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The Association of Medication Adherence and Demographics in IHD Patients

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ABSTRACT:

Background: Low adherence to the medications is a major challenge to reach the therapeutic goal in all the diseases, especially Ischemic Heart Disease. The demographic characteristics may affect the adherence rate. The incorporation of counselling aids can also improve the adherence. **Material and method:** 122 IHD patients were recruited for the study. Their demographic details were collected. They were randomly divided into: Group1 - Control, Group2 - Android Application, Group3 – Personal counselling and Group4 - Android Application & Personal counselling. The questionnaire was filled at the baseline and after two months. A telephonic follow-up of 15 days followed by monthly visit was also done. The data was analysed statistically. **Result and Discussion:** Males were more adherent than females. The adherence level varied irrespective of education level. There was association between age and non-adherence, while it was poor between education and non-adherence (Confidence interval= 95%, $\alpha=5\%$). A 2x2 contingency - Chi square test was significant between gender and the rate of adherence (male-female vs. adherence non-adherence). **Conclusion:** The adherence was positivity associated with the age and gender but not with education.

KEY WORDS: Ischemic heart disease, adherence, demographics.

INTRODUCTION:

Ischemic Heart Disease (IHD) is a condition which requires long-term use of medications to reduce the mortality and morbidity rates. The intensity and severity of the disease is often fatal and can lead to hospitalizations. Hence, medication adherence is essential. The demographic characteristics from the communities are diverse. The tendency and ability of the patients to be adherent may vary. ⁽¹⁾ The WHO defines adherence to long-term therapy as “the extent to which a person’s behaviour - taking medication, following a diet, and/or executing lifestyle changes corresponds with agreed recommendations from

a healthcare provider.”⁽²⁾ A noteworthy percentage of the global population has to meet with the needs of taking large number of medications on regular basis and to treat this acute and chronic condition. However, the therapeutic goal can be achieved only if the patients adhere to it.⁽³⁾ Low adherence has only led to the morbidity, mortality and the inevitable health costs. It is considered that the elderly patients are less likely to be adherent to their medications as compared to the younger ones. Also, education level affects adherence to the therapeutic regimen. Polypharmacy and timely follow-ups can impose a great challenge to the IHD patients(who also have comorbid conditions like hypertension and

diabetes mellitus) especially the elderly as well as those who have less education and find it difficult to understand and remember the names of their medicines.⁽⁴⁾ However, it is essential to know whether the demographics of the patients can affect their level of adherence or not.

METHODOLOGY

For this study, permission from the Ethics Committee (KBIEC) was obtained. The study duration was of six months. The patients diagnosed with IHD, on IHD medications since a month, age: 18 year or above and patients of either of gender were included. Their demographic details were collected. They were randomized into four groups as follows: Group1 - Control, Group2 - Android Application (MedTimer, version 1.0.4), Group3 – Personal counselling (verbal and written Patient Information Leaflet with pictorial representation in both English and Gujarati) and Group4 - Android Application & Personal counselling. Those who were not willing to give informed consent form and those with adherence score 0 at baseline were excluded. Once the patients were enrolled and then refrained from providing the information were considered withdrawn. The patients who lost to follow-up or who did not wish to continue with the study were dropped-out. The questionnaire was filled at the baseline and after 2 months. In addition to above, periodic telephonic follow up was taken at every 15 days followed by monthly visit. Collected data were kept confidential and analyzed statistically.

RESULT AND DISCUSSION

This study aimed to determine the impact of demographic parameters (gender, age and education) on medication adherence in IHD patients. Also, with the help of counselling aids, the challenge of non-adherence can be resolved. Here high and medium adherence level are considered to be adherent. The demographic details are given in Table 1.

Out of total 122 IHD patients, 92 (75.41%) male and 30 (24.59%) female patients completed this study. Moreover, hypertension and diabetes mellitus were the common comorbid conditions along with IHD in this study. Majority of the subjects were treated with Aspirin, Clopidogrel and Rosuvastatin.

