2003

COPING WITH HUMAN IMMUNODEFICIENCY DISEASE AS PREDICTOR OF ADHERENCE WITH ANTIRETROVIRAL MEDICATION

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BY

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN

APPLIED PHARMACEUTICAL SCIENCES

UNIVERSITY OF RHODE ISLAND

2003

MASTERS OF SCIENCE THESIS
OF
SAURABH MISTRY

APPROVED:

Thesis committee
Major Professor

DEAN OF GRADUATE SCHOOL

UNIVERSITY OF RHODE ISLAND

2003

ABSTRACT

Infection by Human Immunodeficiency Virus (HIV) is a multifactor disease process in which the patient must confront an array of physiological, socio-cultural, economic, and psychological stressors that have the collective potential for triggering major stress responses and psychological dysfunction. People's reactions to and the outcomes of traumatic events are mediated by their subjective style of coping. Coping is defined as a person's "constantly changing cognitive and behavioral efforts to manage specific external and internal demands that are appraised as taxing or exceeding the resources of a person". Coping, an important psychological construct has been shown to affect outcomes such as disease progression and quality of life in HIV infected patients. But the subjective styles of coping that patients use to cope with HIV have rarely been assessed as predictors of medication adherence. This study aims at determining the role of coping styles as determined by the "Ways of coping questionnaire" modified by Dunkel-Schetter et al. to suit their study of cancer patients as predictors of medication adherence in patients infected with HIV. The five dimensions of coping identified by Dunkel-Schetter et al. were the first to be identified with a large sample of cancer patients and may be representative of the universal dimensions of coping. This study is the first to utilize the dimensions of coping as described by Dunkel-Schetter et al. to predict adherence in HIV patients. The few studies on coping styles and adherence as an outcome use varied coping scales to assess coping like the Billings and Moos coping inventory and original Ways of coping

questionnaire. Their results have shown that poor coping strategies like avoidance coping were associated with non-adherence.

Methods: The sample for the study consisted of 145 patients who were currently prescribed medication for HIV. The medication adherence shown by patients with anti-retroviral drugs and protease-inhibitor drugs was assessed separately. A total of 137 patients were on anti-retroviral drugs, while 77 patients were on protease-inhibitor drugs. Medication adherence was determined by using the "percentage of doses missed in the past three months and "Medication Adherence Scale. Coping strategies used by the patients were assessed by the "Ways of coping questionnaire" developed by Lazarus and colleagues and later modified by Dunkel-Schetter et al. to suit their study of cancer patients. The scale comprised of five coping sub-scales: seeking social support, distancing, focusing on positive, behavioral escape avoidance and cognitive escape avoidance and assessed the frequency of use of each coping style. Several demographic variables as well as clinical variables, which are known to affect medication adherence, were examined. Logistic Regression analyses were used to determine whether the coping strategies were predictive of medication adherence controlling for the confounding factors.

Results: In agreement with previous research that shows that poor coping was associated with non-adherence, for the patients prescribed antiretroviral medications, behavioral escape avoidance was found to be significantly and inversely associated with adherence. Seeking social support, distancing,

focusing on positive and cognitive escape avoidance were not found to be significantly associated with medication adherence.

ACKNOWLEDGEMENTS

This thesis would not have materialized but for the invaluable inputs of many people whom I am indebted to.

I would like to express my thanks to Dr. Cynthia Willey, my major advisor who helped me with this thesis right from the conception of the idea to the very end. Her expertise and authority in the field of Epidemiology and her advice always led me on the right path. It is a privilege to be associated with her as her student.

I would like to congratulate Dr. Stephen Kogut for successfully defending his Doctoral Thesis and being inducted as faculty member in the Applied Pharmaceutical Sciences. I cannot thank him enough for his tremendous inputs and help. He was always approachable and more like a friend than an instructor.

I express my thanks to Dr. King for being so enthusiastic about my research and for being on the defense committee.

I express my gratitude to Dr. Keykavous Parang for chairing my defense.

I would like to express my thanks to all my friends, including Sridhar, Anil, Amogh ,Rakesh and Sanjeev who were great support for me in a new country. A special thanks to Aniruddha for the numerous brainstorming sessions.

Above all, I am deeply indebted to my family who has always been there for me.

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INTRODUCTION

Acquired Immunodeficiency Syndrome (AIDS) is a devastating disease facing humankind. Since the epidemic started in 1981, more than 60 million people worldwide have been infected with the Human Immunodeficiency virus (HIV), which causes AIDS. Worldwide, AIDS is the fourth leading cause of death. In the United States, approximately 1 million people are either infected with HIV or have AIDS. In the United States, the incidence of HIV is approximately 40 thousand cases every year. Thus, HIV infection and AIDS are significant public health problems and challenges. (1)

Until quite recently, the disease was considered to carry an almost certain debilitating, downward course leading to early death from opportunistic infections. A variety of medications were used to treat HIV related diseases, and some such as Zidovudine could temporarily suppress levels of HIV responsible for immune compromise. However the treatment only produced transient benefits because the circulating HIV remained in enormous quantity and the virus has a rapid error prone replication cycle that allows it to quickly evolve resistance to any single drug. The nature of medical care changed dramatically in 1996 with the development and wide use of treatment regimen that added a new class of anti-retroviral medication called protease inhibitors in combination with other anti-retroviral medications (2). Highly Active Anti-retroviral Therapy (HAART), usually a protease inhibitor combined with at least two other drugs, controls the viral replication by targeting specific viral enzymes. There are currently two distinct groups of anti HIV drugs that are targeted at different viral enzymes.

These are reverse -transcriptase inhibitors and protease inhibitors (3). HAART has enormous potential to delay disease progression and death (4). HAART is designed to suppress HIV viral replication, which results in increases in CD4 cell count, improved immune function, delayed clinical progression, and prolonged survival (5,6). Successful treatment of HIV with HAART requires that patient maintain nearly perfect adherence to the prescribed regimen. Adherence, often used interchangeably with compliance, is "the act, or quality of being consistent with administration of prescribed medication". Non- adherence may mean not taking medication at all, taking reduced amounts, not taking doses at prescribed frequencies or intervals or not matching medication to the food requirements (7).

A] Important of Adherence

Adherence to HAART is the single most important factor for achieving maximum and durable HIV plasma viral load suppression. Several studies have demonstrated that lapses in anti-retroviral adherence lower the likelihood of suppressing viral loads below detectable limit (8). Non-adherence leads to increased mortality and morbidity. A study by Hoggs et al. (9) reported a 16% rise in mortality for every 10% drop in adherence.

Strict adherence to HAART is imperative because the therapy is "unforgiving" in two respects. First, in non-adherent patients, resistant viral strains develop because of high rates of viral mutation and the short half-life of the drugs (10). Condra et al. (11,12,13) reported that resistance might develop after missing as little as one dose in five. The genetic mutations that result in drug resistance often confer resistance to an entire class of protease inhibitors or non-

nucleosides. Thus, in failing one regimen, a non-adherent patient may severely limit future antiviral options (10). Secondly, the level of adherence that must be achieved and maintained for maximal effectiveness exceeds that needed for effective therapy in many other chronic conditions. With HAART, patients must maintain near- perfect adherence to maintain an undetectable viral load (10). A study by Paterson et al. reported only 50% patients with 80%-90% adherence achieved undetectable viral loads. Patients required better than 95% adherence to achieve highest rate of undetectable viral load (14). The development of resistant strains is also a significant public health concern because of the possibility of transferring the resistant strain to others. Evidence was reported documenting the sexual transmission of virus resistant to all known classes of anti-retroviral drugs including protease inhibitors (15). In a prospective study of 93 patients, self reported adherence was independently associated with undetectable seminal HIV RNA level after six months of therapy (16).

One hundred percent adherence to HAART is not easy to achieve. Studies of HIV/AIDS patients have reported low adherence rates. In a cross sectional study by Mostashari et al (17), involving 102 HIV infected females, 62% females reported taking all medications for >= 6 days a week, and were classified as adherent. In an observational cohort study called the ATHENA study (18), adherence to HAART was obtained by self-report and validated by blood assays. Of the 224 patients, 53.1% reported taking all the medications on time, and also followed dietary requirements for the last week. The rest reported missing doses or not taking them on time and were classified as non-adherent. In a study on 46

patients with HIV, Singh et al. (19) reviewing monthly prescription fill records assessed adherence to antiretroviral therapy. All patients filling >=80% of their medications were defined as being adherent. With this criteria, 63% patients were adherent. In a study that of 180 patients randomized into either MEMS, diaries and no surveillance groups, the adherence in the past four weeks was 80.6%, 92% and 93% respectively (20). In a retrospective study of pharmacy claims data regarding prescription fills to assess adherence to HIV medications, only 26% patients had more than 80% adherence. Adherence was defined as proportion of days on which drugs were taken during the first 365 days on therapy. The mean adherence was 53% (21). Thus, the adherence has been found to be less than adequate.

B] Assessment of adherence

A major problem in studying adherence is the lack of a standard measure (8). There is no "gold standard" for measuring adherence. The four methods used most commonly to measure adherence are self reported (questionnaire/ interview/ diary), pill counts, drug assay, and electronic monitoring.

Self- Reported Questionnaires: It is the most common, inexpensive and simple method of determining adherence (22). Advantages of this method include low costs, easily obtainable results and flexibility to tailor the method to the language and reading competency of the subjects (23). Patient self reports are often the only available method. However, the validity of this measure is questionable. In general, self- reports tend to overestimate adherence compared with other methods of determining adherence, like pill counts or electronic monitoring.

Recall bias is another concern (23). Among HIV-infected patients however, there tends to be a strong correlation between self-reports and virologic outcomes. Though this method may not be as accurate as desired, there may be reason to believe that it is useful because patients reporting non-adherence are usually at least as non-adherent as indicated by interview (24).

Pill Counts: Having a physician, nurse or other health care practitioner count pills remaining in a bottle is another way to measure adherence (8). This method involves a comparison of the medicine left in the bottle and the quantity that should have been left if the medication had been taken. The advantage of this method is that they are potentially affected less than the other methods by subjective patient response (8). Adherence assessed by this method correlate better with that measured from electronic bottle caps than does self-reported adherence (25). However, this method had several limitations. Patients may forget to bring their bottles to the clinic when instructed. It is very time-consuming. Patients may empty the bottle or may take all the remaining pills before the visit to the clinic (26).

Drug assay: Plasma and urinary blood levels provide useful objective assessment of adherence (27). The accuracy of this method depends in part on the half-life of the drug (26), which is the time required for the potency of the drug to fall to half or to be eliminated from the body. This means that it depends on how soon the drug reaches the systemic circulation so as to be detected in a drug assay. These studies are very inconvenient and expensive. Some patients may object to having their blood drawn, regarding this as unnecessary and intrusive. Also, patient-to-

patient variability is a drawback (28). In addition, results may be confounded by pharmacokinetic factors, such as poor drug absorption or drug -drug interactions, which may mimic poor adherence (8).

Electronic monitoring: Bottles fitted with caps harboring electronic chips that register each time a pill bottle is opened or closed constitute the most sophisticated method currently available for measuring adherence. Two systems are available: Medication Event Monitoring System (MEMS) and the eDEM monitor (8). Data from the MEMS allows calculation of 1) the adherence rate, 2) prescribed frequency, and 3) prescribed interval. This measure also does not directly measure whether the patient took the medication; hence the accuracy of this method is suspect (26).

C] Determinants of Adherence

Given the importance of adherence with medication regimen in the success of HAART, most research in medication adherence in HIV infection has focused on predictors of adherence and factors affecting adherence. These factors can be classified as patient characteristics, clinical characteristics, treatment regimen characteristics, clinician and clinician-patient relationship and psychological and emotional characteristics.

Patient Characteristics: The literature on adherence strongly and consistently demonstrates that adherence cannot be predicted solely on the basis of gender, age, race or educational status (29). Factors that affect the initiation and adherence to anti-retroviral therapies are knowledge and beliefs about the disease and medication, social support, co-morbid conditions, substance abuse, cognitive

impairment, depression and other mental illnesses (5). Thus adherence is may not related to income, social class, occupation or educational background and nor can it be accurately predicted by physicians (30). In a pilot study to test the effect of behavioral medical management of adherence, self reported adherence in the past four days improved from a mean of 80% to 98% in the group receiving behavioral based intervention of education about the therapy, positive reinforcements and encouragement, counseling and life style assessments (31). Thus knowledge about therapy and positive reinforcement enhance adherence

Clinical Characteristics: After a critical literature review, Haynes (29) commented that there are few associations between disease features and adherence. The only exception being that when patients get better from any illness they are less likely to adhere to treatment regimen (32,33,34).

Medications are more likely to be taken for short term, symptomatic illnesses, where there is a more easily appreciated direct connection between medication and therapeutic effect. (35).

Treatment regimen characteristics: It has been well documented that the likelihood of adherence declines with an increase in the number of medications, frequency of dosing, severity of side effects, and complexity and anticipated duration of side effects. The more the regimen requires alterations or disruptions in daily routines and lifestyle, the less likely will be excellent adherence (36).

