RESEARCH ARTICLE

Determinants of medication adherence in patients with HIV: Application of the health belief model

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Abstract

Objectives: To explore the constructs of the Health Belief Model in order to predict medication adherence in patients with human immunodeficiency virus.

Method: The correlational study was conducted at Jinnah Hospital, Lahore, Pakistan, from March to May 2019, and comprised patients positive for human immunodeficiency virus aged 18-55 years and taking antiretroviral therapy from at least three months. Data was collected using the Urdu version of the health belief scale (HBS), cues to action, and adherence determination questionnaire (ADQ). Data was analysed using SPSS 22.

Results: Of the 150 subjects, 109(72.7%) were males, 36(24%) were females and 5(3.3%) were transgender. The overall mean age was 33.17+/-8.22 years. The perceived susceptibility, severity and barriers to engage in human immunodeficiency virus-preventive behaviour significantly positively predicted medication adherence ($p<0.05$). Perceived benefits were not helpful in understanding medication adherence pattern ($p>0.05$).

Conclusion: There was need to introduce awareness campaign regarding the importance of taking regular medication by human immunodeficiency virus patients.

Keywords: Health belief model, HIV in Pakistan, Medication adherence, Perceived severity, Perceived barriers.
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Introduction

According to Pakistan's National acquired immunodeficiency syndrome (AIDS) Control Programme (NACP), in 2019 approximately 165,000 people were living with human immunodeficiency virus (HIV) and only 17,149 patients were registered with NACP for getting antiretroviral treatment.[1] However, the Joint United Nations Programme on HIV and AIDS (UNAID) reported that in 2019 only 12% of HIV patients were on treatment. In addition, 5% of HIV-positive sex workers, 16.2% drug injectors, and 10.2% transgender were taking antiretroviral therapy in Pakistan.[2] This low level of treatment coverage increases the disease-related mortality rate in Pakistan.

This might be because of various countries in the Asia-Pacific region are dependent on international funding. For example, Indonesia (58%), Bangladesh (84%), Philippines (68%) and Pakistan (64 %) depend on donor-funding to provide antiretroviral therapy (ART) to HIV patients.[3]

ART contributes to slowing down of HIV progression and prevents opportunistic diseases, which, in turn, promotes healthier lives and increases life expectancy of HIV patients.[4] For achieving these benefits, perfect medication adherence (MA) is considered necessary. In the context of Asia-Pacific region, factors considered important in increasing MA in HIV patients include effective communication style of the care provider, HIV treatment literacy, and early referral from health workers or the co-infected[3]. However, research showed that in chronic medical conditions, MA falls 20-80%.[4] Also, studies indicate that patients with HIV are not achieving optimal MA level due to various psychosocial factors, including, age, profession, gender, literacy level, injecting drug use, and fear of diagnosis at public hospitals.[3,5,6]

Besides, the challenges to address non-adherence were based on behaviour theories that are used for behaviour-change. The health belief model (HBM) focuses on various factors, including perceived severity of a disease, perceived susceptibility of an individual to that disease or susceptibility to disease progression, perceived benefits linked with health behaviour to combat the disease, perceived barriers to practising healthy behaviour, cues to action, and self-efficacy to change health behaviour, including adherence, in chronic health conditions, such as HIV and diabetes.[7] In short, HBM is utilised for the detection of disease, finding an acceptable remedy and getting well. The essential idea of HBM is a mechanism to reduce and avoid disease conditions and to clarify or predict health behaviours in various conditions.[8,9]

In Europe, studies have been done using HBM in HIV patients.[4] In Pakistan, less research has been carried out on MA in people living with HIV. The current study was planned to explore HBM constructs to predict MA in patients with HIV.

Patients and Methods

The correlational study was conducted at Jinnah Hospital,

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Lahore, Pakistan, from March to May 2019, After approval from the institutional ethics review committee and AIDS control programme in Lahore, the sample was raised using purposive sampling technique from Jinnah Hospital, which is a 1250-bed public-sector teaching hospital.

Those included were HIV patients aged 18-55 years and on ART for at least three months. Those not willing to participate were excluded.

After taking informed consent, demographic and clinical data was collected from the subjects using a self-generated proforma and other tools. As most of the participants were illiterate, all data-collection tools were administered orally on patients by the researchers. Permission to translate and use the AIDS Health Belief Scale (AHBS),[10] Cues to Action Scale (CAS)[11] and Adherence Determination Questionnaire (ADQ)[12] were obtained from the relevant authors through e-mail. The translation process was carried out in two steps; forward and backward translations with assessment measures in the first step, and a pilot study to test comprehension in the second step.