Out of 122 subjects, 32 were in Group - 1 (control), 30 in Group - 2 (Android Application), 32 in Group - 3 (personal

counselling) and 28 in Group - 4 (Android application + personal counselling).

Effect of counselling aids on adherence level in male & female subjects of various groups is depicted in Table 2.

In our study, the ratio of male: female was 3:1. This infers that the occurrence of IHD in males is higher compared to females. Mosca et al reported that more men are living with and dying of CHD than women.⁽⁵⁾ Here, the male patients were more adherent than female ones. Similarly it has been reported by Frazier et al 1994; Sung et al 1998; Caspard et al 2005; Hertz et al 2005.⁽⁶⁻⁹⁾ On the contrary Degoulet et al 1983; Chuah 1991; Shea et al 1992; Kyngas and Lahdenpera 1999; Viller et al 1999; Kiortsis et al 2000; Lindberg et al 2001; Balbay et al 2005; Choi-Kwon 2005; Fodor et al 2005; Lertmaharit et al 2005 reported that the female patients were more adherent.⁽¹⁰⁻²⁰⁾ According to our study, the use of android application as a counselling aid was the most effective in improving adherence in male patients while for female ones it was personal counselling.

A 2x2 contingency - Chi square test was performed between gender and the rate of adherence (male-female vs. adherence non-adherence) and the result was significant, shown in Table 3.

Effect of counselling aids on adherence level in different education level and groups is depicted in Table 4.

Irrespective of the education level, inadequate health literacy is one of the major factors for non-adherence, so health literacy may be an important consideration in drug adherence.⁽²¹⁾ Hence, the data was also analyzed based on the education level in IHD patients. In this study, the adherence level varied irrespective of the education level. Naturally, it is expected that patients with higher educational level have better knowledge about the disease and its treatment and so are more adherent. However, DiMatteo found that even highly educated patients may not be adherent to their medications.⁽²²⁾ A UK study group found that patients without formal educational qualifications had better adherence.⁽²³⁾ Here, the use of both personal counselling and android application showed maximum improvement in the Uneducated and the Undergraduates whereas for the Graduates and higher, the use of only android application showed maximum benefit.

Correlation coefficient between education and non-adherence

Correlation between education and non-adherence was poor with Pearson's correlation coefficient (r) 0.24 and 0.11 at pre-test and post-test data analysis. Irrespective of literacy, non-adherence still prevailed.

Amongst male and female subjects, the occurrence of IHD was found after the age of 30. (Table 5)

Effect of counselling aids on adherence level in various age groups is depicted in Table 6.

The majority of the patients belonged to the age group of 30-60 years. Specifically, the subjects falling under the age group of 51-60 years were more responsive and showed more improvement in adherence compared to other age groups. Degoulet et al, Christensen and Smith, Caspard et al and Lacasse et al reported that adherence increases with the increase in age^(10, 24, 25) whereas Lorenc and Branthwaite, Menzies et al, Wild et al, Wai et al found that age is not a barrier to adherence.⁽²⁶⁻²⁹⁾

The patients under 30-60 years age group became more adherent with the use of only the android application while the patients under the 60 years and above age group, the combination of both personal counselling and android application improved the adherence.

Correlation coefficient between age and non-adherence

The correlation was poor between the average age and non-adherence in all patients. However, we believed that, correlation might vary from case to case and hence we made an attempt to check correlation in individual-group. (Table 7)

Correlation coefficient (r) was nearly same in group G1 and G2 during pre and post course work.

The association between age and non-adherence was poor in the subjects of less than 60 years of age. However, this association was reported to be stronger with the advancing age i.e. 60 years and above. Hence, there was increase in non-adherence with the increase in age. Group-3 and 4 showed a positive correlation. An eye catching fact came to notice that correlation co-efficient in Group 3 was significantly improved and revealed positive association in the age group 60 years above. The result of association was positive for Group -4 in the age group 60 years below.

Reminders can be beneficial to the patients of all ages, especially those who are unintentionally non-adherent.