Unfortunately, these negative characteristics are associated with the current, complex anti-retroviral medication regimen. Combination anti-retroviral medication regimen involve large number of pills with varying dosing schedules,

food requirements, lifestyle rearrangements and lifelong administration (5). Furthermore, there are numerous side effects associated with the therapy. These include nausea, vomiting, anemia, granulocytopenia, pancreatitis, peripheral neuropathy, oral stomatitis, malaise, skin rash, and fever, to name a few (3).

Psychological and emotional characteristics:

a) Mood status is an important predictor of adherence. A level of anxiety either too high or too low may be related to non-adherence (37). Many cognitive, psychosocial factors as well as well being and quality of life also have impact on adherence.

b) Coping: The concept that susceptibility to, and infectious diseases may be influenced by psychological factors has a very long history. The historical basis for studying the relationship between psychological stress and the immune response has been noted from centuries of clinical observations of individuals who became sick following stressful situations. Infection by HIV is a multifactor disease process in which the patient must confront an array of physiological, socio-cultural, economic, and psychological stressors that have the collective potential for triggering major stress responses and psychological dysfunction (38). Individuals suffering from a chronic medical condition face a variety of stressful life circumstances involving a range of adaptation demands (39). Infection with HIV raises a wide spectrum of concerns and fears among infected individuals. Even before symptoms occur, those infected with HIV have concerns about the future economic security, sexuality and disease transmission, rejection from family, friends, lovers; and eventually ill health and death (40). Diagnosis of HIV

is a traumatic event as it not only presents the possibility of death, but also raises fears regarding changes in appearance, body functioning, role and self esteem (41). The uncertainty of the outcome of the infection can lead to anxiety. Reaction of others to the patients' diagnosis constitutes a significant concern (Ross and Rosser, 1988). In addition, individuals may not be able to conceal their illness from significant others if their symptoms are severe. They may need to take time off from work or stop working altogether. Such changes may lead to cessation of employer sponsored health insurance benefits, social supports, contact with acquaintances and income. The stresses of giving up work are considerable, often leading to depression and lack of self-esteem (42).

Chronically ill patients must cope with the loss of independence, the threat of disease progression, and in most cases, the challenge of modifying their behavior to meet the demands of prescribed medication regimen. Patient adherence to a prescribed regimen can involve a range of adaptive tasks including dietary change, use of medication and change in physical activity (43).

People's reactions to traumatic events are mediated by their subjective style of coping (44). For this study, the conceptualization of coping is based on the work of Lazarus and his colleagues. In Lazarus and Folkman's transactional stress and coping model, stressors themselves do not predict unfavorable outcomes, but rather how one appraises and copes with them determine to some extent their impact on one's health and well-being. Within this model, coping is defined as a person's "constantly changing cognitive and behavioral efforts to manage specific external and internal demands that are appraised as taxing or exceeding the

resources of a person" (44). Thus, coping refers to an individual's cognitive and behavioral efforts to manage specific situations that are appraised as stressful. The reaction and outcome for a particular outcome will depend on the subjective appraisal of the stressor and the coping style used.

Coping styles have been consistently related to mental health adjustments and other health outcomes. Many studies have investigated the relationship between styles of coping and subsequent health in HIV. For example, Ironson et al. found that reaction to the news that one was seropositive for HIV with denial was associated prospectively at one-year follow-up with greater CD4 decline and lower T cell proliferative response and with a greater likelihood of symptoms or death after two years (45). Conversely, Blomkvist et al. found that 'active optimistic coping' was negatively related to mortality over 1-7 years in a hemophiliac cohort (46). A study by Goodkin et al. on eleven asymptomatic HIV+ patients proved that passive coping styles were associated with lower total lymphocyte count and thus may also be predictor of development of AIDS (47). Thus considerably body of evidence suggests that psychological factors and coping play an important role in progression of HIV infection, its morbidity and morbidity. Many researchers have explored the effect of coping on many varied outcomes, but not much work has been carried out to explore the association of coping styles with medication adherence. Christensen et al (48). explored the adherence behavior and coping style preferences among renal dialysis patients. Adherence was predicted to be maximized in cases in which the patients' preferred style of coping matched the type of treatment they received. Planful

problem solving, a type of coping strategy was associated with more favorable adherence (48). In a longitudinal observational study involving 46 HIV positive patients, Singh et al. found that patients who were compliant with their medications had significantly better adaptive coping (19). In another study involving 123 HIV positive patients, Singh et al. reported that refill compliance with antiretroviral medications was significantly associated with problem focused coping (49). The limited studies on coping styles and adherence have been very varied in the use of coping scales to determine coping styles. No study has assessed the coping scales 'seeking social support', 'focusing on positive', 'distancing', 'behavioral escape avoidance', 'cognitive escape avoidance' as predictors of adherence. Also, in the study by Singh et al. (19), the sample comprised of only males. Coping needs to studies on a representative sample to make the results generalizable.

Measurement of coping strategies includes standardized instruments, interviewing protocols or observational techniques that assess the use of coping strategies to a specific stressor (50). Many instruments have been developed to determine the coping strategy used by people. The "ways of coping questionnaire" is one of the standardized instruments that have been used extensively as a research instrument in studies of the coping process. It has been derived from a cognitive-phenomenological theory of stress and coping developed by Lazarus and colleagues (51). This measure consists of a series of predicates, each of which portrays a coping thought or action that people sometimes engage in when under stress. This instrument and its modifications have been used in many studies in a

variety of settings. For example, Vitalinio et al. used the instrument to determine coping as an index of illness behavior in panic disorders (52). This scale was revised by Lazarus, Folkman, and Dunkel-Schetter to develop a questionnaire with 51 items. This scale was again modified by Dunkel-Schetter, Feinstein, Taylor and Flake (53) to suit their study on cancer patients. These were the first coping patterns to be identified with a large and heterogeneous sample of cancer patients and they are similar to those identified with a large sample of community residents experiencing a variety of life stressors. It appears that they may be representative of universal dimensions of coping. The five factors developed as a result of factor loadings were: seeking social support, distancing, focusing on positive, cognitive escape avoidance, and behavioral escape avoidance. In this study, these factors will be assessed as a predictor of medication adherence. There is great variability in the assessment of coping. This study shall add to the understanding of coping styles used by the HIV patients and also to the adherence behavior and predictors of the same.

METHODOLOGY

A. Study Setting and Sample

The sample consisted of 145 patients who were currently prescribed medication for HIV. The eligibility criteria for this study included age between 18 and 74 years, current use of approved antiretroviral medications or protease inhibitors, or use of approved medication for HIV- related complications and prophylaxis of opportunistic infections (for example, trimethoprim, sulfamethoxazole used in the prophylaxis of Pneumocystic carnii pneumonia), ability to read English, and a positive HIV status.

The purpose of the original study was to develop measures of stages of change for medication adherence. The study was funded by the National Institute of Health (NIH) and was conducted by Dr. Cynthia Willey, University of Rhode Island, during 1995 to 1998.

Patients were recruited from three sites affiliated with the study investigators. These sites are a part of seven clinical sites in Rhode Island, which have collaborated since 1987 as part of the Brown University Aids Program and provide primary care services to over 75% of the HIV infected patients from Rhode Island and the surrounding Massachusetts area. The study sites are listed below:

1. **The Miriam Hospital Immunology Center**, which has the largest number of ambulatory visits of HIV seropositive individuals and serves the majority of HIV positive women in Rhode Island.

2. **Stanley Street Treatment and Resources**, which provides primary care for the indigent and intravenous drug users in the greater Fall River, Massachusetts area.
3. **Veteran's Affairs Medical Center in Providence, RI**, which currently provides care to approximately 60 HIV positive seropositive men.

B. Data Collection

A standardized questionnaire was administered to patients meeting the eligibility criteria who visited one of the three sites. The patients were told that the questionnaire was about how they think and feel about their HIV related medications, and about different strategies that people use to take their medications. Research assistants explained the questionnaire to the patients in a private location on each site, and were available to answer questions while the respondents were filling out the questionnaire.

Some patients did not complete the questionnaire at the clinic and were allowed to fill out the questionnaire at home and mail it to the clinic. They were told that they would each receive a $20 gift certificate after they had turned the questionnaire in. The data was collected during the year 1996-97.

The survey questionnaire administered to the patients included questions to gather data on demographics, living arrangements, education, employment, income, insurance coverage, social support, side effects, and psychological measurement scales. The information about the medication and several adherence related questions were asked for each antiretroviral and protease inhibitor medication the patient was on. The respondents responded to a set of questions for every drug

they were prescribed. Of the 145 respondents, a subset of 77 respondents responded to questions on protease inhibitor medications in addition to antiretroviral medications. Thus, each respondent answered questions about each drug they were on separately. The medications the respondents provided information on included antiretroviral medications like AZT (retrovir, zidovudine), DDI (videx, didanosine), DDC (hivid, zalcitabine), D4T (zerit, stavudine), 3TC (epivir, lamivudine) and protease inhibitor medications like saqinavir (invirase), ritonavir (norvir) and indinavir (crixivan). Responses were also obtained for anti- infective medications like trimethoprim or sulfamethoxazole, clarithromycin, dapsone, flucanazole, rifabutin and itraconazole. It was a self-reported questionnaire. All the questionnaires were checked for completeness before the incentives were awarded.

C. Measures and Variables assessed

The questionnaire included questions regarding the following:

- Demographics: age, gender, ethnicity, years of education, family income, health insurance coverage, number of people in the household, and employment status.
- Current health status and mood status.
- Social support: emotional, financial, physical support from family and friends.
- Physical functioning: severity of bodily pain, number of days in bed in the past two weeks, number of hospitalizations in the past year, interference of pain with normal work in the past four weeks, T-cell count last tested. The

Medical Outcomes Study (MOS) 36 item quality of life scale was included (54).

- Medical status: self reported disease and medication history, number of doses missed in the past one month, number of doses missed in the past three months.
- Coping: ways in which people cope with HIV and its treatment. The Ways of coping scale as modified by Dunkel-Schetter, Feinstein, Taylor, Flake (53) to suit their study on cancer patients was included.

D. Assessment of Medication Adherence

Medication adherence with anti-retroviral and protease inhibitor medications was assessed separately using data on **two scales**. The adherence was calculated separately for antiretroviral and protease inhibitor medications because the respondents had answered questions for each type of medication separately. The two scales used to measure adherence are:

1. **Medication Adherence Scale:** MAS or Medication Adherence Scale is a previously validated scale to measure adherence (55). It contains six questions that are answered yes or no. A positive response indicates inadequate adherence.

- During the ***last 3 months***, have you ever stopped taking your antiretroviral medication because you **felt worse**?
- During the ***last 3 months***, have you ever forgotten to take antiretroviral medication?

- During the ***last 3 months***, have you at times been careless about taking antiretroviral medication?
- During the ***last 3 months***, have you ever taken less of your antiretroviral medicine than your doctor prescribed because you **felt better**?
- During the ***last 3 months***, have you ever taken less of your antiretroviral medicine than your doctor prescribed because you **felt worse**?
- Since you began taking protease inhibitor/antiretroviral medication, have you ever purposely taken more/less of the medicine than your physician prescribed or discontinued your medication?

On the response options, a "Yes" was coded as "2" and "No" was coded as "1". The score for the scale was obtained by summing the response codes on each item on the scale. The range for the scales could thus be 6 to 12. Any respondents who had not responded to more than one item were dropped from the analyses. The scores were calculated separately for antiretroviral drugs and protease inhibitor drugs. The MAS score for each anti-retroviral drug was calculated. Further, the average score for all the anti-retroviral drugs was calculated and used in the analyses. Similarly, the scores for all protease inhibitor drugs were calculated and averaged.

Percentage Adherence:

Percentage adherence in the past one month was calculated using the answers to the questions "During the past month, about how many times did you miss a dose of the medication?" and "How often do you take this medication?" The responses to the question "How often do you take this medication" were used to determine

the total doses prescribed for each medication. From this question, the number of doses the respondent should take for one month was calculated.

Percentage adherence in the past one month was calculated using the formula:

$$\text{Percentage adherence} = 1 - \left[\frac{\text{Number of doses of medication missed in the past one month}}{\text{Total number of doses in the past one month}} \right] \times 100$$

The percentage adherence in the past one-month was determined separately for antiretroviral drugs and protease inhibitors. Protease inhibitor medications were newly introduced at the time of the study, and hence it was thought interesting to explore adherence to these drugs separately. The percentage adherence was calculated for all the antiretroviral drugs and was averaged to get an average percentage adherence in the past one month to all antiretroviral medications the patient was on. Similarly, the percentage adherence was determined for all protease inhibitors and was averaged. Thus, the range of values for percentage adherence can be from 0 to 100.

Two definitions were followed to classify respondents as adherent or non-adherent. A respondent was classified as "adherent" if his percentage adherence was 100, i.e. he reported not missing any dose in the past one month. This stringent cut off was chosen to offset the likely overestimation of adherence by respondents. A big drawback of self-reported adherence is that the patients tend to overestimate the adherence (23,24). All the respondents having less than 100 % adherence were classified as "non-adherent". But since in the real world, it would

be almost impossible to attain 100% adherence, an alternative cut off of 95% was also chosen.