The AHBS, developed by Zagumny and Brady in 1998, was used to assess HBM components perceived severity of contracting HIV, perceived benefits of prevention methods, perceived susceptibility to contracting HIV, and perceived barriers to engaging in HIV-prevention behaviours. It has 16-items scored on a 6-point scale ranging from 1 = strongly disagree to 6 = strongly agree, with no middle point. Its reliability ranges from 0.82 to 0.93.[10]

CAS, developed by Wilson et al. in 1991 based on HBM, was used to assess participants' exposure to cues that could influence them to engage in an HIV/AIDS preventive health behaviour. The scale has 10 items, with a score range of 0-10. Cronbach's alpha reliability was 0.40.[11]

The ADQ, developed by DiMatteo et al. in 1993, is based on HBM and consists of 38 short statements rated on a Likert scale from 1 = strongly disagree to 5 = strongly agree. It has seven subscales: perceptions of the interpersonal aspects of medical care received, beliefs about the severity of the disease, beliefs about susceptibility to disease, beliefs about the perceived utility of the recommendations, subjective norms regarding adherence, intentions to adhere, and the presence of supports and the absence of barriers to adherence. The alpha reliability of the subscales ranged from 0.65 to 0.85.[12]

Data was analysed using SPSS 22.[13] Spearman-Brown correlation analysis and linear regression analysis was used as required, to find out which HBM components could predict MA.

Results

Of the 170 adults approached, 150(88.2%) participated;

Table-1: Demographics of the study sample (N=150).

Characteristics	M(SD)	f(%)
Age (Years)	33.17(8.22)	
Gender		
Male		109(72.7)
Female		36(24.0)
Transgender		5(3.3)
Religion		
Islam		142(94.7)
Christianity		8(5.3)
Education		
Uneducated		51(34.3)
Primary		22(14.7)
Matric		55(36.7)
Intermediate		14(9.3)
Graduate and above		8(5.3)
Occupation		
Non worker		47(31.3)
Government job		8(5.3)
Private job		72(48.0)
Business		22(14.7)
No. of Siblings		
1-3		9 (31.30)
4-7		119 (292.0)
8 and above		22 (382.3)
Marital Status		
Married		97(64.7)
Unmarried		53(35.3)
Duration of Marriage (Years)	8.06(8.91)	
No. of Children		
0-3		130 (252.14)
4-7		19(286.7)
8 and above		1 (100)
Family System		
Joint		77(51.3)
Nuclear		73(48.7)
Monthly Income	PKR 25,903 (12767.1)	
Geographic status		
Urban		113(75.3)
Rural		37(24.7)
Drug/Alcohol abuse		
No Abuse		81(54.0)
Injection		57(38.0)
Alcohol		
Others		12(8)
HIV infection status		
CD4 cell count	433.55 (250.86)	
Any HIV infected family member		
No Infected family members		110(73.3)
Spouse		35(23.3)
Other members (Children, Parent)		5(3.3)
Age of onset (Years)	30.4 (7.94)	
Duration of Infection (Years)	2.86 (2.57)	
No of years on HIV medication	2.76 (2.46)	

Note. f= frequency, %= percentage, M: Mean, SD: Standard deviation, HIV: Human immunodeficiency virus, CD4: cluster of differentiation.

Table-2: Spearman-Brown Correlation among demographics and study variables (N=150).

Variables	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p	r	p
1 MA interpersonal aspect of care	-	-	.24	.00	.12	.14	.33	.000	.09	.26	.11	.19	-.01	.87	.47	.00	-.14	.07	.79	.000	.75	.000	.07	.37	.15	.07	.84	.000
2.MA perceived utility			-	-	.11	.19	.22	.00	.04	.67	.04	.64	-.12	.14	.30	.000	.12	.13	.19	.02	.22	.00	.00	.94	.19	.01	.23	.005
3 MA severity					-	-	.08	.30	.13	.13	.07	.37	-.09	.28	.14	.09	.08	.34	.07	.38	.14	.09	.10	.21	.12	.13	.12	.14
4 MA susceptibility							-	-	.05	.52	.12	.16	-.14	.09	.33	.000	.27	.001	.19	.02	.33	.000	.22	.007	.21	.00	.23	.00
5 MA subjective norms									-	-	-.11	.19	-.04	.56	.83	.000	.01	.88	.02	.84	.19	.02	.03	.69	.14	.09	.16	.05
6.MA intentions											-	-	-.07	.38	-.11	.17	.01	.87	.12	.15	.02	.80	.06	.45	.08	.36	.15	.07
7MAsupport &barrier													-	-	.06	.45	.05	.55	.07	.39	.08	.34	.01	.84	.06	.44	.05	.56
8Overall MA															-	-	.13	.13	.29	.000	.47	.000	.06	.49	.25	.00	.47	.000
9 Cues to action																	-	-	.18	.02	.05	.52	.11	.16	.23	.00	.16	.04
10AHB susceptibility																			-	-	.27	.00	.07	.34	.09	.27	.61	.000
11AHB severity																					-	-	.08	.33	.11	.18	.67	.01
12 AHB benefit																							-	-	.11	.19	.33	.000
13AHB barriers																									-	-	.49	.000
14 Overall AHB																											-	-
M	2.76		5.86		15.60		13.87		21.24		6.04		56.75		29.47		27.20		14.62		12.59		59.99		11.98		15.66	
SD	2.46		1.93		3.08		3.32		2.24		2.98		6.56		4.93		4.18		3.08		2.15		12.94		.30		3.00	

