Health Information Technology Department
Mashhad University of Medical Sciences

In the name of God

Mashhad University of Medical Sciences

CORRELATES OF MOBILE PHONE USE IN HIV CARE: RESULTS FROM A CROSS-SECTIONAL STUDY IN SOUTH AFRICA

Shadi Hoseini Toosi

Dr Khalil Kimiafar

Hoseinits951@mums.ac.ir

Preventive Medicine Reports 2 (2015) 512–516

Contents lists available at ScienceDirect

Preventive Medicine Reports

journal homepage: http://ees.elsevier.com/pmedr

PMR : Preventive Medicine Report

International Journal of Educational Research

Support Open Access

Editor-in-Chief: Allen Thurston

Scopus coverage years: from 2014 to Present **0.99**

Subject area : Medicine: Public Health, Environmental and Occupational Health

،Health Informatics

AUTHOR

Page ⌄ Set document feed Request to merge authors

	Author	Documents	Subject area	Affiliation	City	Country/Territory
1	Madhvani, Naieya	1	Medicine	Karolinska Institutet	Stockholm	Sweden

Hide last title ^

INTRODUCTION

By 2012, **34 million** people were living with Human Immunodeficiency Virus (HIV) worldwide.

eight million people receiving Antiretroviral Therapy (ART) globall. South Africa, has the highest reported number of absolute HIV cases worldwide at **5.6 million** people.

during 2010 approximately **55%** of HIV patients in South Africa were enrolled in ART programs.

INTRODUCTION

Even with an increasing number of ART recipients, many are **lost to follow up** and in recent years this problem appears to have deteriorated.

Forgetfulness is repeatedly cited as being a common or significant reason.

According to the World Health Organization (WHO), **mobile and wireless technologies** have "the potential to transform the face of health service delivery across the globe.

INTRODUCTION

Latest 2013 figures from the **International Telecommunication Union** suggest that there are approximately **6.8 billion** mobile phone subscriptions worldwide, equating to a global penetration of **96%** (**89%** in developing countries)

The use of mobile phone devices has the potential to support HIV patients and **reduce loss to followup** ; importantly mobile phone use in South Africa, relative to other electronic devices is high.

INTRODUCTION

A number of studies have looked at the impact of mobile phones as appointment reminders.

the effects appear to depend on **the type of mobile phone intervention** (Pop-Eleches et al., 2011; Sidney et al., 2012), **the time period of the intervention** (Puccio et al., 2006), **and the adherence measurement** used.

INTRODUCTION

Studies have shown that patients who fail to attend appointments differ in characteristics including:

Age

education level

Employment

marital status

mobile phone ownership.

INTRODUCTION

The aim of our study was to identify patient demographic groups least likely to use mobile phones as reminders for:

i) attending clinic appointments on time and

ii) adherence to ART, in Soweto, South Africa.

The goal was to improve our understanding of the type of barriers faced by HIV patients for not using their mobile phones.

METHODS

Study design

- study was a cross-sectional study carried out at the **Chris Hani Baragwanath Hospital**, Soweto, South Africa.
- study was conducted during **March to September 2008**

METHODS

After obtaining written informed consent information on socio-demographic characteristics, reminders used for attending clinic appointments, failing to attend appointments, reminders for taking medication, and failing to take medication was collected through a structured questionnaire from 998 participants.

Analysis was performed on 883 first-line therapy recipients.

METHODS

For exposure , we included variables that could potentially influence the impact of mobile phone technology: age, gender, education level, marital status, number of sexual partners in the last three months, income level, and employment status.

METHODS

Statistical analysis

Bivariate analyses to identify risk factors for

i) attending clinic appointments (retention in care)

ii) taking medication on time

adherence to ART were performed using Chi-square tests, Fisher's exact tests and bivariate logistic regression

METHODS

Ethical considerations:

- Ethical approval for the original study was obtained from the regional Medical Ethics Board, Stockholm, Sweden (Protocol 2008/3:7) and the Research Ethics Committee, University of Witwatersrand, Johannesburg, South Africa (M070721)

RESULTS

1. Demographic characteristics of patients interviewed
2. Frequency distribution of reminders
3. Number of reminders
4. Significant associations between demographic variables and mobile phone reminders
5. Bivariate and multivariate logistic regression analyses
6. Variable interactions

RESULTS

Demographic characteristics of patients interviewed:

Data was analyzed from 883 first line regimen patients.