For the second cut-off, all patients showing ≥95% adherence were classified as "adherent" and those showing <95% adherence were classified as "non-adherent". This cut off was chosen based on a study by Paterson D et al. (14) that reported that even with adherence as high as 95%, only 80% of patients had undetectable viral loads. The coding system followed was: "1" for adherence, and "0" for non-adherence.

Coping: Coping was assessed using the responses to a 50-item scale. The scale gives the frequency of use of each coping style by the respondents. The questions were of the type: In the last month, how often did you think, feel or do each item? The response options to the items are in form of a likert scale as follows:

1= Never; 2= Rarely; 3=Occasionally; 4= Often; 5= Very often

This scale was taken from the Ways of Coping Questionnaire (WOC) developed by Folkman and Lazarus (44). It describes a broad range of behavioral and cognitive coping strategies that a person might use during a stressful encounter. This scale was revised by Lazarus, Folkman, Dunkel-Schetter to develop a questionnaire with 51 items. This scale was again modified by Dunkel-Schetter, Feinstein, Taylor, Flake (53) to suit their study on cancer patients. These were the first coping patterns to be identified with a large and heterogeneous sample of cancer patients and they are similar to those identified with a large sample of community residents experiencing a variety of life stressors. It appears that they

may be representative of universal dimensions of coping. The five factors developed as a result of factor loadings were:

Behavioral Escape- Avoidance: sum of nine items (item numbers 29, 23, 24, 35, 39, 18, 3, 5, 25).

Focus on positive: sum of eight items (item numbers 26, 27, 17, 41, 21, 28, 14, 47).

Distancing: sum of 12 items (item numbers 40, 30, 33, 9, 10, 11, 50, 37, 15, 32, 48, 52).

Cognitive-Escape-Avoidance: sum of nine items (item numbers 7, 44, 45, 42, 43, 46, 8, 51, 12).

Seek and Use Social Support: sum of eleven items (item numbers 4, 34, 22, 20, 16, 49, 13, 31, 6, 19, 1).

Description of these items is in appendix III.

The final score for each factor was obtained by summing the responses on the items constituting that factor. Lazarus and Folkman (44) described this method of raw scoring.

For example, the score for Behavioral Escape-Avoidance = Sum (qvi29 + qvi23+ qvi24+ qvi35+ qvi39+ qvi18+ qvi5+ qvi3+ qvi25)

For each factor, observations with more than two missing values were dropped from the analyses.

E. <u>Variables Used:</u>

The following variables were determined to be of interest and were included in the analyses.

Dependent Variables:

1. **Percentage adherence:** to antiretroviral drugs in the past one-month. (100% as cut off)- **abbreviated as 100% A.V.**
2. **Percentage adherence:** to antiretroviral drugs in the past one-month. (95% as cut off)- **abbreviated as 95% A.V.**
3. **Percentage adherence:** to protease inhibitor drugs in the past one-month. (100% as cut off) -**abbreviated as 100% P.I.**
4. **Percentage adherence:** to protease inhibitor drugs in the past one-month. (95% as cut off) -**abbreviated as 95% P.I.**
5. **Medication Adherence Scale for antiretroviral drugs:** Dichotomous measure of adherence- **abbreviated as MAS A.V.**
6. **Medication Adherence Scale for protease inhibitor drugs:** Dichotomous measure of adherence- **abbreviated as MAS P.I.**

Independent Variables:

The IV's of primary interest were the **coping styles.** These were used as continuous variables for univariate and bivariate analysis, but had to be categorized for use in final logistic regression analysis. The coping styles are:

Seeking social support – **abbreviated as 'sss'.**

Distancing -**abbreviated as 'dis'**

Focusing on positive- **abbreviated as 'fop'**

Behavioral escape avoidance -**abbreviated as 'bea'**

Cognitive escape avoidance -**abbreviated as 'cea'**

Demographic Variables

Age: The variable age was categorized into three groups of < 35 years, 35-41 years and ≥ 42 years. The first category was coded as 0, the 35-41 years age category was coded as 1, while the > 42 years age group was coded as 2 for the analysis.

Gender: For the purpose of analysis, males were coded as '1' and females as '0'.

Race: The variable race was dichotomized into 'whites' and 'non-whites'. The 'whites' were coded as '1', whereas 'native Americans', 'Hispanics', 'African American, 'Asian' and others' were collapsed into a single category 'non-whites' and were coded '0'.

Annual income: The respondents were dichotomized as having income of less than $15,000 (coded as '1'), or more than $ 15,000 (coded as '0').

Years of Education: Respondents having attained more than 12 years of education were coded as '0' where as those with less than 12 years of education were coded as '1'.

Insurance: The respondents which reported having any form of insurance were coded as '0', where as those without any insurance were coded as '1'.

Clinical variables

Bodily pain: Respondents who reported moderate to severe bodily pain were grouped into one category and were coded as '1', where as those which reported none to mild pain were coded as '0'.

Times since diagnosis with HIV: Patients who had been diagnosed with HIV before less than 2 years were coded as '1', those diagnosed before 3-4 years were coded as '2', whereas those who were diagnosed before 5 years were coded as '3'.

CD4 count: The patients with CD4 cell count between 50-200 were coded as '0', whereas those with count between 201-500 were coded as '1'.

Injection drug use: Occasional and regular drug users were coded as '1', while those who were not drug users were coded as '0'.

There were 137 respondents who were prescribed antiretroviral medications. There were 77 respondents who were prescribed protease inhibitor medications.

Data Analysis:

The above-mentioned variables constitute the independent and dependent variables as described. The associations between the independent variables and the dependent variables were examined using bivariate and multivariate statistics. The data was analyzed using the Statistical Analysis System (SAS) version 8.00 on the computers of Department of Applied Pharmaceutical Sciences, University of Rhode Island.

The data was screened for normality, linearity and homoscedasticity. The variable "adherence using MAS" was markedly negatively skewed for both antiretroviral medications and protease inhibitor medications. Several transformations including square root, exponential, log, were tried to make the variable normal. The variable was dichotomized due to a markedly skewed distribution. All respondents with a score of 6 were categorized as being "adherent" and those with score of 7 and

above were categorized as being "non-adherent", that is, any respond who responded 'yes' to even a single question were categorized as being non-adherent. Further, bivariate analyses were run between the primary independent variables and all other variables and also between the primary dependent variables and all other variables to check for the potential confounding variables. Bivariate statistics were used to determine the association between each dependent variable and each independent variable, excluding the independent variables of primary interest i.e. coping styles. Similarly, association between each primary independent variable and other independent variables was determined. The associations between each dependent variable (100% A.V., 95% A.V., 100% P.I., 95% P.I., MAS A.V., MAS P.I.) and the independent variables (age, gender, race, income, years of education, insurance, bodily pain, time since diagnosis, CD4 count, injection drug use) excluding the primary independent variables, i.e. the coping styles, were explored using chi-square tests. The associations between each primary independent variable (sss, dis, fop, bea, cea) and other independent variables (gender, race, income, years of education, insurance, bodily pain, CD4 count, injection drug use) were explored using multiple T-tests. ANOVA's were run to explore the association between the coping styles (ss, dis, fop, bea, cea) and the variables "time since diagnosis" and "age".

Further, each primary independent variable (coping styles) was categorized into three categories so that preliminary logistic regression models could be run between each coping style and each dependent variable to assess the parametric form. The primary independent variables were transformed into categorical

variables as they did not show a linear relationship with the dependent variables and hence could not be used as continuous variables in the final logistic models. Each coping style was categorized into three level variables based on the frequency distribution. Each coping style was categorized as "seldom used", "used often" and "used very often". Further, these categorical independent variables were transformed into dummy variables as follows:

Seeking Social Support:

ssshigh- 'using seeking social support very often'

sssmed- 'using seeking social support often

reference category- 'using seeking social support seldom'

Distancing:

dishigh- 'using distancing very often'

dismed- 'using distancing often

reference category- 'using distancing seldom'

Focusing on Positive:

fophigh- 'using focusing on positive very often'

fopmed- 'using focusing on positive often

reference category- 'using focusing on positive seldom'

Behavioral Escape Avoidance:

beahigh- 'using behavioral escape avoidance very often'

beamed- 'using behavioral escape avoidance often

reference category- 'using behavioral escape avoidance seldom'

Cognitive Escape Avoidance:

ceahigh- 'using cognitive escape avoidance very often'

ceamed- 'using cognitive escape avoidance often

reference category- 'using cognitive escape avoidance seldom'

The variable 'age' was dummy coded as follows:

highage- >=42 years.

medage- 35-41 years.

reference category- < 35 years.

The variable 'time since diagnosis' was dummy coded as follows:

longtime- >= 5 years.

medtime- 3 to 4 years.

reference category- <=2 years.

Finally, logistic regression analysis was run to assess the effect of each coping style on each dependent variable. Logistic models were run separately for each independent variable with each dependent variable. Logistic regression models to assess the effect of each primary independent variable on each dependent variable were tested following the strategy described by David Kleinbaum. The 'chunk' tests were performed to detect any interactions. The Maximum Likelihood ratio tests were used to check for the significance of the interaction terms in the model. The likelihood ratio test is a chi-square test that makes use of maximum likelihood values. The full model with the interaction terms included and the reduced model (without interaction terms) were compared using the difference between the log likelihood statistics for the two models. Checking the effect of

adding each variable to the model separately assessed confounding. Confounding assessment followed the interaction assessment. The confounding assessment was guided by considerations of validity and precision as described by Klienbaum. Starting with the 'gold model', i.e. the model with all Independent variables included, variables were sequentially dropped to check the effect on the odds ratios and 95% confidence intervals. Only the variables whose deletion did not caused a change in the odds ratio and C.I. were dropped. Separate models were run for each primary independent variable due to high correlation between them. Each primary independent variable was conceptually very different and separate models were run to assess the effect of each primary I.V. on each D.V.

The logistic regression models are listed below:

For Anti-retroviral drugs:

1) Percentage adherence 100% cut-off (D.V.)= ssshigh + sssmed
2) Percentage adherence 100% cut-off (D.V.)= dishigh + dismed
3) Percentage adherence 100% cut-off (D.V.)= fophigh + highmed
4) Percentage adherence 100% cut-off (D.V.)= beahigh + beamed
5) Percentage adherence 100% cut-off (D.V.)= ceahigh + ceamed
6) Percentage adherence 95% cut-off (D.V.)= ssshigh + sssmed
7) Percentage adherence 95% cut-off (D.V.)= dishigh + dismed
8) Percentage adherence 95% cut-off (D.V.)= fophigh + highmed
9) Percentage adherence 95% cut-off (D.V.)= beahigh + beamed
10) Percentage adherence 95% cut-off (D.V.)= ceahigh + ceamed
11) MAS adherence (D.V)= ssshigh + sssmed

12) MAS adherence (D.V)= dishigh + dismed

13) MAS adherence (D.V)= fophigh + highmed

14) MAS adherence (D.V)= beahigh + beamed

15) MAS adherence (D.V)= ceahigh + ceamed

For protease-inhibitor drugs:

16) Percentage adherence 100% cut-off (D.V.)= ssshigh + sssmed

17) Percentage adherence 100% cut-off (D.V.)= dishigh + dismed

18) Percentage adherence 100% cut-off (D.V.)= fophigh + highmed

19) Percentage adherence 100% cut-off (D.V.)= beahigh + beamed

20) Percentage adherence 100% cut-off (D.V.)= ceahigh + ceamed

21) Percentage adherence 95% cut-off (D.V.)= ssshigh + sssmed

22) Percentage adherence 95% cut-off (D.V.)= dishigh + dismed

23) Percentage adherence 95% cut-off (D.V.)= fophigh + highmed

24) Percentage adherence 95% cut-off (D.V.)= beahigh + beamed

25) Percentage adherence 95% cut-off (D.V.)= ceahigh + ceamed

26) MAS adherence (D.V)= ssshigh + sssmed

27) MAS adherence (D.V)= dishigh + dismed

28) MAS adherence (D.V)= fophigh + highmed

29) MAS adherence (D.V)= beahigh + beamed

30) MAS adherence (D.V)= ceahigh + ceamed

RESULTS

Table 1. Demographics and Clinical Characteristics of Patient Population prescribed Anti-retroviral Medication:

A total of 137 patients were on anti-retroviral medication. These patients were between the ages of 24 to 57. The median age was 38. An equal proportion of respondents (34.09%) were between the age groups of 35-41 years and greater than 42 years, where as 31.82% were less than 35 years of age. The majority of the patients were males, who constituted 72.06% of the sample, whereas females constituted 27.94% of the sample.

A majority of the respondents (65.18%) had more than 12 years of education. 72.99% of the sample reported that their health status was excellent to good. Whites constituted 63.50% of the sample, while the non-whites (Native Americans, Hispanics, Asians, African Americans and others) constituted 36.50% of the sample. About 29.20% of the patients said that they lived alone, while 70.80% said that they lived with others. 61.24% of the patients reported that their annual income was less than $15,000, while 38.76% reported that their annual income was above $15,000. Only 16.06% of the patients reported as having no insurance, while 83.74% reported as having some insurance.59.85% of the patients reported that they experienced none to mild bodily pain, while 40.15% reported that they experienced moderate to very severe bodily pain. 64.18% of the patients reported that they had been diagnosed with HIV for a time period greater than 5 years. 47.92% of the patients reported that their T-cell count was less than 200 and 53.08% of the patients reported that their T-cell count was greater than

200. Only 3.65% of the patients reported that they occasionally used intravenous drugs, while the majority of the patients, 40.88% reported that they had never at all or never in the past 6 months used intravenous drugs.