However, elderly patients may forget to take their medication because of memory problems and the use of smartphones might be inconvenient to them. Adolescents, on the other hand, may forget their dose because of their busy lives.⁽³⁰⁾ Components of medication usage, such as medication type, patient population or disease progression determine the success of reminders.⁽³¹⁾

Result of the association revealed that the aging process significantly affects adherence. Number of articles published in the literature showed association and effect of advancement of age and non-adherence irrespective of other factors. Number of interventions is available in present time. Of the all, one could be mobile health.

Concept of mobile health is versatile and easy even WHO has also taken a notice of significant impact of mhealth in disease treatment.⁽³²⁾

Positive result of association indicated that mhealth was/is good for improvement in adherence for with the patient age 60. Reason may be well verse and with its utility while above 60 age patients were found limited. Traditional counselling found beneficial. Reason might be affection and understanding.

CONCLUSION

The adherence was positivity associated with the age and gender but not with education. The elderly patients and female patients were benefitted with the personal counselling while the middle-aged ones and the counselling uneducated and undergraduates with the combination method. Improved adherence in graduates and above was with the help of reminders through android application.

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CONFLICT OF INTEREST

There are no conflicts of interest.

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Tables

Table 1 Demographic details of IHD patients

Demographic parameters	Percentage (n=122)
Male	75.41(92)
Female	24.59(30)
Total	100(122)
Age(in years)	
• 31-40	4.92(6)
• 41-50	13.11(16)
• 51-60	33.61(41)
• 61-70	27.87(34)
• 71-80	14.75(18)
• 81-90	5.74(7)
Education	
• Uneducated	13.11(16)
• Primary	4.91(6)
• Secondary	19.67(24)
• Diploma	2.45(3)
• Higher secondary	12.29(15)
• Graduate	37.7(46)
• Double graduates	3.27(4)
• Post graduates	6.55(8)

Table 2 Effect of counselling aids on adherence level in male & female subjects of various groups

Adherence Level in percentage (n)							
Gender	Groups	Pre-test data(Day1)			Post test data(Day60)		
		H	M	L	H	M	L
Male (n=92)	G1(n=22)	0(0)	59.10(13)	40.90(9)	0(0)	86.36(19)	13.63(3)
	G2(n=24)	0(0)	54.17(13)	45.83(11)	25(6)	75(18)	0(0)
	G3(n=22)	0(0)	50(11)	50(11)	22.72(5)	68.18(15)	9.09(2)
	G4(n=24)	0(0)	66.67(16)	33.33(8)	33.33(8)	62.50(15)	4.16(1)
Female (n=30)	G1(n=10)	0(0)	50(5)	50(5)	0(0)	86.36(7)	13.63(3)
	G2 (n=6)	0(0)	50(3)	50(3)	0(0)	100(6)	0(0)
	G3(n=10)	0(0)	70(7)	30(3)	30(3)	70(7)	0(0)
	G4 (n=4)	0(0)	75(3)	25(1)	0(0)	100(4)	0(0)

Table note: Adherence level: H= High (score 0), M= Medium (score 1-8), L= Low (score ≥9);

G1=Control group, G2=Android Application group, G3=Personal counselling group, G4= Android Application & Personal counselling group

Table 3 Chi square test 2x2 contingency

	Non-adherence (%)	Adherence (%)	Total
Male	100	27	127
Female	100	15	115
Total	200	42	242

Table note: The result was significant (p<0.1), excludes data of group 1

Table 4 Effect of counselling aids on adherence level in different education level and groups

