Health Information Technology Department
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In the name of God

Mashhad University of Medical Sciences

THE FEASIBILITY OF TEXT REMINDERS TO IMPROVE MEDICATION ADHERENCE IN ADOLESCENTS WITH ASTHMA

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ABOUT THE JOURNAL

Country : USA

Publisher : Oxford University Press

JAMIA is AMIA's journal for biomedical and health informatics

Impact Factor 2016 :3.698

H-Index :121

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ABOUT ARTICLE

- **Published:** 11 December 2015
- Volume 23, Issue 3, 1 May 2016
- https://doi.org/10.1093/jamia/ocv158
- **Citing**

➢ Web of Science (8)

➢ Google Scholar(12)

CONTENTS

- Introduction
- research method
- Discussion
- Conclusion

INTRODUCTION

- Treatment of chronic illnesses → Major healthcare expense → 75% of the $2.7 trillion

What is significant cause of this cost?

Poor adherence

defined as the extent to which behavior opposes medical advice

especially affects children and adolescents

INTRODUCTION(CONTINUE)

Mobile phones provide near-ubiquitous access to patient

does not require a smart phone → low-income populations

INTRODUCTION(CONTINUE)

The goal of this study

To examine the impact of MMH(a website and a short messaging service (SMS)-based reminder system) on medication adherence and self-efficacy and quality of life in adolescents with asthma

12% of high school students

9.5% in children

adherence rates as low as 40%

unnecessary visits to emergency departments

METHODS

MMH

- web application designed to run on a tablet or desktop computer
- structured medication list
- dosing schedule to each medication
- to request a text-message reminder for each dose
- password-protected profile including a cell phone number

verification response

log in and create a medication list

METHODS(CONTINUE)

- Names are coded using the RxNorm standard
- Reminders can be combined into one message
- Reply to a reminder by typing a letter: (T)aking, (S)kipping , or (H)olding a dose one time

METHODS(CONTINUE)

STUDY DESIGN

- In pediatric outpatient settings at an academic medical center
- Participants were recruited with **flyers, an advertisement, and letters of invitation**
- Eligible participants were **English speaking, aged 12–17 years, prescribed an asthma medication, able to access the Internet, and in possession of a cell phone with an SMS plan**
- Verbal consent was obtained
- completed baseline online surveys

METHODS(CONTINUE)

STUDY DESIGN

- Participation in the trial lasted for **3 weeks**
- Instructions were sent via **email**, which included a phone number for **24-h** support, a demonstration video
  - Research coordinator

enrollment

159

Exclude: 61
Not meeting inclusion criteria(11)
Declined to participate (19)
Enrollment not completed(12)
Other reason(19)

Randomized(98)

Allocation

Intervention(53)

Control(45)

Lost to follow up(7)
Did not complete time 2 survey (6)
Withdrew(1)

Follow up

Lost to follow up(2)
Did not complete time 2 survey(2)

Total analyzed(46)

Analysis

Total analyzed(43)

METHODS(CONTINUE)
DATA SOURCES/COLLECTION AND MEASURES

- family demographics, medication regimen, asthma control test
- Perceptions of Asthma Medication → 5-point scale → Cronbach's α 0.70
- self-efficacy → 5-point scale → Cronbach's α reliability at 0.87
- quality of life → 13 items, 7-point → Cronbach's α 0.80
- Illness Management Survey → five items on a scale of 1–5 → Cronbach's α of 0.87

METHOD(CONTINUE)
DATA ANALYSIS

- **intention-to-treat**
- **Wilcoxon** test for continuous variables
- **Pearson's chi-squared** test for categorical variables
- **Wilcoxon** test for significance to assess the change from the baseline survey to the follow-up survey results, and to assess MMH impact on asthma control, medication adherence asthma self-efficacy, and quality-of-life

RESULTS

- There were **not** statistically significant differences between groups
- Notably, both groups had **similar scores** of self-reported asthma control and medication adherence

	N	Control (N = 43)	Intervention (N = 46)	P-value
Age	۸۹	۱/ ± ۱۳/۹۳ ۵۴	۱/ ± ۱۴/۱۷ ۸۳	0.644[a]
Gender	۸۹			
Male		(۲۳) %۵۳	(۲۲) %۴۸	
Female		(۲۰) %۴۷	(۲۴) %۵۲	
Race	۸۹			0.162[b]
White		(۲۰) %۴۷	(۲۱) %۴۶	
African American		(۲۰) %۴۷	(۲۳) %۵۰	
Hispanic		(۰) %۰	(۲)%۴	
Other[c]		(۳) %۷	(۰) %۰	
Family Income	۷۴			0.389[b]
۰۰۰ ۲۰$>		(۱۱) %۳۳	(۱۵) %۳۷	
-۰۰۱ ۲۰$ ۰۰۰ ۴۰$		(۷) %۲۱	(۱۳) %۳۲	
-۰۰۱ ۴۰$ ۰۰۰ ۷۰$		(۸) %۲۴	(۷) %۱۷	
۰۰۰ ۷۰$<		(۷) %۲۱	(۶) %۱۵	
Parent/Guardian Education	۸۹			0.422[b]
Some high school		(۱۴) %۳۳	(۲۲) %۴۸	
High school degree		(۴) %۹	(۵) %۱۱	
Some college, no degree		(۱۲) %۲۸	(۱۱) %۲۴	
College degree		(۹) %۲۱	(۷) %۱۵	
Graduate degree		(۴) %۹	(۱) %۲	