p<.05, **p<.01, p<.001, MA: Medication adherence, AHB: Acquired immunodeficiency syndrome [AIDS] health belief scale.

Table-3: Linear regression analysis of components' of Health Belief Model (HBM) as the predictors of medication adherence (MA) (N=150).

	Medication Adherence		
Predictors	**B**	**S.E**	**β**
Perceived Severity	2.0	.33	.44***
Perceived Susceptibility	-.72	.35	-.14*
Perceived Barriers	.78	.37	.15*
Perceived Benefit	-.37	.48	-.05
R^2		.24	
F	.	.000***	
$\triangle R^2$	.	.14	

Note. *p<.05, ***p<.001 , SE: Standard error, B: Unstandardised coefficients, β: Beta standardised coefficients, R2: Explained variance.

109(72.7%) males, 36(24%) females and 5(3.3%) transgenders. The overall mean age of the sample was 33.17±8.22 years. Also, 142(94.7%) subjects were Muslims; 113(75.3%) belonged to urban areas; and 103(68%) were working. Further, 81(54%) participants had not used any type of addictive drugs (Table-1); 150(100%) had HIV-1 infection; and 110(73.3%) had no family members infected with HIV. The mean age of HIV onset was 30.4±7.94 years and the mean duration of infection was 2.86±2.57 years. Of the total, 101(67.3%) participants had no disease before HIV infection; 126(84%) had no psychological co-morbidity with HIV; 74(49.3%)showed complete MA behaviour; and 76(50.6%) had partial MA behaviour

overall AHB and perceived susceptibility, severity, and barriers to engaging in HIV-preventive behaviour subscales were significantly positively correlated with overall MA (p<0.05). However, CAS was non-significantly positively correlated with overall MA (p>0.05) (Table-2).

No demographic variable was controlled for regression analysis as no significant correlation was found between demographic variables and the studied variables. Analysis showed that perceived severity, susceptibility and barriers to engage in HIV-preventive behaviour significantly predicted MA, but perceived benefit was not significant in this regard (p>0.05). The studied variables explained 24% variance in MA, and the behaviour increased by 2.0 with each unit increase in perceived severity, and by 0.78 with each unit increase in perceived barriers to engaging in HIV-preventive behaviour, but MA behaviour decreased by -0.72 with each unit increase in perceived susceptibility (Table-3).

Discussion

Findings indicated that MA was significantly positively correlated with three components of HBM. Also, linear regression analysis revealed that perceived severity, susceptibility, and barriers to engaging in HIV-preventive behaviour significantly predicted MA, which is in line with literature.[14,15]

Moreover, in patients susceptible to the disease, MA behaviour decreased and this might be because their cluster of differentiation (CD) counts were in a controlled range. This is in line with the literature.[14,16] Also, perceived barriers to engage in HIV-preventive behaviours

increased MA which reflected the capacity to deal with barriers and the ability to take necessary actions.[17]

In the current sample, except one, all HBM components explained MA. Literature presents a variety of results regarding HBM and MA in HIV patients.[18,19] This might be because of the use of varied types of HBM scales in different researches.[20]

Despite being the first study on the matter conducted in Lahore, the current study has its limitations as data was collected only from the one hospital. Also, the study was correlational, and, therefore, no causal relationship could be identified. The scales used were self-reported measures and may manifest socially-desirable responses. However, the scales have been widely used and the findings of the current study have significant correlation with other data-sets. Future longitudinal studies should explore the perceived cost of antiretroviral drugs in terms of finance and other factors to assess variables that may predict MA.

Conclusion

Perceived severity, susceptibility and barriers to engage in HIV-preventive behaviour significantly predicted MA. The findings can be used to develop strategies to improve HIV MA.

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