

Factors affecting adherence level to HAART (Adherence predictors) in Kuala Lumpur, MalaysiaUmar Yagoub^{1,5}, Awang Bulgiba¹, Peramalah Devi¹, Didi EM², Mustafa Ali², Christopher Lee³, Chik Zamri^{2,4}¹ Julius Centre University of Malaya, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia² Shimadzu UMMC Center for Xenobiotics Studies, Department of Pharmacology, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia³ Department of Medicine, Sungai Buloh Hospital, 47000 Sungai Buluh Selangor Malaysia⁴ University of Malaya Bioequivalence and Testing Center (UBAT), Department of Pharmacology, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia⁵ Medical Research Center, Jazan University, Kingdom of Saudi Arabiamohammedumar2001@yahoo.com

Abstract: Adherence to Highly Active Antiretroviral Treatment (HAART) is the most important factor in predicting an HIV-infected patient treatment outcome. The objective of this paper is to examine the key determinants of adherence to HAART in a resource-limited setting. A total of 925 HIV-infected patients on antiretroviral treatment were studied using a self-reported adherence questionnaire. We analysed the data using multiple logistic regression. We found that adherence was less likely if the patient had diarrhoea (aOR=0.081; 95% CI 0.034-0.192), vomiting (aOR=0.131; 95% CI 0.058-0.294), simply forgot their medication (aOR=0.080; 95% CI 0.033-0.197), used herbal medicine (aOR=0.227; 95% CI 0.103-0.501), used religious treatment (aOR=0.067; 95% CI 0.027-0.165) or had to travel too far to get their medication (aOR=0.264; 95% CI 0.111-0.632). Adherence was more likely with the use of the alarm clock (aOR=6.712; 95% CI 2.747-16.397), if they accepted their HIV status (aOR=4.727; 95% CI 1.960-11.403), had self-efficacy (aOR=4.711; 95% CI 2.062-10.761); were older (aOR=5.119; 95% CI 2.159-12.14), had higher education (aOR=1.430; 1.108-1.844) and had higher income (aOR=9.993; 95% CI 3.175-31.454). In conclusion, healthcare providers should treat adverse effects as effectively as possible, discourage the use of alternative treatments, provide counselling, encourage the alarm clock use and look into providing HAART closer to the patient's home to improve adherence.

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1. Introduction

The provision of Highly Active Antiretroviral Therapy (HAART) has been credited with having a positive effect on the lives of people living with HIV/AIDS in Malaysia (Mazlan et al., 2006; Wolfe et al., 2010). Many factors have been associated with patients' behaviour of taking HIV/AIDS medication correctly as prescribed by their physician (Chesney, 2000; Do et al., 2010; Maqutu et al., 2010).

To our knowledge there have been no published studies in Malaysia on adherence to HAART and associated factors in HIV positive patients on HAART. Thus, in this study we aimed at determining the factors affecting the adherence level in HIV-positive patients in the Malaysian setting.

2. Material and Methods

This study was conducted between October 2010 and November 2011 in a large tertiary level infectious disease-focused hospital in Malaysia. Nine hundred and twenty five adult (18 years and above) HIV-positive Malaysian nationals receiving HAART

were recruited into a perspective cohort study aimed at studying adherence to HAART. This paper is from the first part of that study.

Eligible participants filled a culturally adapted and modified self-reported Adult Clinical Trial Group (ACTG) follow up questionnaire which has been used in many international studies (M. A. Chesney et al., 2000; M.A. Chesney et al., 2000; Gross et al., 2009; Levine et al., 2006; Peltzer et al., 2010)

Collected data were entered into SPSS version 16, checked for consistency and cleaned. Multiple logistic regression was used to determine the effect of independent variables on the dichotomized adherence level measured by overall self-reported adherence questionnaire. Odds ratios were computed with 95% CI and interpreted accordingly. This study was approved by both the University of Malaya Medical Centre Research Ethics Committee (IRP Reference # 714.14) and Ministry of Health Malaysia.

3. Results

Of the eligible participants or 925 participants (94.6%) completed the questionnaire and their data was analyzed. The majority were males

(76.3%), Chinese (63.2%), aged 31-34 years (36.5%), who were married (62.3%). Table 1 displays their socio-demographic characteristics. Table 2 displays the final multiple logistic regression model results.