Adolescent needs to earn cell phone	٨٩			0.083[b]
Yes		(٨) %١٩	(٣) %٧	
No		%٨١ (٣٥)	%٩٣ (٤٣)	
Type of asthma inhaler	٨٩			0.250[b]
Rescue		%٣٣ (١٤)	%٢٢ (١٠)	
Rescue + Control		%٦٧ (٢٩)	%٧٨ (٣٦)	
Asthma control Test	٨٩	± ١٩/٣٧ ٣/٧٥	٣ ± ١٩/١٣ .٩٦	0.951[a]

Adherence last 7 days	٦٥	٢ ± ٥/١٧ .٢٢	٢/ ± ٤/٢٥ ٠٦	0.058[a]
Self-efficacy	٨٩	٠ ± ٤/٣١ .٤٥	٠/ ± ٤/٠٤ ٦٦	0.089[a]
Perceptions about Medication	٨٩	٠ ± ٢/١٣ .٥١	٠/ ± ٢/٣٠ ٥٩	0.161[a]
Quality of Life	٨٩	٠ ± ٥/٩٠ ٩٠	١/ ± ٥/٣٦ ٣٦	0.107[a]
Illness management	٨٩	١ ± ٢/٣٧ .٠١	٠/ ± ٢/٦٦ ٩١	0.200[a]

RESULTS(CONTINUE)

IMPACT ON ASTHMA MANAGEMENT

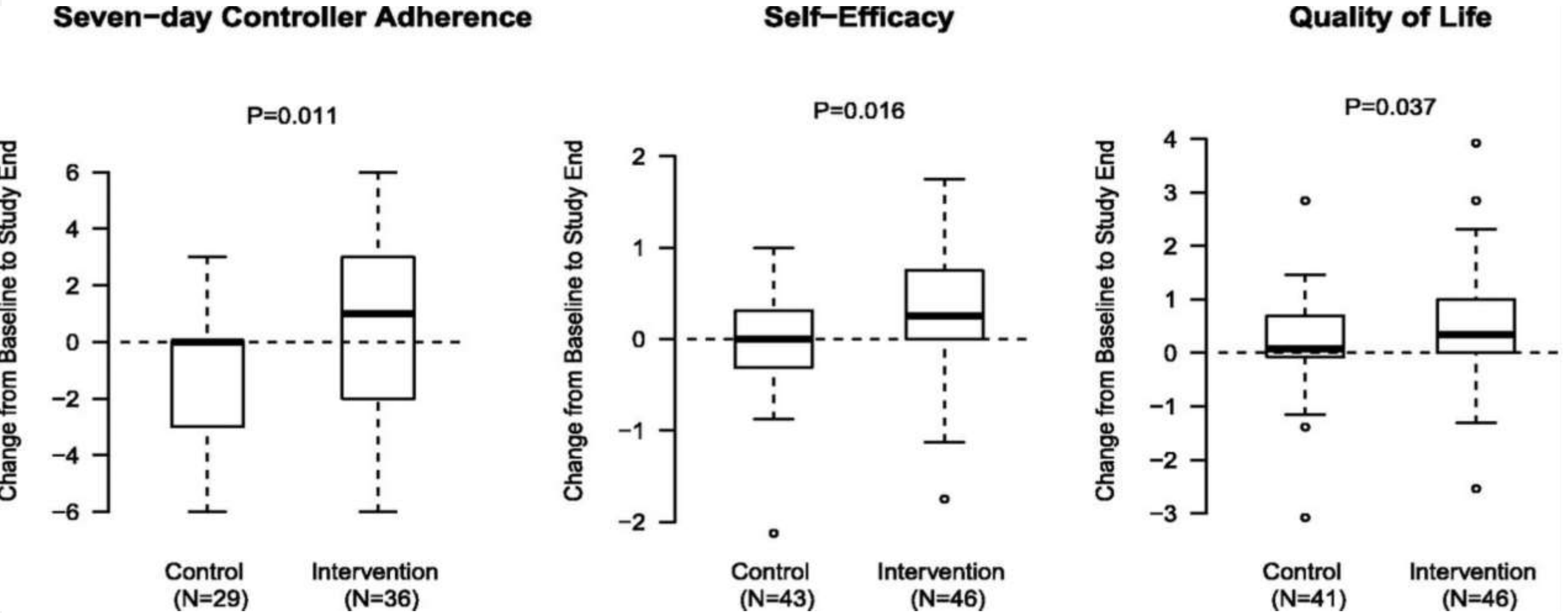
- Compared with control patients, intervention patients had a significant improvement in