- Most individuals were 35–44 years old (47.2%), women (73.2%), had completed secondary schooling (78.0%), were single (39.6%), with no or only one sexual partner in the last three months (97.3%), and retired/not employed (66.7%) With regard to income, the median level of the month prior to study enrolment was equal to 940 South African Rands (R) (approximately equivalent to 88 United States Dollars.

Table 1
Demographic characteristics of study participants (n = 883).

	N (%)
Age	*883 (100)*
≤34 years	256 (29.0)
35–44 years	417 (47.2)
≥45 years	210 (23.8)
Sex	*883 (100)*
Man	237 (26.8)
Woman	646 (73.2)
Education level	*883 (100)*
Tertiary	48 (5.4)
Secondary school	689 (78.0)
Primary school or never been to school	146 (16.5)
Marital status	*881 (99.8)*
Single	349 (39.6)
Divorced/separated/widowed	83 (9.4)
Married	127 (14.4)
Sexual relationship	210 (23.8)
Co-habitation	112 (12.7)
Sexual partners last three months	*879 (99.5)*
≤1	855 (97.3)
≥2	24 (2.7)
Income level (median = 940 R, equivalent to 88 USD)	*883 (100)*
≥1351R	213 (24.1)
941-1350R	122 (13.8)
421-940R	312 (35.3)
≤420R	236 (26.7)
Employment status	*883 (100)*
Employed	233 (26.4)
Work on daily basis	61 (6.9)
Retired or not employed	589 (66.7)

RESULTS

Frequency distribution of reminders

	appointment reminder	medication reminder
clinic register card	N = 543; 61.5%	.....
diary/appointment book	(N = 192; 21.7%),	**(N = 5; 0.6%)**
relying on their memory	(N=183; 20.7%)	**(N= 429; 48.6%)**
using a mobile phone	N = 93; 10.5%)	**(N=431; 48.8%)**
close friend/relative to remind	(N = 86; 9.7%).	**(N = 173; 19.6%)**
using a partner	(N = 36; 4.1%)	**(N = 68; 7.7%)**
friend at work	(N= 2; 0.2%)	**(N= 6; 0.7%)**
other reminder device	(N= 14; 1.6%).	**(N = 176; 19.9%)**
using a pill box		**(N = 7; 0.8%)**

RESULTS

Number of reminders

	appointment reminder	medication reminder
one type of reminder	(73.2%)	(57.9%).
two reminders	24.1%	37.9%
three or more types of reminders	(2.7%).	(4.1%)
P-value	0.056	0.654

RESULTS

Significant associations between demographic variables and mobile phone Reminders:

	appointment reminder	medication reminder
demographic variables and mobile phone Reminders	**age** **sex** **education level** **employment status**	**Age** **Education level** **income** **employment status**

RESULTS

Bivariate and multivariate logistic regression analyses

	Appointment reminder	medication reminder
Less likely to use a mobile phone	patients 45 years or older women completed primary schooling/never having been to school.	**patients 35–44 years** **earning less than or equal to 420R per month**

Table 2
Association between exposure variables and mobile phone reminder for clinic appointments (n = 883).