Table 1: Socio-demographic characteristics of adherent and non-adherent HIV positive patients using self-reported adherence questionnaire

| Variable | Adherent (%) | Not Adherent (%) | Total (%) | OR (95%CI) |
|-------------------------------|--------------|------------------|------------|-------------------------|
| Gender | | | | |
| Female | 171 (78.1) | 48 (21.9) | 219 (23.7) | Reference category |
| Male | 585 (82.9) | 121 (17.1) | 706 (76.3) | 0.736 (0.506, 1.072) |
| Total | 756 (81.7) | 169 (18.3) | 925 (100) | |
| Religion | | | | |
| Islam | 215 (83.3) | 43 (16.7) | 258 (27.9) | Reference category |
| Buddhism | 368 (82.1) | 80 (17.9) | 448(48.4) | 0.794 (0.171, 3.692) |
| Hinduism | 40 (75.5) | 13 (24.5) | 53 (5.7) | 0.270 (0.034, 2.117) |
| Christianity | 82 (84.5) | 15 (15.5) | 97 (10.5) | 1.232 (0.234, 6.478) |
| Taoism | 39 (70.9) | 16 (29.1) | 55 (5.9) | 0.312 (0.056, 1.725) |
| Others | 12 (85.7) | 2 (14.3) | 14 (1.5) | 0.794 (0.082, 7.651) |
| Total | 756 (81.7) | 169 (18.3) | 925 (100) | |
| Ethnicity | | | | |
| Malay | 209 (83.6) | 41 (16.4) | 250 (27.0) | Reference category |
| Chinese | 474 (81.0) | 111 (19.0) | 585 (63.2) | 1.154 (0.245, 5.433) |
| Indian | 57 (79.2) | 15 (20.8) | 72 (7.8) | 2.356 (0.304, 18.272) |
| Others | 16 (88.9) | 2 (11.1) | 18 (1.9) | 7.678 (0.715, 82.402) |
| Total | 756 (81.7) | 169 (18.3) | 925 (100) | |
| Completed Educational | | | | |
| No formal schooling | 55 (46.6) | 63 (53.4) | 118 (12.8) | Reference category |
| Primary school | 108 (72.5) | 41 (27.5) | 149 (16.1) | 8.544 (3.490, 20.914) |
| Secondary school – 3 | 222 (88.4) | 29 (11.6) | 251 (27.1) | 26.924 (11.009, 65.848) |
| Secondary school – 5 | 200 (93.0) | 15 (7.0) | 215 (23.2) | 9.71 (3.618, 26.064) |
| High school (form6 level) | 51 (85.0) | 9 (15.0) | 60 (6.5) | 4.053 (1.225, 13.41) |
| Diploma | 36 (87.8) | 5 (12.2) | 41 (4.4) | 5.454 (1.161, 25.630) |
| Degree | 84 (92.3) | 7 (7.7) | 91 (9.8) | 6.574 (2.018, 21.42) |
| Total | 756 (81.7) | 169 (18.3) | 925 (100) | |
| Marital status | | | | |
| Single | 225 (64.5) | 124 (35.5) | 349 (37.7) | Reference category |
| Married | 531 (92.2) | 45 (7.8) | 576 (62.3) | 6.503 (4.469, 9.462) |
| Total | 756 (81.7) | 169 (18.3) | 925 (100) | |
| Average monthly income | | | | |
| ≤RM 1,500 / Month | 228 (62.3) | 138 (37.7) | 366 (39.5) | Reference category |
| RM 1,501—2,500 | 227 (93.8) | 15 (6.2) | 242 (26.2) | 7.708 (4.148, 14.323) |
| RM 2,501—10,000 | 301 (95.0) | 16 (5.0) | 317 (34.3) | 2.488 (1.127, 5.490) |
| Total | 756 (81.7) | 169 (18.3) | 925 (100) | |
| Age group in years | | | | |
| 18—30 | 210(63.6) | 120 (36.4) | 330 (35.7) | Reference category |
| 31—44 | 312 (92.3) | 26 (7.7) | 338 (36.5) | 10.877 (4.944, 23.927) |
| 45 or more | 234 (91.1) | 23 (8.9) | 257 (27.8) | 21.379 (9.446, 48.386) |
| Total | 756 (81.7) | 169 (18.3) | 925 (100) | |

Demographic factors examined – gender, religion, ethnicity, completed educational, marital status average monthly income and age group in years.