Adherence Level in percentage (n)							
Education level	Groups	Pre-test data(Day1)			Post-test data(Day60)		
		H	M	L	H	M	L
Uneducated (n = 16)	G1(n=8)	0(0)	75(6)	25(2)	0(0)	100(8)	0(0)
	G2(n=1)	0(0)	0(0)	100(1)	0(0)	100(1)	0(0)
	G3(n=6)	0(0)	83.33(5)	16.67(1)	66.67(4)	33.33(2)	0(0)
	G4(n=1)	0(0)	100(1)	0(0)	100(1)	0(0)	0(0)
Under Graduates (n = 49)	G1(n=14)	0(0)	57.14(8)	42.86(6)	0(0)	85.71(12)	14.29(2)
	G2(n=10)	0(0)	80(8)	20(2)	30(3)	70(7)	0(0)
	G3(n=18)	0(0)	55.56(10)	44.44(8)	16.67(3)	77.78(14)	5.56(1)
	G4(n=7)	0(0)	85.71(6)	14.28(1)	28.57(2)	71.43(5)	0(0)
Graduates and higher (n = 57)	G1(n=10)	0(0)	40(4)	60(6)	0(0)	70(7)	30(3)
	G2(n=19)	0(0)	42.10(8)	57.9(11)	15.79(3)	84.21(16)	0(0)
	G3(n=8)	0(0)	37.5(3)	62.5(5)	12.5(1)	75(6)	12.5(1)
	G4(n=20)	0(0)	60(12)	40(8)	25(5)	70(14)	5(1)

Table note: Adherence level: H= High (score 0), M= Medium (score 1-8), L= Low (score ≥9);

G1=Control group, G2=Android Application group, G3=Personal counselling group, G4= Android Application & Personal counselling group

Table 5 Occurrence of IHD in male and female of different age groups

Age (years)	Male(n)	Female(n)	Total(n)
<30	-	-	-
30-60	77.78(49)	22.22(14)	51.64(63)
>60	72.88(43)	27.11(16)	48.36(59)

Table 6 Effect of counselling aids on adherence level in various age groups

Age (Years)	Groups	Adherence Level in percentage (n)					
		Pre-test data(Day1)			Post-test data(Day60)		
		H	M	L	H	M	L
<30 (n=0)	G1(n=0)	-	-	-	-	-	-
	G2(n=0)	-	-	-	-	-	-
	G3(n=0)	-	-	-	-	-	-
	G4(n=0)	-	-	-	-	-	-
30-60 (n = 63)	G1(n=12)	0(0)	66.67(8)	33.33(4)	0(0)	83.33(10)	16.67(2)
	G2(n=21)	0(0)	61.90(13)	38.09(8)	28.57(6)	71.43(15)	0(0)
	G3(n=11)	0(0)	63.63(7)	36.36(4)	36.36(4)	54.55(6)	9.09(1)
	G4(n=19)	0(0)	63.16(12)	36.84(7)	26.32(5)	68.42(13)	5.26(1)
>60 (n = 59)	G1(n=20)	0(0)	50(10)	50(10)	0(0)	85(17)	15(3)
	G2(n=9)	0(0)	33.33(3)	66.67(6)	0(0)	100(9)	0(0)
	G3(n=21)	0(0)	52.38(11)	47.62(10)	19.04(4)	76.2(16)	4.76(1)
	G4(n=9)	0(0)	77.78(7)	22.22(2)	33.33(3)	66.67(6)	0(0)

Table note: Adherence level: H= High (score 0), M= Medium (score 1-8), L= Low (score ≥9);

G1=Control group, G2=Android Application group, G3=Personal counselling group, G4= Android Application & Personal counselling group

Table 7 Correlation between age and non-adherence

Average age (years)	Correlation coefficient between age and non-adherence									
	All (except G1)		G1		G2		G3		G4	
	Pre(r)	Post(r)	Pre(r)	Post(r)	Pre(r)	Post(r)	Pre(r)	Post(r)	Pre(r)	Post(r)
All	-0.057	0.034	0.119	0.127	-0.441	-0.334	0.551	0.592	-0.232	-0.176
<60	0.963	0.869	0.999	0.999	0.999	0.994	0.957	0.807	0.909	0.807
>60	-0.97	-0.985	-0.97	-0.968	-0.991	-0.993	-0.666	-0.953	-0.993	-0.993

Table note: G1=Control group, G2=Android Application group, G3=Personal counselling group, G4= Android Application & Personal counselling group, Pearson’s Correlation coefficient “r”

No significant difference was observed as compared to the pre-test data.