Table 2. Demographics and clinical characteristics of patient population prescribed Protease-inhibitor medication:

A total of 76 patients were on protease-inhibitor medication. These patients were between the ages of 24 to 57. The median age was 38. Of these, 40% were above 42 years, 36% between 35-41 years and 24% below 35 years of age. The majority of the patients were males, who constituted 75.00% of the sample, whereas females constituted 25.00% of the sample. A majority of the respondents (77.33%) had more than 12 years of education. 80.52% of the sample reported that their health status was excellent. Whites constituted 75.32% of the sample, while the non-whites (Native Americans, Hispanics, Asians, African Americans and others) constituted 24.68% of the sample. About 28.57% of the patients said that they lived alone, while 71.43% said that they lived with others. 57.33% of the patients reported that their annual income was less than $15,000, while 42.67% reported that their annual income was above $15,000. Only 12.99% of the patients reported as having some insurance, while 87.01% reported as having no insurance.58.44% of the patients reported that they experienced none to mild bodily pain, while 41.56% reported that they experienced moderate to very severe bodily pain. 59.74% of the patients reported that they had been diagnosed with HIV for a time period greater than 5 years. 51.33% of the patients reported that their T-cell count was less than 200 and 48.65% of the patients reported that their

T-cell count was greater than 200. Only 2.60% of the patients reported that they occasionally used intravenous drugs, while the majority of the patients, 41.96% reported that they had never at all or never in the past 6 months used intravenous drugs.

Table 3. Adherence with Anti-retroviral (A.V.) and Protease Inhibitor (P.I.) Medications (Dependent Variables):

For patients on A.V Medications: With a 95% cut off (patients whose adherence was above 95% were categorized as adherent, while those below 95% were categorized as non-adherent), 85.61% (n = 113) of the patients were found to be adherent, whereas 14.39% (n = 19) were found to be non-adherent.

With a 100% cut off (patients whose adherence was 100% were categorized as adherent, while those below 100% were categorized as non-adherent), 47.73% (n = 63) of the patients were found to be adherent whereas 52.27% (n = 69) were found to be non-adherent.

Using the MAS, 45.26% (62) patients were found to be adherent, while 54.74% (75) patients were found to be non-adherent.

For patients on P.I Medications: With a 95% cut off (patients whose adherence was above 95% were categorized as adherent, while those below 95% were categorized as non-adherent), 86.67% (n = 65) of the patients were found to be adherent whereas 13.33% (n = 10) were found to be non-adherent.

With a 100% cut off (patients whose adherence was 100% were categorized as adherent, while those below 100% were categorized as non-adherent), 49.33% (n

= 37) of the patients were found to be adherent whereas 51.95% (n = 40) were found to be non-adherent.

Using the MAS, 48.05% (37) patients were found to be adherent, while 51.95% (40) patients were found to be non-adherent.

Table 4. Frequency of use of each coping style (primary I.V.) by patients prescribed Anti-retroviral and those prescribed Protease Inhibitor Medications:

For patients on A.V. Medications: Patients were categorized into three groups based on the frequency of use of the coping styles i.e. using coping style seldom, using it often and using it very often. The majority (43.31%) of the patients reported using "Focusing on positive" very often. Seeking social support, distancing, Behavioral escape avoidance, cognitive escape avoidance and was used very often by 35.43%, 38.89%, 40.00%, and 38.40% patients respectively.

For patients on P.I. Medications: Majority (44.59%) of the patients reported using "Focusing on positive" very often. Seeking social support, distancing, Behavioral escape avoidance, cognitive escape avoidance and was used very often by 44.00%, 43.24%, 40.85%, and 44.59% patients respectively. Thus there is no trend or preference for use of any particular coping style by patients.

Table 5: Adherence status by frequency of use of coping style in patients on Antiretroviral medications: Table 5 summarizes the adherence status of patients on antiretroviral medication by their frequency of use of coping styles. The results are comparable for 100% adherence and adherence as measured by MAS.

Table 6: Adherence status by frequency of use of coping style in patients on Protease inhibitor medications: Table 5 summarizes the adherence status of patients on protease inhibitor medication by their frequency of use of coping styles.

Table 7. Multiple Chi-Square Tests with Adherence to Antiretroviral Medications with 100% cut off (Categorical Dependent Variable) and other Categorical Independent Variables:

None of the independent variables was significantly associated with adherence in the chi square test.

Table 8. Multiple Chi-Square Tests with Adherence to Antiretroviral Medications with 95% Cut-off (Categorical Dependent Variable) and other Categorical Independent Variables:

None of the variables showed a significant association with medication adherence. The variables "insurance" and "time since diagnosis" did not have enough sample size per cell and hence the chi-square was not a valid test to check for the differences in the proportions of respondents who were adherent and those who were non-adherent.

Table 9. Multiple Chi-Square Tests run with Adherence to Antiretroviral Medications using MAS (Categorical Dependent Variable) and other Categorical Independent Variables:

None of the variables showed a significant difference in their proportions of adherent and non-adherent patients, suggesting no association between these variables and adherence.

Table 10. Multiple Chi-Square Tests with Adherence to Protease inhibitor Medications with 100% cut off (categorical Dependent Variable) and other Categorical Independent Variables.

The variable "gender" (p= 0.02) was found to be significantly different between the adherent and non-adherent patients. Greater proportion of males were adherent.

Table 11. Multiple Chi-Square Tests with Adherence to Protease Inhibitor Medications using MAS (categorical Dependent Variable) and other other Categorical Independent Variables:

The variables "annual family income"(fisher's p value = 0.16), "T-cell count" (p-value = 0.03) were found to be significantly different between the adherent and non-adherent patients. Respondents with annual income more than $15,000 and those with T-cell count of less than 200 were found to be more adherent than those with income less than $15,000 and those with T-cell count greater than 200.

Table 12. Multiple T tests with "Seeking social support" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

The mean score on the variable "Seeking Social Support" was significantly different between the patients with insurance and patients with no insurance (p-value=0.0003). The mean score was also significantly different between patients living alone and patients living with someone (p-value=0.005). The patients who were insured and those who lived alone had greater mean score on "Seeking

Social Support" as compared to those who were uninsured and those who did not live alone.

Table 13. Multiple T tests with "Distancing" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

The mean score on the variable "Distancing" was significantly different between the patients living alone and patients not living alone (p-value=0.03). The patients living alone had a greater mean score on the variable "Distancing" as compared to those who did not live alone.

Table 14. Multiple T tests with "Focusing on Positive" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

The mean score on the variable "Focusing on Positive" was significantly different between the patients with excellent/good health and patients with fair/poor health (p-value=0.03). The score was also significantly different between the patients living alone and those not living alone (p-value=0.05). Also, the mean score was significantly different between patients with income <15,000 and those with income $\geq$ 15,000 (p-value=0.02).

Table 15. Multiple T tests with "Behavioral Escape Avoidance" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

The mean score on the variable "Behavioral Escape Avoidance" was significantly different between the patients living alone and those not living alone (p-

value=0.03). The score was also significantly different between the patients with none/mild pain and patients with moderate/severe pain (p-value=0.01). The patients living alone and those with moderate to severe pain reported more behavioral escape avoidance as compared to patients not living alone and those with none to mild pain.

Table 16. Multiple T tests with "Cognitive Escape Avoidance" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

The mean score on the variable "Cognitive Escape Avoidance" was significantly different between the white patients and the non-white patients (p-value=0.01). Whites had a significantly greater score on cognitive escape avoidance scale as compared to the non-whites.

Table 17. ANOVA between the categorical I.V "Time Since Diagnosis", "age" and continuous primary Independent Variables for people prescribed Anti-retroviral medication:

None of the continuous primary I.V's showed significant differences across the groups of "time since diagnosis" or "age".

Table 18. Multiple T tests with "Seeking social support" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medication:

The mean score on the variable "Seeking Social Support" was significantly different between the patients with insurance and those without insurance (p-value=0.002). The scores were also different between patients with none/mild

body pain and those with moderate/severe pain (p-value=0.03). The patients with some insurance and those with moderate to severe pain reported using more seeking social support as compared with those with no insurance and those with none to mild pain.

Table 19. Multiple T-tests with "Distancing" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medications:

No significant difference was found in the means of the variable "distancing".

Table 20. Multiple T-tests with "Focusing on Positive" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medications:

The mean score on the variable "focusing on positive" was significantly different between the patients with insurance and those without insurance (p-value=0.04). The patients with some insurance reported using focusing on positive as compared to those with no insurance.

Table 21. Multiple T-tests with "Behavioral Escape Avoidance" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medications:

The mean score on the variable "behavioral escape avoidance" was significantly different between the patients living alone and those not living alone (p-value=0.008).

Table 22. Multiple T-tests with "Cognitive Escape Avoidance" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medications:

No significant difference was found in the means of the variable "Cognitive Escape Avoidance".

Table 23. ANOVA between the Categorical Independent Variable "Time since diagnosis", "age" and Continuous primary Independent Variables for People prescribed Protease-inhibitor Medications:

There was significant difference in the means of the variable "Cognitive Escape Avoidance" between the groups of variable "time since diagnosis" (p-value=0.02) for people prescribed A.V. medications.

The results for patients on P.I. medications were non significant.

Table 24 to Table 47 summarize the final logistic regression models run between each of the independent variables (coping styles) with each of the dependent variables (100% A.V., 95% A.V., MAS A.V., 100% P.I., 95% P.I., MAS P.I.) controlling for the potential confounding variables. In the bivariate tests, some demographic and clinical variables were found to be significantly associated with either some independent variable or some dependent variable, but none was found to be significantly associated with both the independent variable and dependent variable, and hence did not qualify to be a confounder. Introducing the variables in ascending order as well as descending order assessed the effect of each independent variable on the dependent variables. In the final model, 'behavioral escape avoidance' was significantly associated with medication adherence as

assessed by medication adherence scale for patients on antiretroviral medications. The people who used behavioral escape avoidance very often are 60% less likely to be adherent as compared to those who use this coping style seldom. Similarly, people who used behavioral escape avoidance often are 70% less likely to be adherent as compared to those who use this coping style seldom. BEA was also significantly associated with adherence to antiretroviral medications using a 100% cut off definition. The respondents using BEA very often are 70% less likely and those using BEA often are 90% less likely to be adherent as compared to their counterparts who use BEA seldom. All other logistic regression models were non-significant. Also, the final models revealed some interesting associations. Education and living arrangement were also found to be significantly associated with adherent to protease inhibitors as defined by 95% cut off. The respondents with less than 12 years of education and those living alone were 90% less likely to be adherent as compared with those with more than 12 years of education and not living alone.

Discussion

The purpose of this research was to assess coping with HIV as a predictor of medication adherence. Two measures of medication adherence, MAS and percentage adherence were used to assess the adherence to anti-retroviral and protease-inhibitor medications. There is much uncertainly as to what definition or method is best for measuring and assessing medication adherence. Hence, classifying the respondents as being adherent or non-adherent was accomplished using two scales to increase the validity. Both the scales gave data which was self-reported by the patients. Two cut-off's were used for the percentage adherence, 95% cut-off and 100% cut off. The 95% cut-off was chosen based on literature review. The 100% adherence cut off, though seemingly unpractical, was chosen because it has been well established how medication adherence dictates the success of the medication therapy in HIV. It is absolutely imperative to adhere strictly to the medication regimen. Given the repercussions of non-adherence and missing even a few doses, strict adherence with the medication regimen is imperative. Efforts should be directed to have the most stringent benchmark for adherence, to identify the factors influencing and predicting adherence, and to use this knowledge to develop dedicated interventions to eradicate the problem of non-adherence. Disease states affect not only physical health, but also have psychological implications. This is especially true in diseases like HIV, which has no cure as yet, and leads to a slow death. The complexities of this disease are enormous as it raises concerns regarding health, well-being, and social stigma, confounded by a slow and sure death. Hence it is necessary to study the

psychological factors that may influence various factors and behaviors, including medication adherence. Coping is one such psychological domain that has not been studied in relation to medication adherence in depth. Research with psychological variables is complicated by the fact that there are no standard tools for measurement of the domains. For this study, responses on the Ways of Coping Questionnaire as modified by Dunkel-Schetter were used. In this study, most patients coped in multiple ways with HIV. Patients did not report any single pattern of coping more frequently than the other. This is consistent with the results of the study by Dunkel-Schetter et al. in which they determined the coping strategies used by cancer patients (53). The patients appear to use a large repertoire of behaviors to cope flexibly with HIV, rather then rigidly adhering to a particular coping style. This indicates to instability in the pattern of use of coping styles. Lazarus and Folkman opine that coping strategies used keep changing based on changing appraisal of stress level and situation. This situational aspect and changing instable nature of coping makes assessment of coping styles a difficult issue. Some authors have suggested measuring coping responses over time and exploring sustainable trends over time.