Table 2: Final multiple logistic regression model on factors affecting self-reported adherence

| Variables (Yes versus No) | Crude odds ratio (95% CI) | Adjusted Odds ratio (95% CI) |
|---|------------------------------|---------------------------------|
| Diarrhoea | 0.107 (0.074, 0.155) | 0.081 (0.034, 0.192) |
| Vomiting | 0.099 (0.068, 0.144) | 0.131 (0.058, 0.294) |
| Use of religious treatment | 0.071 (0.049, 0.105) | 0.067 (0.027, 0.165) |
| Use of herbal medicine | 0.302 (0.214, 0.426) | 0.227 (0.103, 0.501) |
| Use of Alarm /Clock | 7.057 (4.445, 11.205) | 6.712 (2.747, 16.397) |
| Self efficacy to adhere | 12.527 (8.459, 18.551) | 4.711 (2.062, 10.761) |
| Acceptance of HIV status | 5.687 (3.989, 8.106) | 4.727 (1.960, 11.403) |
| Simply forget | 0.160 (0.111, 0.230) | 0.080 (0.033, 0.197) |
| Distance to travel too long | 0.240 (0.170, 0.340) | 0.264 (0.111, 0.632) |
| *Education level | 0.986 (0.898, 1.084) | 1.430 (1.108, 1.844) |
| Age group 1 (18—30; Reference group) | | |
| Age group 2 (31—44) | 5.765 (3.554, 9.352) | 5.119 (2.159, 12.14) |
| Age group 3 (45 or more) | 0.880 (0.492, 1.575) | 1.077 (0.388, 2.990) |
| Income group 1 (≤RM 1,500; Reference group) | | |
| Income group 2 (RM 1,501—2,500) | 3.109 (1.620, 5.192) | 6.139 (2.289, 16.465) |
| Income group 3 (RM 2,501—10,000) | 4.088 (2.151, 7.152) | 9.993 (3.175, 31.454) |

Self-efficiency to adhere = Self-efficiency to take & adhere to medication

Distance to travel too long = Distance to hospital too long and costly

*Education = number of schooling (7 categories)

We found that adherence was less likely if the patient had diarrhoea (aOR=0.081; 95% CI 0.034-0.192), vomiting (aOR=0.131; 95% CI 0.058-0.294), simply forgot their medication (aOR=0.080; 95% CI 0.033, 0.197), used herbal medicine (aOR=0.227; 95% CI 0.103-0.501), used religious treatment (aOR=0.067; 95% CI 0.027-0.165) or had to travel too far to get their medication (aOR=0.264; 95% CI 0.111-0.632).

Adherence was more likely with the use of the alarm clock (aOR=6.712; 95% CI 2.747-16.397), if they accepted their HIV status (aOR=4.727; 95% CI 1.960-11.403), had self-efficacy (aOR=4.711; 95% CI 2.062-10.761); were older (aOR=5.119; 95% CI 2.159-12.14), had higher education (aOR=1.430; 1.108-1.844) and had higher income (aOR=9.993; 95% CI 3.175-31.454).

4. Discussion

In this study, diarrhoea and vomiting were side effects identified to be negatively associated with the adherence to HAART and would result in lower adherence. Similar results have been reported elsewhere and this is not easy to resolve as diarrhoea is prevalent in 30 -70% of HIV-infected patients (Sherman et al., 2000).

More worrying but potentially modifiable are the use of religious treatment and of traditional medicine as co-treatments in HIV infections, which have been shown here to reduce adherence to HART (Nsimba, 2010; Owen-Smith et al., 2007). We think

that healthcare providers need to make their patients understand that these religious or traditional treatments cannot be used as substitutes for HIV infection.

About two-thirds (69.4%) of the study respondents stated that using a watch and/or an alarm clock would help them to remember the time of drug intake. The use of simple but evidently effective devices like these to increase adherence has been shown by Yao et. al., (2010). We found that the distance to the hospital was inversely related to adherence. We think policy makers need to consider making HAART more easily accessible to patients as this will obviously resolve this apparent barrier to adherence. Other researchers like Kgatlwane et. al., (2006); Adam et. al., (2003); and Laws et. al., (2000) have noted the significance of self-efficacy in HAART adherence to antiretroviral drugs. This is confirmed in our own study. Reasons for missing medications that included forgetfulness and long travel distance were found to be significantly related with non-adherence one of the self-reported adherence questionnaire; these reasons have a decreasing effect on the adherence to antiretroviral treatments (Wasti et al., 2012). According to similar studies, the most common reason for missing medication is forgetfulness (Barfod et al., 2006).

Limitations of this study include recall bias and social desirability bias (Shi et al., 2010). Recall bias was minimised by ensuring proper definition and articulation of the research question and improving

the quality of the questionnaire. Social desirability bias was minimized by engaging a research assistant who was not directly involved in the HIV clinic to collect the data.

5. Conclusion

Healthcare providers should treat adverse effects as effectively as possible, discourage the use of alternative treatments, provide counselling, encourage the use of the alarm clock and consider providing HAART closer to the patient's home to improve adherence.

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