		Used phone			Bivariate analysis			Multivariate analysis[a]		
		No, N (%)	Yes, N (%)	P	OR	CI (95%)	P	OR	CI (95%)	P
Age	*883 (100)*									
≤34	256 (29.0)	217 (27.5)	39 (41.9)	**<0.001**	1			1		
35–44	417 (47.2)	370 (46.8)	47 (50.5)		1.4	(0.9–2.2)	0.136	1.5	(0.9–2.4)	0.103
≥45	210 (23.8)	203 (25.7)	7 (7.5)		5.2	(2.3–11.9)	**<0.001**	4.5	(1.9–10.5)	**0.001**
Sex	*883 (100)*									
Man	237 (26.8)	203 (25.7)	34 (36.6)	**0.025**	1			1		
Woman	646 (73.2)	587 (74.3)	59 (63.4)		1.7	(1.1–2.6)	**0.027**	1.8	(1.1–2.9)	**0.015**
Education level	*883 (100)*									
Tertiary	48 (5.4)	38 (4.8)	10 (10.8)	**0.002**	1			1		
Secondary school	689 (78.0)	612 (77.5)	77 (82.8)		2.1	(1.0–4.4)	**0.049**	1.6	(0.8–3.1)	0.205
Primary school or no education	146 (16.5)	140 (17.7)	6 (6.5)		6.1	(2.1–18)	**0.001**	3.4	(1.1–10.4)	**0.034**
Marital status	*881 (99.8)*									
Single	349 (39.6)	310 (39.3)	39 (41.9)	0.567	1					
Divorced/separated/widowed	83 (9.4)	77 (9.8)	6 (6.5)		1.6	(0.7–4)	0.294			
Married	127 (14.4)	110 (14.0)	17 (18.3)		0.8	(0.4–1.5)	0.508			
Sexual relationship	210 (23.8)	188 (23.8)	22 (23.7)		1.1	(0.6–1.9)	0.798			
Co-habitation	112 (12.7)	103 (13.1)	9 (9.7)		1.4	(0.7–3.1)	0.346			
Sexual partners last three months	*879 (99.5)*									
≤1	855 (97.3)	764 (97.2)	91 (97.9)	1	1					
≥2	24 (2.7)	22 (2.8)	2 (2.2)		1.3	(0.3–5.7)	0.718			
Income	*883 (100)*									
≥1351R	213 (24.1)	184 (23.3)	29 (31.2)	0.188	1					
941-1350R	122 (13.8)	107 (13.5)	15 (16.1)		1.1	(0.6–2.2)	0.731			
421-940R	312 (35.3)	281 (35.6)	31 (33.3)		1.4	(0.8–2.5)	0.195			
≤420R	236 (26.7)	218 (27.6)	18 (19.4)		1.9	(1–3.5)	**0.041**			
Employment status	*883 (100)*									
Employed	233 (26.4)	195 (24.7)	38 (40.9)	**0.004**	1			1		
Work on daily basis	61 (6.9)	58 (7.3)	3 (3.2)		3.8	(1.1–12.7)	**0.032**	2.9	(0.8–9.8)	0.092
Retired or not employed	589 (66.7)	537 (68.0)	52 (55.9)		2.0	(1.3–3.2)	**0.002**	1.5	(1.0–2.5)	0.072

[a] Multivariable logistic regression adjusted for age, sex, education level and employment status.

Table 3
Association between exposure variables and mobile phone reminder for taking medication (n = 883).