For the patients prescribed protease inhibitors, males exhibited significantly more adherence than females, using the percentage cutoff definition of adherence. Gender has been inconsistently associated with medication adherence with HIV in previous research. HIV+ women have also been shown to be more depressed than males (56). This could have a bearing on adherence. In a retrospective cohort study of antiretroviral medication adherence using New York State Medicaid

data, women were less likely to be adherent and more likely to be depressed than males (56). In a study to characterize the prevalence and predictors of diagnosed depression among HIV patients on Medicaid, women were more likely to be diagnosed with depression (57). The respondents who reported living alone displayed significantly low adherence as compared to those not living alone. This could be attributed to the important role social support plays in adherence behavior. Previous research has demonstrated consistently that patient with good social support display better adherence to medical therapy. This may be due the support, care and reminders from the people living with the patients. Similarly, those with education greater than 12 years are significantly more adherent as compared with those with less than 12 years of education. Education imparts a maturity and sense of responsibility. People with more education may be more capable of understanding the disease and the importance of adherence better. Also educated people may have more income as compared with those who are not educated. Similarly, when adherence was assessed using MAS, patients with greater family income were found to be significantly more adherent as compared to those with low income. This could be because these patients are able to better afford the medications. In the literature review, demographic variables have been reported to be inconsistently associated with medication adherence. This variability is rooted in the varied samples, varied definitions of adherence and different measurement techniques. Some significant associations were observed with the styles of coping used. Patients with some insurance and those with moderate to sever pain reported using 'seeking social support' with significantly

greater frequency as compared with those having no insurance and with mild pain. This could be because patients with insurance could have more meaningful social interactions and those in pain and suffering have a tendency to seek external support. Patients with some insurance were also found to use 'focusing on positive' to a significantly greater extent than those with no insurance.

In the final logistic regression models, the variable gender was significantly associated with percentage adherence using the 100% cut off (OR, 0.2; 95% CIs, 0.08-0.8). Males were 80% less likely to be adherent to protease inhibitors as compared with females. In the previous researches, gender has been inconsistently associated with medication adherence.

For patients prescribed antiretroviral medications, those with some insurance coverage and those living alone used 'seeking social support' with significantly greater frequency as compared with those with no insurance and not living alone. Also, patients living alone reported significantly more use of 'distancing' and 'behavioral escape avoidance' as compared with patients not living alone. This could be because people who use passive coping strategies tend to be more depressed and withdrawn. Patients having some insurance, those with good health, living alone and having income greater than $15,000 reported using 'focusing on positive' significantly more than those without these attributes. With the knowledge of these associations, people with the attributes associated with non-adherent can be identified and targeted for interventions.

Coping- the results of this study indicate the coping style **'behavioral escape avoidance'**, was significantly associated with adherence to antiretroviral

medications as assessed by the medication adherence scale and 100% cut-ff. Consistent with the results of previous research which assess effect of coping strategies on various outcomes, behavioral escape avoidance seems to have an inverse effect with medication adherence as assessed by medication adherence scale in patients prescribed antiretroviral medications. Behavioral escape avoidance is known to involve behavioral signs of avoidance such as social withdrawal, impulsivity and drug use. The patients who use this coping style very often and often are 80% and 90% less likely to be adherent as compared to those who seldom use behavioral escape avoidance. Use of behavioral escape avoidance was found to be significantly associated with percentage adherence to antiretroviral drugs using the 100% cut off. The patients who use this coping style 'very often' and 'often' are 70% and 90% less likely to be adherent as compared to those who seldom use behavioral escape avoidance This result is in agreement with that obtained by Singh et al. (49) in a study of predictors in a sample of 123 HIV+ patients. Singh et al. used the Billings and Moos coping inventory to assess the active-cognitive, active-behavioral or avoidance coping used by the respondents. The results showed that 'avoidance' coping was significantly correlated with non-adherence. Avoidance coping involved strategies like denying that the problems exists, or indirectly reducing tension by behaviors like eating and smoking. These strategies are very similar to those that constitute behavioral escape avoidance in this study. Adherence was measured by refill adherence and patients who obtained <90% or refills in the preceding six months were considered non-adherent. In a prospective study involving 46 patients, Singh et al.

(19), utilized the 'Ways of coping questionnaire' to assess coping styles and their association with medication refill adherence at 6 months. The authors reported that adherence was significantly associated with better adaptive coping and non adherence with poor coping. Although in this research no association was found between adaptive coping styles like seeking social support or focusing on positive, non-adherence was significantly associated with behavioral escape avoidance. Although the previous researchers have used different coping scales for assessing coping as predictor of medication adherence, the coping behaviors involving escape avoidance strategies have consistently been associated with non-adherence.

This indicates that patients who exhibit behavioral escape avoidance tend to be less adherent and is a group, which should be focused for behavioral intervention.

The conceptualization of adherence as the extent to which the patient follows medical instructions is an oversimplification of a multidimensional complex construct. It is now agreed upon that adherence is the extent to which a patient's behavior- taking medications, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from health care provider (58). Adherence involves a motivated behavioral change. This broader view of adherence highlights the importance of psychological constructs and predictors of adherence. This study is an addendum to and compelling support to the previous researches that have investigated psychological predictors to adherence. The results obtained are within some limitations, which despite diligence in statistical

methodology, could have contributed significantly to the results. These limitations are discussed in the following paragraph.

Limitations: The limitations, in part were due to the nature of the data and also the lack of reliable and foolproof measures for the variables such as medication adherence.

The sample size was only 145. Many variable distributions were skewed. Statistical techniques were used to rectify this shortcoming, but the skewness may indicate selection bias.

Self-reported data: A major shortcoming was the fact that the data was self-reported. The validity of self-reports is questionable as it lends itself to patient's recollection of the past. Recall bias plagues self-reports. There is a degree of subjectivity that seeps in as the responses depend on the situational mood of the respondent, education, social desirability concerns. These might influence the patient's ability and willingness to give accurate responses.

Measurement: The lack of any standard for the measurement and quantification of medication adherence is another limitation. The varied assessment techniques and definitions used for adherence and the varied results in adherence studies stand evidence to this.

This study was an effort to work within these limitations and tries to assess coping as a predictor of medication adherence. More research with more objective measures needs to be carried out on a larger sample to make the results generalizable to the population.

CONCLUSION

The study to assess coping as a predictor of adherence with HIV medication has produced some interesting results. For both anti-retroviral and protease-inhibitor medications, approximately 85% patients were adherent based on the 95% cut-off. This degree of adherence, though high is still inadequate in HIV. In contrast, the 100% cut-off and MAS showed disappointing results. 50-55% of the patients were non-adherent on these scales. A majority of patients (43.31%) on antiretroviral medications use "focusing on positive" very often. Majorities of the patients tend to use all coping styles very often.

Contrary to expectations, the final logistic models were not significant, suggesting no association between coping styles and medication adherence. Only 'behavioral escape avoidance' was found to be significantly associated with adherence to antiretroviral medications when assessed using MAS and 100% cut off. This is consistent with previous research findings. Patients using avoidance strategies can be identified and targeted for behavioral interventions to improve adherence behavior. This association, however was not found with adherence using other measures like percentage cut off's. These results however, are from statistical manipulations of data on merely 145 patients. Moreover, the adherence was self-reported. Measuring adherence is an extremely complex issue and self-reports are plagued by errors of overestimation and recall bias. The results obtained were within the limitations of limited sample size and self-reported adherence. Given the critical importance of adherence, focused efforts of identifying predictors of

adherence using reliable and objective measures of adherence are essential. Psychological factors are important determinants of health, well-being and quality of life of patients. For a disease such as HIV, factors influencing medication adherence needs to be identified and evaluated to develop interventions that can solve the problem of non-adherence and help make maximum good of the therapies available. More research needs to be done on such factors, including coping.

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Appendix I- Result Tables

Table 1: Demographics and Clinical Characteristics of Patient Population prescribed Anti-retroviral Medication:

Demographic Variables	N(%)	
Age		Mean=39.24
< 35 yrs.	42(31.82)	Median=38
35-41 yrs.	45(34.09)	Min=24 Max=57
≥ 42 yrs.	45(34.09)	S.D.= 7.55
Yrs. of education		Mean=12.00
<12 yrs.	46(34.85)	Median=12
≥ 12 yrs.	86(65.18)	Min=0 Max=22
		S.D.=3.04
Gender		
Female	38(27.94)	
Male	98(72.06)	
Race		
Whites	87(63.50)	
Non-whites:	50(36.50)	
-Native American		
-Hispanic		
-Asian		
-African American		
-Others		
Living arrangement		
Alone	40(29.20)	
With others	97(70.80)	
Annual Household Income		
<15,000	79(61.24)	
> 15,000	50(38.76)	
Insurance		
Some	22(16.06)	
None	115(83.74)	

Clinical Variables	N(%)	
Bodily pain		
None-Mild	82(59.85)	
Moderate-V.Severe	55(40.15)	
Current Health Status		
Excellent-Good	100(72.99)	
Fair-Poor	37(27.01)	
Time Since Diagnosis		
<1month-2years	23(17.16)	
3-4 years	25(18.66)	
≥ 5 years	86(64.18)	
T-cell Count		
≤200	61(46.92)	
>200	69(53.08)	
IV Drug Use		
Never or not in past 6 months	56(40.88)	
Occasionally	5(3.65)	

Table 2: Demographics and Clinical Characteristics of Patient Population prescribed Protease-inhibitor Medication:

Demographic Variables	N(%)	
Age		Mean=39.37
< 35 yrs.	18(24.00)	Median=38
35-41 yrs.	27(36.00)	Min=24 Max=57
≥ 42 yrs.	30(40.00)	S.D.= 7.44
Yrs. of education		Mean=12.88
<12 yrs.	17(22.67)	Median=12
≥ 12 yrs.	58(77.33)	Min=0 Max=22
		S.D.=3.19
Gender		
Female	19(25.00)	
Male	57(75.00)	
Race		
Whites	58(75.32)	
Non-whites:	19 (24.68)	
-Native American		
-Hispanic		
-Asian		
-African American		
-Others		
Living arrangement		
Alone	22(28.57)	
With others	55(71.43)	
Annual Household Income		
<15,000	43(57.33)	
> 15,000	32(42.67)	
Insurance		
Some	10(12.99)	
None	67(87.01)	

Clinical Variables	N(%)	
Bodily pain		
None-Mild	45(58.44)	
Moderate-V.Severe	32(41.56)	
Current Health Status		
Excellent-Good	62(80.52)	
Fair-Poor	15(19.48)	
Time Since Diagnosis		
<1month-2years	15(19.58)	
3-4 years	16(20.78)	
≥ 5 years	4659.74)	
T-cell Count		
≤200	36(48.65)	
>200	38(51.35)	
IV Drug Use		
Never or not in past 6 months	32(41.56)	
Occasionally	2(2.60)	

Table 3: Adherence with Anti-retroviral (A.V.) and Protease Inhibitor Medications (Dependent Variables):

Dependent Variable	Adherent Number (%)	Non-adherent Number (%)
Antiretroviral Medication		
A.V. 95% cut-off	113 (85.61)	19 (14.39)
A.V. 100% cut-off	63 (47.73)	69 (52.27)
MAS Adherence	62(45.26)	75(54.74)
Protease Inhibitor Medication		
P.I. 95% cut-off	65 (86.67)	10 (13.33)
P.I. 100% cut-off	37 (49.33)	38 (50.67)
MAS Adherence	37(48.05)	40(51.95)

Table 4: Frequency of use of each coping style (primary I.V.) by patients prescribed Anti-retroviral and those prescribed Protease Inhibitor Medications:

Coping style	Seldom N(%)	Often N(%)	Very often N(%)
Patients Prescribed Antiretroviral Medications:			
Seeking Social Support	36 (29.27)	44 (35.77)	43 (34.96)
Distancing	39 (31.97)	35 (28.69)	48 (39.34)
Behavioral Escape Avoidance	32 (26.45)	41 (33.88)	48 (39.67)
Cognitive Escape Avoidance	32 (26.45)	41 (33.88)	48 (39.67)
Focusing on Positive	37 (29.84)	35 (28.23)	52 (41.94)
Patients Prescribed Protease-inhibitor Medications:			
Seeking Social Support	23 (30.67)	20 (26.67)	32 (42.67)
Distancing	22 (29.33)	20 (44.00)	31 (26.67)
Behavioral Escape Avoidance	23 (31.08)	25 (33.78)	26 (35.14)
Cognitive Escape Avoidance	18 (25.35)	24 (33.80)	29 (40.85)
Focusing on Positive	16 (21.62)	25 (33.78)	33 (44.59)

Table 5: Adherence status by frequency of use of coping style in patients on Antiretroviral medications:

