X	X	
MIT's Jupiter weather information system		X	X	
Amtrak's "Julie" system		X	X	
Berkeley's TIER group's Tamil Market project		X	X	X
Designing a Graphical User Interface for Healthcare Workers in Rural India, ACM CHI 1997	X			X
Handheld computers for rural healthcare, experiences in a large scale implementation. In Proceedings of Development By Design, 2002	X		X	X
Design studies for a financial management system for micro-credit groups in rural India. Proc. of the ACM Conference on Universal Usability, ACM Press (2003)				X
VoicePedia		X	X	

Community Health in Pakistan

- Various training programs
  - Lady Health Workers
  - Community Mid-Wives
  - Community Health Attendants
  - Community Health Workers
- Various levels of education and literacy
- Barriers to adequate training
  - Lack of trainers/materials
  - Low literacy

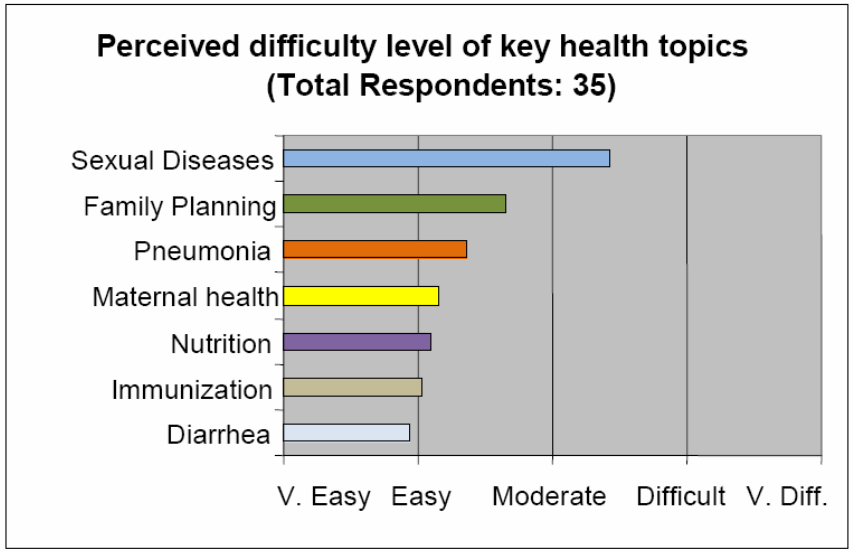
Health Worker Needs Assessment

TABLE I
HEALTH TOPICS CONSULTED IN THE MANUAL

Health Topic	Responses
Management of Diarrhea - e.g. dose of O.R.S.	5
Management of Pneumonia - e.g. dose of cotrimaxazole	3
Pregnancy care - e.g. what to do if a pregnant woman's BP goes high and she has asthma?	3
Family Planning - e.g. under what conditions should a woman abstain from taking injections for birth control	3
Hepatitis	1
Treatment of worms	1
Eclampsia	1
Delivery complications	1

TABLE II
PERCEIVED KNOWLEDGE GAPS

Topic	Requests
Hepatitis	18
Diabetes	12
Sexual diseases	10
HIV/AIDS	9
Deliveries	8
Antenatal Care	7
High blood pressure	5



Tables and graph from Sherwani, J, et al. "HealthLine: Speech-based Access to Health Information by Low-literate Users." *Proceedings of International Conference on Information and Communication Technologies and Development* (ICTD 2007), Bangalore, India. doi:10.1109/ICTD.2007.4937399.

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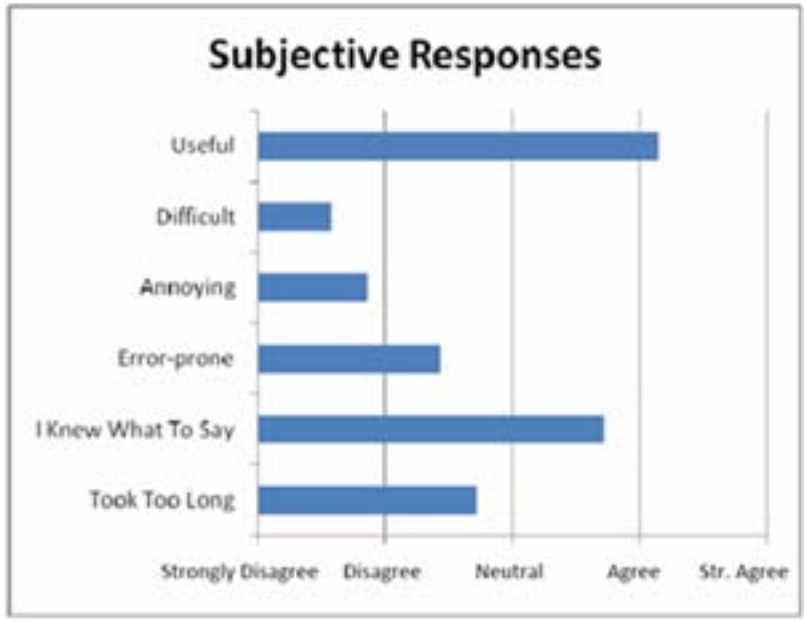
HealthLine Prototype

- Hello, I'm Dr Jameela, and I'm here to give you whatever health information you need. What topic do you want information on: Diarrhea, Pneumonia, or Important Messages for Health Workers?
- Diarrhea: This topic has 7 sections, when you hear the one you want, just say it: 1 What is Diarrhea [pause], 2 Causes of Diarrhea [pause], …, 7 The Third Principle of Treatment.
- What is Diarrhea? Diarrhea is a …[continues to the end of the section]. To hear this again, say "repeat"; to choose a different section, say "different section", or for a different topic, say "different topic". If you're done, say "goodbye".

Pilot Study

- 9 CHWs → 6 CHWs (3 not fluent in Urdu)
- 5/6 able to hear and report information from the system
- Technical difficulties
- Subjective analysis



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Future Directions

- Increase knowledge on what health workers have been trained on
- Provide new knowledge beyond training
- Keyword search abilities
- Evaluate for low-literate users

Conclusion

- Good system design approach?
- Good system evaluation approach?
- Advantages of speech system over GUI?
- Other interfaces for low literate users?