		Used phone			Bivariate analysis			Multivariate analysis[a]		
		No, N (%)	Yes, N (%)	P	OR	CI (95%)	P	OR	CI (95%)	P
Age	*883 (100)*									
≤34	256 (29.0)	103 (22.8)	153 (35.5)	**<0.001**	1			1		
35–44	417 (47.2)	208 (46.0)	209 (48.5)		1.5	(1.1–2)	**0.015**	1.5	(1.1–2.1)	**0.012**
≥45	210 (23.8)	141 (31.2)	69 (16.0)		3.0	(2.1–4.4)	**<0.001**	2.9	(2.0–4.3)	**<0.001**
Sex	*883 (100)*									
Man	237 (26.8)	131 (29.0)	106 (24.6)	0.141	1					
Woman	646 (73.2)	321 (71.0)	325 (75.4)		0.8	(0.6–1.1)	0.142			
Education level	*883 (100)*									
Tertiary	48 (5.4)	18 (4.0)	30 (7.0)	**0.027**	1					
Secondary school	689 (78.0)	348 (77.0)	341 (79.1)		1.7	(0.9–3.1)	0.084			
Primary school or no education	146 (16.5)	86 (19.0)	60 (13.9)		2.4	(1.2–4.7)	**0.011**			
Marital status	*881 (99.8)*									
Single	349 (39.6)	180 (39.9)	169 (39.3)	0.716	1					
Divorced/separated/widowed	83 (9.4)	44 (9.8)	39 (9.1)		1.1	(0.7–1.7)	0.814			
Married	127 (14.4)	69 (15.3)	58 (13.5)		1.1	(0.7–1.7)	0.595			
Sexual relationship	210 (23.8)	99 (22.0)	111 (25.8)		0.8	(0.6–1.2)	0.31			
Co-habitation	112 (12.7)	59 (13.1)	53 (12.3)		1.0	(0.7–1.6)	0.839			
Sexual partners last three months	*879 (99.5)*									
≤1	855 (97.3)	436 (96.9)	419 (97.7)	0.478	1					
≥2	24 (2.7)	14 (3.1)	10 (2.3)		1.3	(0.6–3.1)	0.48			
Income	*883 (100)*									
≥1351R	213 (24.1)	93 (20.6)	120 (27.8)	**0.019**	1			1		
941-1350R	122 (13.8)	57 (12.6)	65 (15.1)		1.1	(0.7–1.8)	0.588	1.1	(0.7–1.8)	0.561
421-940R	312 (35.3)	167 (37.0)	145 (33.6)		1.5	(1.0–2.1)	**0.027**	1.3	(0.9–1.8)	0.182
≤420R	236 (26.7)	135 (29.9)	101 (23.4)		1.7	(1.2–2.5)	**0.004**	1.6	(1.1–2.4)	**0.014**
Employment status	*883 (100)*									
Employed	233 (26.4)	101 (22.4)	132 (30.6)	**0.02**	1					
Work on daily basis	61 (6.9)	32 (7.1)	29 (6.7)		1.4	(0.8–2.5)	0.204			
Retired or not employed	589 (66.7)	319 (70.6)	270 (62.7)		1.5	(1.1–2.1)	**0.005**			

[a] Multivariable logistic regression adjusted for age and income.

DISCUSSION

Our study showed that HIV infected patients in Soweto, South Africa use various tools as appointment reminders and medication reminders. For appointment reminders, patients most often used **a clinic register card.**

In contrast, for medication reminders patients most often used a **mobile phone.**

DISCUSSION

Using an increasing number of clinic appointment reminders might be associated with being less likely to miss an appointment, but the association was not significant. No association was seen for medication reminders.

For clinic reminders, the majority of people did not appear to use mobile phones as reminder tools. Understanding which groups don't use mobile phones may help us to study their reasons and potentially make changes in policy and practice to overcome these barriers.

For medication reminders it appears that a reminder has a more active role, prompting the patient to remember to take their medication on time.

DISCUSSION

Our results also suggest that one reminder is sufficient, with a single prompt during each scheduled drug dose.

Through both stages of statistical analysis and for both appointment reminders and medication reminders older age was associated with being less likely to use a mobile phone as a reminder aid. There may be various reasons for this association and the other associations noted

DISCUSSION

These reasons could be divided into: "not having" and "not wanting"

That is:

- not having a mobile phone,
- not having the finances to buy and use a mobile phone,
- not having the knowledge to operate a mobile phone,
- not having any use for a phone,
- as well as not wanting to use a mobile phone
- not wanting to change from older communication methods to newer methods.

DISCUSSION

Limitations:

individuals volunteered to be part of the study

participants were grouped in age categories, with the lowest age group consisting of people younger than 35 years

information on exposure and outcome was self-reported and might have been subjected to recall bias and social desirability bias.

Knowing that adherence to therapy is important for successful treatment outcome might have influenced the answers of study participants in the direction of over reporting treatment adherence and use of mobile phones.

DISCUSSION

more information about the usage of mobile phones might have been interesting to analyze our results. Questions specifically directed at how exactly mobile phones were used as reminders (e.g. use of calendar devices or automatic reminders on the phone) might have provided interesting information and should be included in further studies on mHealth and adherence to therapy.

CONCLUSION

Our study identified a number of groups that did not use mobile phones as reminder devices both for attending appointments and for taking medication on time.

These groups were being a woman, of low education level, low income and age older than 35.

Thanks for Your Attention

Shadi Hoseini Toosi

Hoseinits951@mums.ac.ir