Adherence / Coping	100% adherence Adh. N(%)	Non-adh. N(%)	95% adherence Adh. N(%)	Non-adh. N(%)	MAS adherence Adh. N(%)	Non-adh. N(%)
sss very often	21 (48.8)	22 (51.2)	37 (86.1)	6 (13.9)	20(44.4)	25(55.56)
sss often	22 (50.0)	22 (50.0)	38 (86.3)	6 (13.7)	23(50.0)	23(50.00)
sss seldom	16 (44.4)	20 (55.6)	32 (88.8)	4 (11.1)	14(38.8)	22(61.11)
dis very often	26 (54.1)	22 (45.8)	43 (89.5)	5 (10.5)	24(48.9)	25(51.02)
dis often	16 (45.7)	19 (54.3)	29 (82.8)	6 (17.2)	16(42.1)	22(57.89)
dis seldom	18 (46.2)	21 (53.8)	35 (89.7)	4 (10.3)	18(46.1)	21(53.85)
fop very often	25 (48.0)	27 (51.9)	49 (94.2)	3 (5.7)	26(47.2)	29 (52.7)
fop often	18 (51.4)	17 (48.5)	28 (80.0)	7 (20)	16 (45.7)	19 (54.2)
fop seldom	16 (43.2)	21 (56.7)	31 (83.7)	6 (16.3)	15 (40.5)	22 (59.4)
bea very often	23 (47.9)	25 (52.1)	40 (83.3)	8 (16.6)	20 (40.0)	30 (60.0)
bea often	15 (36.5)	26 (63.4)	35 (85.3)	6 (14.7)	15 (34.8)	28(65.1)
bea seldom	21 (65.6)	11 (34.4)	31 (96.8)	1 (3.2)	21(65.6)	11(34.38)
cea very often	25 (52.0)	23 (47.9)	42 (87.5)	6 (12.5)	23 (47.9)	25 (52.1)
cea often	17 (41.4)	24 (58.6)	33 (80.4)	8 (19.5)	17 (38.6)	27(61.4)
cea seldom	16 (50.0)	16 (50.0)	30 (93.7)	2 (6.3)	17 (51.5)	16 (48.8)

Table 6: Adherence status by frequency of use of coping style in patients on Protease inhibitor medications:

Adherence / Coping	100% adherence		MAS adherence	
	Adh. N(%)	Non-adh. N(%)	Adh. N(%)	Non-adh. N(%)
sss very often	16 (50.0)	16 (50.0)	16 (50.00)	16 (50.00)
sss often	13 (56.5)	10 (43.5)	8 (40.00)	12 (60.00)
sss seldom	7 (38.8)	11 (61.9)	12 (52.17)	11 (47.83)
dis very often	14 (45.1)	17 (54.9)	17 (51.52)	16 (48.48)
dis often	12 (57.1)	9 (42.9)	7 (35.00)	13 (65.00)
dis seldom	10 (47.6)	11 (52.4)	12 (54.55)	10 (45.45)
fop very often	15 (48.3)	16 (61.7)	17 (51.52)	16 (48.48)
fop often	11 (44.0)	14 (56.0)	11 (44.00)	14 (56.00)
fop seldom	10 (58.8)	7 (41.1)	8 (50.00)	8 (50.00)
bea very often	16 (51.6)	15 (48.3)	12 (46.15)	14 (53.85)
bea often	9 (37.5)	15 (62.5)	10 (40.00)	15 (60.00)
bea seldom	11 (61.1)	7 (38.9)	13 (56.52)	10 (43.48)
cea very often	15 (57.6)	11 (42.3)	15 (51.72)	14 (48.28)
cea often	11 (44.0)	14 (56.0)	12 (50.00)	12 (50.00)
cea seldom	10 (55.5)	8 (44.4)	9 (50.00)	9 (50.00)

Table 7: Multiple Chi-Square Tests with Adherence to Antiretroviral Medications with 100% cut off (Categorical Dependent Variable) and other Categorical Independent Variables.

Categorical I.V.	Adherent N(%)	Non-Adherent %	p-value
Age			
< 35 yrs.	42.55 (20)	57.45 (27)	NS
35-41 yrs.	51.11 (23)	48.89 (22)	
≥ 42 yrs.	50.00 (20)	50.00 (20)	
Yrs. of education			
<12 yrs.	53.49 (23)	46.51 (20)	NS
≥ 12 yrs.	51.14 (45)	48.86 (43)	
Gender			
Male	46.32 (44)	53.68 (51)	NS
Female	52.78 (19)	42.22 (17)	
Insurance			
None	38.10 (8)	61.90 (13)	NS
Some	49.07 (53)	50.93 (55)	
Current Health Status			
Good-Excellent	48.45 (47)	51.55 (50)	NS
Poor-Fair	45.71 (16)	54.29 (19)	
Ethnicity			
Whites	50.00 (42)	50.00 (42)	NS
Non-Whites	44.68 (21)	55.32 (26)	
Living Arrangement			
Alone	44.74 (17)	55.26 (21)	NS
With Others	48.94 (46)	51.06 (48)	
Annual Family Income			
<15,000	50.00 (38)	50.00 (38)	NS
≥15,000	46.94 (23)	53.06 (26)	
Bodily Pain			
None-Mild	48.15 (26)	51.85 (28)	NS
Moderate-Sever	47.44 (37)	52.56 (41)	
Time Since Diagnosis			
<1 month-2 years	46.43 (39)	53.57 (45)	NS
3-4 years	45.83 (11)	54.17 (13)	
≥ 5 years	50.00 (11)	50.00 (11)	
T-Cell Count			
≤ 200	45.45 (30)	54.55 (36)	NS
>200	46.67 (28)	53.33 (32)	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 8: Multiple Chi-Square Tests with Adherence to Antiretroviral Medications with 95% Cut off (Categorical Dependent Variable) and other Categorical Independent Variables.

Categorical I.V.	Adherent %	Non-Adherent %	p-value
Age			
< 35 yrs.	91.94 (43)	8.51 (4)	NS
35-41 yrs.	86.67 (39)	13.33 (6)	
≥ 42 yrs.	77.50 (31)	22.50 (9)	
Yrs. of education			
<12 yrs.	79.07 (34)	20.93 (9)	NS
≥ 12 yrs.	88.64 (78)	11.36 (10)	
Gender			
Male	86.32 (82)	13.68 (13)	NS
Female	83.33 (30)	16.67 (6)	
Insurance			
None	95.24 (20)	4.76 (1)	-
Some	84.26 (91)	15.74 (17)	
Current Health Status			
Good-Excellent	82.47 (80)	5.71 (2)	NS
Poor-Fair	94.29 (33)	17.53 (17)	
Ethnicity			
Whites	83.33 (70)	16.67 (14)	NS
Non-Whites	89.36 (42)	10.64 (5)	
Living Arrangement			NS
Alone	78.95 (30)	21.05 (8)	
With Others	88.30 (83)	11.70 (11)	
Annual Family Income			
<15,000	86.84 (66)	13.16 (10)	NS
≥15,000	83.67 (41)	16.33 (8)	
Bodily Pain			
None-Mild	83.33 (65)	16.67 (13)	NS
Moderate-Sever	88.89 (48)	11.11 (6)	
Time Since Diagnosis			
<1 month-2 years	92.86 (78)	7.14 (6)	-
3-4 years	66.67 (16)	33.33 (8)	
≥ 5 years	77.27 (17)	22.73 (5)	
T-Cell Count			
≤ 200	83.33 (55)	16.67 (11)	NS
>200	86.67 (52)	13.33 (8)	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 9: Multiple Chi-Square Tests with Adherence to Antiretroviral Medications using MAS (Categorical Dependent Variable) and other Categorical Independent Variables.

Categorical I.V.	Adherent %	Non-Adherent %	p-value
Age			
< 35 yrs.	37.50 (18)	62.50 (30)	NS
35-41 yrs.	51.06 (24)	48.94 (23)	
≥ 42 yrs.	47.62 (20)	53.38 (22)	
Yrs. of education			
<12 yrs.	47.83 (22)	52.17 (24)	NS
≥ 12 yrs.	44.44 (40)	55.56 (50)	
Gender			
Male	43.88 (43)	56.12 (55)	NS
Female	47.37 (18)	52.63(20)	
Insurance			
None	45.45 (10)	54.55 (12)	NS
Some	44.46 (50)	55.36 (62)	
Current Health Status			
Good-Excellent	46.00 (46)	54.00 (54)	NS
Poor-Fair	43.24 (16)	56.76 (21)	
Ethnicity			
Whites	48.28 (42)	51.72 (45)	NS
Non-Whites	40.82 (20)	59.18 (29)	
Living Arrangement			
Alone	40.00 (16)	60.00 (24)	NS
With Others	47.42 (46)	52.58 (51)	
Annual Family Income			
<15,000	44.30 (35)	55.70 (44)	NS
≥15,000	46.00 (23)	54.00 (27)	
Bodily Pain			
None-Mild	45.12 (37)	54.88 (45)	NS
Moderate-Sever	45.45 (25)	54.55 (30)	
Time Since Diagnosis			
<1 month-2 years	44.19 (38)	55.81 (48)	NS
3-4 years	44.00 (11)	56.00 (14)	
≥ 5 years	47.83 (11)	52.17 (12)	
T-Cell Count			
≤ 200	39.13 (27)	60.87 (42)	NS
>200	50.82 (31)	49.18 (30)	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 10: Multiple Chi-Square Tests with Adherence to Protease inhibitor Medications with 100% cut off (categorical Dependent Variable) and other Categorical Independent Variables.

Categorical I.V.	Adherent %	Non-Adherent %	p-value
Age			
< 35 yrs.	53.33 (16)	46.67 (14)	NS
35-41 yrs.	48.15 (13)	51.85 (14)	
≥ 42 yrs.	44.44 (8)	55.56 (10)	
Yrs. of education			
<12 yrs.	50.00 (8)	50.00 (8)	NS
≥ 12 yrs.	50.00 (29)	50.00 (29)	
Gender			
Male	57.14 (32)	42.86 (24)	0.02*
Female	26.32 (5)	73.68 (14)	
Insurance			
None	33.33 (3)	66.67 (6)	NS
Some	51.52 (34)	48.48 (32)	
Current Health Status			
Good-Excellent	50.00 (30)	50.00 (30)	NS
Poor-Fair	46.67 (7)	53.33 (8)	
Ethnicity			
Whites	50.88 (29)	49.12 (28)	NS
Non-Whites	41.18 (7)	58.82 (10)	
Living Arrangement			NS
Alone	50.00 (10)	50.00 (10)	
With Others	49.09 (27)	50.91 (28)	
Annual Family Income			
<15,000	45.24 (19)	54.76 (23)	NS
≥15,000	53.13 (17)	46.88 (15)	
Bodily Pain			
None-Mild	52.38 (22)	47.62 (20)	NS
Moderate-Sever	45.45 (15)	54.55 (18)	
Time Since Diagnosis			
<1 month-2 years	47.92 (23)	52.08 (25)	NS
3-4 years	50.00 (7)	50.00 (7)	
≥ 5 years	53.85 (7)	46.15 (6)	
T-Cell Count			
≤ 200	40.63 (13)	59.38 (19)	NS
>200	52.50 (21)	47.50 (19)	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 11: Multiple Chi-Square Tests with Adherence to Protease Inhibitor Medications using MAS (categorical Dependent Variable) and other Categorical Independent Variables.