adherence ***P* = .011**

Self Efficacy **P=** .016

Quality of Life **p=.37**

Measure	Control				Intervention				
	N	T1	T2	Change	N	T1	T2	Change	P
Asthma Control Test	۴۳	۱۹/۳۷	۲۱/۱۲	۱/۷۴	۴۶	۱۹/۱۳	۲۰/۷۸	۱/۶۵	۰/۷۲۸
Adherence in last 7 Days	۲۹	۵/۱۷	۳/۸۳	۱/۳۴۵-	۳۶	۴/۲۵	۴/۸۶	۰/۶۱۱	۰/۰۱۱
Self Efficacy	۴۳	۴/۳۰۵	۴/۲۷۶	۰/۰۲۹۱	۴۶	۴/۰۳۸	۴/۳۲۱	۰/۲۸۲۶	۰/۰۱۶
Quality of Life	۴۳	۵/۹۰۲	۶/۰۵۳	۰/۰۹۵۷	۴۴	۵/۳۵۵	۵/۸۸۵	۰/۵۳۰۱	۰/۰۳۷


Seven−day Controller Adherence
P=0.011
Change from Baseline to Study End
6
4
2
0
−2
−4
−6
Control
(N=29)
Intervention
(N=36)
Self−Efficacy
P=0.016
Change from Baseline to Study End
2
1
0
−1
−2
Control
(N=43)
Intervention
(N=46)
Quality of Life
P=0.037
Change from Baseline to Study End
4
3
2
1
0
−1
−2
−3
Control
(N=41)
Intervention
(N=46)

RESULTS(CONTINUE)
USABILITY OF THE MYMEDIHEALTH WEBSITE

- shows that usability scores were the same among active and less active users

- total of 78% of active users and 86% of non active users expressed interest in continuing to use MMH

	Active Users (N = 23)	Non-Users (N = 21)	P-value
	Mean (SD)	Mean (SD)	
I felt comfortable interacting with the MyMediHealth website	۸۱٫۲ (۲۴٫۷)	۷۹٫۲ (۲۲٫۹)	۰٫۸۰۱
MyMediHealth is easy to learn.	۸۳٫۷ (۲۰٫۹)	۸۱٫۵ (۲۳٫۲)	۰٫۹۰۰
I was able to create my medication schedule easily.	۷۲٫۲ (۳۲٫۰)	۷۱٫۹ (۲۹٫۵)	۰٫۷۹۵
I found the medication summary report to be useful.	۷۳٫۷ (۲۶٫۸)	۷۸٫۰ (۱۹٫۹)	۰٫۷۰۴
When using the MyMediHealth website, I was able to tell when I made an error or mistake	۵۶٫۷ (۳۰٫۱)	۷۲٫۷ (۲۵٫۳)	۰٫۰۴۸

The website effectively alerts me to any potential errors or problems.	(۲۷٫۶) ۶۷٫۵	(۲۹٫۲) ۶۸٫۱	۰٫۷۶۸
If I noticed an error or was alerted by the website that there was an error or problem, I was able to make the changes needed to fix the problem.	(۳۶٫۴) ۵۶٫۰	(۳۰٫۸) ۶۹٫۱	۰٫۱۹۴
MyMediHealth allows me to do what I need to do with this website.	(۲۹٫۰) ۷۵٫۴	(۲۴٫۶) ۷۳٫۷	۰٫۵۱۵
MyMediHealth provides me with all of the information I need in order to use the website effectively.	(۲۹٫۲) ۷۳٫۰	(۲۴٫۱) ۷۹٫۶	۰٫۳۹۱
MyMediHealth is easy to start up (e.g., setting up my medication schedule) and begin using.	(۳۱٫۳) ۷۶٫۳	(۲۸٫۲) ۷۵٫۰	۰٫۷۱۱
MyMediHealth allows me to work quickly when I am busy or do not have much time.	(۲۷٫۶) ۷۲٫۳	(۲۶٫۰) ۷۴٫۸	۰٫۸۶۷
The website has a pleasing and appropriate appearance.	(۲۰٫۲) ۸۵٫۵	(۲۴٫۲) ۸۲٫۹	۰.803

DISCUSSION

- Though this study is **small**, it is one of the first to demonstrate even a short-term impact on pediatric medication adherence
- **This study is the first to involve adolescents, and the first to report changes related to perceived quality of life and self-efficacy**
- And are good starting points for identifying patient beliefs and barriers to self-care

CONCLUSION

- The MMH intervention was associated with improvement in controller medication adherence, quality of life, and self-efficacy
- **We also found a significant racial disparity in the rate of MMH adoption**
- Further research is needed to identify and address barriers to adoption

Thanks for Your Attention

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