Categorical I.V.	Adherent %	Non-Adherent %	p-value
Age			
< 35 yrs.	50.00 (14)	50.00 (14)	NS
35-41 yrs.	44.44 (12)	55.56 (15)	
≥ 42 yrs.	50.00 (11)	50.00 (11)	
Yrs. of education			
<12 yrs.	43.71 (7)	56.25 (9)	NS
≥ 12 yrs.	50.00 (30)	50.00 (30)	
Gender			
Male	50.88 (29)	49.12 (28)	NS
Female	36.84 (7)	63.16 (12)	
Insurance			
None	50.00 (5)	50.00 (5)	-
Some	47.76 (32)	52.24 (35)	
Current Health Status			
Good-Excellent	50.00 (31)	50.00 (31)	NS
Poor-Fair	40.00 (6)	60.00 (9)	
Ethnicity			
Whites	51.72 (30)	48.28 (28)	NS
Non-Whites	38.89 (7)	61.11 (11)	
Living Arrangement			NS
Alone	45.45 (10)	54.55 (12)	
With Others	49.09 (27)	50.91 (28)	
Annual Family Income			0.90
<15,000	39.53 (17)	60.47 (26)	fisher=0.16
≥15,000	56.25 (18)	43.75 (14)	*
Bodily Pain			
None-Mild	51.11 (23)	48.89 (22)	NS
Moderate-Sever	43.75 (14)	56.25 (18)	
Time Since Diagnosis			
<1 month-2 years	45.65 (21)	54.35 (25)	NS
3-4 years	50.00 (8)	50.00 (8)	
≥ 5 years	53.33 (8)	46.67 (7)	
T-Cell Count			
≤ 200	33.33 (12)	66.67 (24)	0.03*
>200	57.89 (22)	42.11 (16)	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 12: Multiple T tests with "Seeking social support" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	34.61	NS
≥ 12 yrs.	33.09	
Gender		
Male	33.6	NS
Female	33.7	
Insurance		
None	27.5	0.0003*
Some	34.7	
Current Health Status		
Good-Excellent	34.0	NS
Poor-Fair	32.2	
Ethnicity		
Whites	33.6	NS
Non-Whites	33.5	
Living Arrangement		
Alone	36.9	0.005*
With Others	32.2	
Annual Family Income		
<15,000	32.9	NS
≥15,000	34.2	
Bodily Pain		
None-Mild	32.5	NS
Moderate-Sever	35.3	
Years of Education		
<12 years	34.4	NS
≥12 years	33.2	
T-Cell Count		
≤ 200	32.7	NS
>200	34.4	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 13: Multiple T tests with "Distancing" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	34.71	NS
≥ 12 yrs.	35.84	
Gender		
Male	36.7	NS
Female	33.2	
Insurance		
None	36.5	NS
Some	34.9	
Current Health Status		
Good-Excellent	36.1	NS
Poor-Fair	33.6	
Ethnicity		
Whites	33.8	NS
Non-Whites	36.7	
Living Arrangement		
Alone	38.7	0.03*
With Others	33.9	
Annual Family Income		
<15,000	35.2	NS
≥15,000	36.6	
Bodily Pain		
None-Mild	34.1	NS
Moderate-Sever	36.4	
Years of Education		
<12 years	35.3	NS
≥12 years	35.1	
T-Cell Count		
≤ 200	34.0	NS
>200	36.1	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 14: Multiple T tests with "Focusing on Positive" (continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	26.61	NS
≥ 12 yrs.	25.09	
Gender		
Male	25.9	NS
Female	24.6	
Insurance		
None	21.8	0.007*
Some	26.2	
Current Health Status		
Good-Excellent	26.3	0.03*
Poor-Fair	23.5	
Ethnicity		
Whites	25.0	NS
Non-Whites	26.7	
Living Arrangement		
Alone	27.4	0.05*
With Others	24.8	
Annual Family Income		
<15,000	24.4	0.02*
≥15,000	27.2	
Bodily Pain		
None-Mild	25.8	NS
Moderate-Sever	25.1	
Years of Education		
<12 years	25.2	NS
≥12 years	26.4	
T-Cell Count		
≤ 200	24.9	NS
>200	26.2	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 15: Multiple T tests with "Behavioral Escape Avoidance" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	22.87	NS
≥ 12 yrs.	21.95	
Gender		
Male	22.4	NS
Female	21.7	
Insurance		
None	22.3	NS
Some	22.2	
Current Health Status		
Good-Excellent	21.8	NS
Poor-Fair	23.2	
Ethnicity		
Whites	21.5	NS
Non-Whites	23.6	
Living Arrangement		
Alone	24.1	0.03*
With Others	21.5	
Annual Family Income		
<15,000	22.6	NS
≥15,000	21.7	
Bodily Pain		
None-Mild	21.2	0.01*
Moderate-Sever	23.9	
Years of Education		
<12 years	22.9	NS
≥12 years	21.9	
T-Cell Count		
≤ 200	22.0	NS
>200	22.3	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 16: Multiple T tests with "Cognitive Escape Avoidance" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed anti-retroviral medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	29.2	NS
≥ 12 yrs.	27.81	
Gender		
Male	27.9	NS
Female	28.8	
Insurance		
None	28.0	NS
Some	28.2	
Current Health Status		
Good-Excellent	28.2	NS
Poor-Fair	28.2	
Ethnicity		
Whites	27.2	0.01*
Non-Whites	30.2	
Living Arrangement		
Alone	29.0	NS
With Others	27.9	
Annual Family Income		
<15,000	27.8	NS
≥15,000	28.7	
Bodily Pain		
None-Mild	28.8	NS
Moderate-Sever	27.3	
Years of Education		
<12 years	27.6	NS
≥12 years	29.6	
T-Cell Count		
≤ 200	28.3	NS
>200	27.8	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 17: ANOVA between the categorical I.V's "Time Since Diagnosis", "age" and continuous primary Independent Variables for people prescribed Anti-retroviral medication:

Dependent Variable	R-square	F-value	p-value
Time Since Diagnosis			
Seeking social support	0.00	0.03	NS
Distancing	0.00	0.09	NS
Focusing on positive	0.00	0.2	NS
Behavioral escape avoidance	0.02	1.7	NS
Cognitive escape avoidance	0.04	2.5	NS
Age			
Seeking social support	0.01	0.63	NS
Distancing	0.03	1.96	NS
Focusing on positive	0.03	2.19	NS
Behavioral escape avoidance	0.01	0.94	NS
Cognitive escape avoidance	0.00	0.05	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 18: Multiple T tests with "Seeking social support" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	32.75	NS
≥ 12 yrs.	33.31	
Gender		
Male	33.4	NS
Female	32.4	
Insurance		
None	25.3	0.002*
Some	34.2	
Current Health Status		
Good-Excellent	33.9	NS
Poor-Fair	30.4	
Ethnicity		
Whites	33.9	NS
Non-Whites	30.6	
Living Arrangement		
Alone	35.8	NS
With Others	32.2	
Annual Family Income		
<15,000	33.3	NS
≥15,000	32.4	
Bodily Pain		
None-Mild	31.4	0.03*
Moderate-Sever	35.5	
Years of Education		
<12 years	32.7	NS
≥12 years	33.3	
T-Cell Count		
≤ 200	32.8	NS
>200	33.4	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 19: Multiple T tests with "Distancing" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	34.58	NS
≥ 12 yrs.	36.15	
Gender		
Male	36.1	NS
Female	31.3	
Insurance		
None	33.9	NS
Some	39.0	
Current Health Status		
Good-Excellent	35.8	NS
Poor-Fair	30.6	
Ethnicity		
Whites	33.7	NS
Non-Whites	36.2	
Living Arrangement		
Alone	36.9	NS
With Others	33.3	
Annual Family Income		
<15,000	33.6	NS
≥15,000	36.4	
Bodily Pain		
None-Mild	31.7	NS
Moderate-Sever	36.4	
Years of Education		
<12 years	34.5	NS
≥12 years	34.5	
T-Cell Count		
≤ 200	34.3	NS
>200	34.7	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 20: Multiple T tests with "Focusing on Positive" (continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	25.93	NS
≥ 12 yrs.	25.82	
Gender		
Male	26.5	NS
Female	23.7	
Insurance		
None	21.8	0.04*
Some	26.4	
Current Health Status		
Good-Excellent	26.4	NS
Poor-Fair	23.4	
Ethnicity		
Whites	25.7	NS
Non-Whites	26.2	
Living Arrangement		
Alone	27.5	NS
With Others	25.2	
Annual Family Income		
<15,000	25.3	NS
≥15,000	26.0	
Bodily Pain		
None-Mild	25.5	NS
Moderate-Sever	26.2	
Years of Education		
<12 years	25.9	NS
≥12 years	25.8	
T-Cell Count		
≤ 200	25.5	NS
>200	26.1	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 21: Multiple T tests with "Behavioral Escape Avoidance" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	22.5	NS
≥ 12 yrs.	22.10	
Gender		
Male	22.5	NS
Female	21.1	
Insurance		
None	21.5	NS
Some	22.2	
Current Health Status		
Good-Excellent	22.0	NS
Poor-Fair	22.8	
Ethnicity		
Whites	21.8	NS
Non-Whites	23.1	
Living Arrangement		
Alone	25.0	0.008*
With Others	21.1	
Annual Family Income		
<15,000	23.1	NS
≥15,000	20.9	
Bodily Pain		
None-Mild	21.3	NS
Moderate-Sever	23.3	
Years of Education		
<12 years	22.1	NS
≥12 years	22.5	
T-Cell Count		
≤ 200	22.2	NS
>200	21.9	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 22: Multiple T tests with "Cognitive Escape Avoidance" (Continuous primary I.V.) and other Independent Variables (Categorical) for people prescribed Protease-inhibitor medication:

Independent Variables	Means	p-value
Yrs. of education		
<12 yrs.	29.23	NS
≥ 12 yrs.	27.30	
Gender		
Male	27.8	NS
Female	27.1	
Insurance		
None	27.0	NS
Some	27.7	
Current Health Status		
Good-Excellent	27.9	NS
Poor-Fair	26.3	
Ethnicity		
Whites	27.2	NS
Non-Whites	29.5	
Living Arrangement		
Alone	29.0	NS
With Others	27.1	
Annual Family Income		
<15,000	27.2	NS
≥15,000	27.8	
Bodily Pain		
None-Mild	28.2	NS
Moderate-Sever	26.7	
Years of Education		
<12 years	27.3	NS
≥12 years	29.2	
T-Cell Count		
≤ 200	28.5	NS
>200	26.4	

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 23: ANOVA between the categorical I.V's "Time Since Diagnosis", "age" and continuous primary Independent Variables for people prescribed Protease-inhibitor medication:

Dependent Variable	R-square	F-value	p-value
Time Since Diagnosis			
Seeking social support	0.00	0.03	NS
Distancing	0.00	0.1	NS
Focusing on positive	0.01	0.5	NS
Behavioral escape avoidance	0.05	2.0	NS
Cognitive escape avoidance	0.1	3.7	0.02*
Age			
Seeking social support	0.01	0.68	NS
Distancing	0.06	2.36	NS
Focusing on positive	0.04	1.72	NS
Behavioral escape avoidance	0.02	0.79	NS
Cognitive escape avoidance	0.00	0.09	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 24: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication With 100% cut off and 'Seeking Social Support'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
ssshigh	0.5	0.1-1.7	-0.5	NS
sssmed	0.7	0.2-2.0	-0.3	NS
highage	0.5	0.2-1.6	-0.5	NS
medage	0.7	0.2-2.0	-0.2	NS
Health status	0.7	0.2-2.1	-0.3	NS
Ethnicity	0.9	0.3-2.7	-0.004	NS
Education	1.0	0.4-2.6	-0.09	NS
Employment	0.6	0.2-1.6	-0.5	NS
Insurance	0.6	0.1-2.0	-0.4	NS
Income	1.0	0.4-2.4	0.02	NS
Bodily pain	1.9	0.7-5.0	0.6	NS
Longtime	1.3	0.4-4.1	0.2	NS
Medtime	1.6	0.4-6.4	0.5	NS
CD4 count	1.3	0.5-3.3	0.3	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 25: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication With 100% cut off and 'Distancing'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
dishigh	0.9	0.3-2.4	-0.09	NS
dismed	0.7	0.2-1.9	-0.3	NS
Health status	0.8	0.2-2.4	-0.2	NS
Education	1.0	0.4-3.5	0.08	NS
Living arrangement	0.9	0.3-2.3	-0.08	NS
Insurance	0.5	0.1-1.8	-0.5	NS
Income	1.0	0.4-2.5	0.09	NS
Bodily pain	1.3	0.5-3.2	0.2	NS
CD4 count	1.0	0.4-2.3	0.08	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 26: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication With 100% cut off and 'Focusing on Positive'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
fophigh	0.9	0.3-2.5	-0.03	NS
fopmed	1.2	0.4-3.5	0.2	NS
Health status	0.8	0.3-2.2	-0.1	NS
Education	1.1	0.5-2.6	0.1	NS
Employment	0.7	0.3-1.7	-0.3	NS
Insurance	0.5	0.1-1.7	-0.5	NS
Income	1.2	0.5-2.7	0.1	NS
Bodily pain	1.1	0.5-2.8	0.1	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 27: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication With 100% cut off and 'Escape Avoidance Coping'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
With 'Behavioral Escape Avoidance'				
beahigh	0.3	0.1-0.9	-1.1	0.04*
beamed	0.1	0.05-0.6	-1.6	0.005*
Education	1.0	0.4-2.6	0.08	NS
Living arrangement	1.0	0.4-2.5	0.02	NS
Insurance	0.4	0.1-1.3	-0.8	NS
Income	1.1	0.5-2.7	0.1	NS
Bodily pain	1.6	0.6-3.8	0.4	NS
CD4 count	0.8	0.3-1.9	-0.1	NS
With 'Cognitive Escape Avoidance'				
ceahigh	0.9	0.3-2.4	-0.05	NS
ceamed	0.7	0.2-1.9	-0.3	NS
Employment	0.7	0.2-1.8	-0.3	NS
Living arrangement	0.8	0.3-1.8	-0.2	NS
Insurance	0.6	0.2-1.8	-0.4	NS
Income	1.0	0.4-2.3	0.03	NS
Bodily pain	1.2	0.5-2.8	0.2	NS
CD4 count	1.0	0.4-2.4	0.08	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 28: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication With 95% cut off and 'Seeking Social Support'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
ssshigh	1.1	0.2-6.0	0.1	NS
sssmed	0.6	0.1-2.9	-0.4	NS
Gender	0.4	0.1-1.7	-0.7	NS
Ethnicity	0.3	0.07-1.3	-1.1	NS
Education	0.2	0.06-0.8	-1.4	0.02*
Employment	0.2	0.03-1.2	-1.5	NS
Living arrangement	0.2	0.06-1.0	-1.2	NS
Income	1.4	0.4-5.0	0.3	NS
CD4 count	1.5	0.4-5.1	0.4	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 29 **Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication With 95% cut off and 'Distancing'.**

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
dishigh	1.3	0.2-7.4	0.3	NS
dismed	0.7	0.1-3.7	-0.2	NS
Gender	0.5	0.1-1.8	-0.6	NS
Ethnicity	0.4	0.09-1.9	-0.8	NS
Education	0.2	0.08-0.9	-1.2	0.02*
Employment	0.2	0.04-1.4	-1.3	NS
Living arrangement	0.3	0.08-1.3	-1.1	NS
Income	1.3	0.4-4.6	0.3	NS
CD4 count	1.2	0.3-4.3	0.2	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 30 **Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication With 95% cut off and 'Focusing on Positive'.**

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
Fophigh	3.7	0.7-20.0	1.3	NS
fopmed	0.4	0.1-1.9	-0.7	NS
Gender	0.4	0.1-1.6	-0.7	NS
Ethnicity	0.4	0.09-1.7	-0.8	NS
Education	0.2	0.07-0.9	-1.3	0.03*
Employment	0.5	0.09-2.7	-0.6	NS
Living arrangement	0.1	0.04-0.7	-1.6	0.02*

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 31 **Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication With 95% cut off and 'Escape Avoidance Coping'.**

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
With 'Behavioral Escape Avoidance'				
beahigh	0.1	0.01-1.8	-1.6	NS
beamed	0.2	0.02-2.2	-1.4	NS
Gender	0.4	0.1-1.5	-0.8	NS
Ethnicity	0.3	0.07-1.4	-1.1	NS
Education	0.2	0.087-1.0	-1.2	NS
Employment	0.3	0.06-1.8	-1.0	NS
Living arrangement	0.4	0.1-1.6	-0.8	NS
CD4 count	1.4	0.4-4.8	0.3	NS
With 'Cognitive Escape Avoidance'				
ceahigh	0.4	0.06-2.6	-0.8	NS
ceamed	0.2	0.03-1.3	-1.4	NS
Gender	0.4	0.1-1.6	-0.7	NS
Ethnicity	0.2	0.06-1.1	-1.2	NS
Education	0.2	0.06-0.7	-1.5	NS
Employment	0.2	0.04-1.4	-1.3	NS
Living arrangement	0.3	0.08-1.1	-1.1	NS
CD4 count	1.7	0.5-6.0	0.5	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 32 Logistic Regression Analysis between Percentage Adherence to Protease-inhibitor Medication With 100% cut off and 'Seeking Social Support'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
ceahigh	0.8	0.2-3.5	-0.1	NS
ceamed	0.9	0.2-4.2	-0.003	NS
Gender	0.2	0.05-0.7	-1.6	0.02*
Education	1.2	0.3-4.9	0.3	NS
Insurance	0.4	0.07-2.3	-0.8	NS
Income	0.8	0.2-2.7	-0.1	NS
Bodily pain	0.7	0.2-2.2	-0.2	NS
CD4 count	1.4	0.4-4.2	0.3	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 33 **Logistic Regression Analysis between Percentage Adherence to Protease-inhibitor Medication With 100% cut off and 'Distancing'.**

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
ceahigh	0.6	0.2-2.3	-0.3	NS
ceamed	0.9	0.2-3.6	-0.05	NS
Gender	0.2	0.07-0.8	-1.4	0.02*
Ethnicity	1.5	0.4-5.1	0.4	NS
Education	1.4	0.4-5.0	0.3	NS
Bodily pain	0.7	0.2-1.9	-0.3	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 34 Logistic Regression Analysis between Percentage Adherence to Protease-inhibitor Medication With 100% cut off and 'Focusing on Positive'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
ceahigh	0.2	0.06-1.2	-1.2	NS
ceamed	0.2	0.06-1.2	-1.2	NS
Gender	0.1	0.04-0.7	-1.7	0.01*
Insurance	0.2	0.05-1.4	-1.3	NS
Income	0.5	0.1-1.9	-0.5	NS
Bodily pain	0.9	0.3-2.7	-0.09	NS
CD4 count	1.5	0.4-4.2	0.3	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table. 35 Logistic Regression Analysis between Percentage Adherence to Protease-inhibitor Medication With 100% cut off and 'Escape Avoidance Coping'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
With 'Behavioral Escape Avoidance'				
ceahigh	0.5	0.1-2.0	-0.6	NS
ceamed	0.3	0.07-1.6	-1.0	NS
Gender	0.1	0.04-0.6	-1.7	0.01*
Education	1.5	0.4-5.9	0.4	NS
Insurance	0.3	0.06-1.9	-1.0	NS
Bodily pain	0.8	0.2-2.4	-0.1	NS
CD4 count	1.3	0.4-3.9	0.3	NS
With 'Cognitive Escape Avoidance'				
ceahigh	0.6	0.1-2.6	-0.4	NS
ceamed	0.4	0.1-1.7	-0.7	NS
Gender	0.2	0.05-0.8	-1.5	0.02*
Education	2.0	0.5-8.2	0.7	NS
Insurance	0.5	0.1-3.0	-0.5	NS
Income	0.8	0.2-2.8	-0.1	NS
Bodily pain	0.8	0.2-2.7	-0.1	NS
CD4 count	1.4	0.4-4.4	0.3	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 36.: Logistic Regression Analysis between Percentage Adherence to Protease-inhibitor Medication With 95% cut off and 'Seeking Social Support'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
ssshigh	0.5	0.07-4.8	-0.5	NS
sssmed	0.3	0.04-3.6	-0.9	NS
Gender	0.1	0.02-0.8	-1.8	0.03*
Education	0.1	0.02-1.0	-1.7	NS
Living arrangement	0.1	0.02-1.3	-1.8	NS
Bodily pain	0.9	0.1-4.2	-0.1	NS
CD4 count	1.2	0.2-6.2	0.1	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 37.: Logistic Regression Analysis between Percentage Adherence to Protease-inhibitor Medication With 95% cut off and 'Focusing on Positive'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
fophigh	0.9	0.1-7.8	-0.01	NS
fopmed	0.4	0.06-3.6	-0.7	NS
Gender	0.1	0.03-0.9	-1.7	0.03*
Education	0.1	0.03-1.1	-1.6	NS
Living arrangement	0.1	0.01-1.2	-1.9	NS
Bodily pain	0.8	0.1-3.8	-0.1	NS
CD4 count	1.2	0.2-6.2	0.2	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 38.: Logistic Regression Analysis between Percentage Adherence to Protease-inhibitor Medication With 95% cut off and 'Distancing'.

Independent Variables	Odds ratio		Parameter estimate	
	Point estimate	95% Wald's C.I.		
dishigh	3.0	0.3-25.3	1.1	NS
dismed	0.7	0.1-4.7	-0.3	NS
Gender	0.1	0.02-0.8	-1.9	0.03*
Education	0.1	0.02-0.9	-1.8	0.04*
Living arrangement	0.1	0.01-0.8	-2.2	0.03*
Bodily pain	0.8	0.1-3.7	-0.1	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 39.: Logistic Regression Analysis between Percentage Adherence to Protease-inhibitor Medication With 95% cut off and 'Escape avoidance coping'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
With 'Behavioral Escape Avoidance'				
beahigh	0.3	0.02-3.6	-1.1	NS
beamed	0.4	0.03-6.4	-0.7	NS
Gender	0.1	0.03-0.9	-1.7	0.04*
Education	0.2	0.03-1.1	-1.5	NS
Living arrangement	0.2	0.03-1.6	-1.4	NS
Bodily pain	1.0	0.2-5.0	0.09	NS
With 'Cognitive Escape Avoidance'				
ceahigh	1.1	0.1-9.5	0.1	NS
ceamed	0.8	0.1-5.7	-0.2	NS
Gender	0.1	0.03-0.7	-1.8	0.02*
Education	0.2	0.03-1.7	-1.3	NS
Living arrangement	0.2	0.03-1.7	-1.4	NS
Bodily pain	0.9	0.2-4.6	-0.02	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 40.: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication using Medication adherence scale and 'Seeking Social Support'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
ssshigh	0.6	0.2-1.8	-0.4	NS
sssmed	0.9	0.3-2.4	-0.1	NS
highage	0.3	0.1-1.1	-0.9	NS
medage	0.9	0.3-2.4	-0.09	NS
Health status	0.6	0.2-1.8	-0.4	NS
Education	1.1	0.4-2.8	0.1	NS
Insurance	0.7	0.2-2.5	-0.2	NS
Income	0.6	0.2-1.4	-0.4	NS
Bodily pain	2.2	0.8-5.6	0.7	NS
Longtime	1.8	0.5-5.9	0.6	NS
Medtime	1.5	0.3-6.1	0.4	NS
CD4count	2.1	0.9-4.9	0.7	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 41.: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication using Medication adherence scale and 'Distancing'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
dishigh	0.8	0.3-2.1	-0.2	NS
dismed	0.5	0.2-1.5	-0.5	NS
Gender	1.0	0.4-2.6	0.04	NS
Health status	0.6	0.2-2.1	-0.3	NS
Education	1.2	0.5-3.0	0.2	NS
Insurance	0.7	0.2-2.4	-0.2	NS
Income	0.7	0.3-1.8	-0.2	NS
Bodily pain	1.7	0.7-4.2	0.5	NS
CD4count	1.8	0.8-4.00	0.6	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 42.: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication using Medication adherence scale and 'Focusing on Positive'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
fophigh	0.7	0.2-2.1	-0.2	NS
fopmed	0.6	0.2-1.9	-0.4	NS
Health status	0.4	0.1-1.4	-0.7	NS
Living arrangement	0.5	0.2-1.3	-0.6	NS
Insurance	0.5	0.1-1.8	-0.5	NS
Income	0.7	0.3-1.6	-0.3	NS
Bodily pain	2.2	0.9-5.6	0.8	NS
CD4count	1.4	0.6-3.2	0.4	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 43.: Logistic Regression Analysis between Percentage Adherence to Anti-retroviral Medication using Medication adherence scale and 'Escape Avoidance Coping'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
With 'Behavioral Escape Avoidance'				
beahigh	0.2	0.08-0.6	-1.4	0.005*
beamed	0.1	0.06-0.5	-1.6	0.002*
Income	0.8	0.3-1.9	-0.1	NS
Bodily pain	1.8	0.7-4.2	0.5	NS
Longtime	0.9	0.3-2.6	-0.06	NS
medtime	1.1	0.3-4.2	0.1	NS
With 'Cognitive Escape Avoidance'				
ceahigh	0.7	0.2-1.9	-0.2	NS
ceamed	0.5	0.2-1.3	-0.6	NS
Living arrangement	0.5	0.2-1.3	-0.5	NS
Insurance	0.6	0.2-1.9	-0.4	NS
Income	0.7	0.3-1.7	-0.2	NS
Bodily pain	1.6	0.7-3.6	0.4	NS
CD4 count	1.5	0.7-3.4	0.4	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 44.: Logistic Regression Analysis between Percentage Adherence to Protease inhibitor Medication using Medication adherence scale and 'Seeking Social Support'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
ssshigh	0.7	0.2-2.6	-0.2	NS
sssmed	0.3	0.09-1.5	-0.9	NS
Health status	0.4	0.1-1.8	-0.7	NS
Bodily pain	0.9	0.3-2.9	-0.04	NS
CD4count	3.1	1.1-8.5	1.1	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 45.: Logistic Regression Analysis between Percentage Adherence to Protease inhibitor Medication using Medication adherence scale and 'Distancing'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
dishigh	0.8	0.2-2.7	-0.2	NS
dismed	0.4	0.1-1.8	-0.8	NS
Ethnicity	1.7	0.4-6.3	0.5	NS
Education	0.5	0.1-2.2	-0.5	NS
Income	0.3	0.1-1.0	-1.0	NS
Bodily pain	1.1	0.3-3.3	0.1	NS
CD4count	3.5	1.1-10.5	1.2	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 46.: Logistic Regression Analysis between Percentage Adherence to Protease inhibitor Medication using Medication adherence scale and 'Focusing on Positive'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
fophigh	0.7	0.1-2.7	-0.3	NS
fopmed	0.4	0.09-1.8	-0.8	NS
Insurance	0.7	0.1-3.8	-0.2	NS
Income	0.2	0.09-0.9	-1.2	0.03*
Bodily pain	1.1	0.3-3.4	0.1	NS
CD4count	3.0	1.0-8.6	1.1	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

Table 47.: Logistic Regression Analysis between Percentage Adherence to Protease inhibitor Medication using Medication adherence scale and 'Escape Avoidance Coping'.

Independent Variables	Odds ratio		Parameter estimate	Wald's p-value
	Point estimate	95% Wald's C.I.		
With 'Behavioral Escape Avoidance'				
beahigh	0.6	0.1-2.3	-0.4	NS
beamed	0.7	0.1-3.0	-0.2	NS
Health status	0.3	0.08-1.8	-0.9	NS
Education	0.7	0.1-2.9	-0.3	NS
Employment	1.6	0.4-5.8	0.4	NS
Income	0.3	0.1-1.1	-1.0	NS
Bodily pain	1.1	0.3-3.6	0.1	NS
CD4count	2.8	0.9-8.5	1.0	NS
With 'Cognitive Escape Avoidance'				
ceahigh	0.6	0.1-2.4	-0.4	NS
ceamed	0.8	0.2-3.0	-0.2	NS
Insurance	0.9	0.1-4.4	-0.09	NS
Income	0.4	0.1-1.2	-0.8	NS
Bodily pain	1.0	0.3-3.1	0.07	NS
CD4count	3.1	1.0-9.1	1.1	NS

Note: If $\alpha \leq 0.05$ then p- value is significant, NS= Non Significant

APPENDIX II- SAS codes for adherence measures and coping.

```
/*SAS PROGRAM TO DICHOTOMIZE PATIENTS ON ANTIRETROVIRAL DRUGS AS
BEING ADHERENT OR NON ADHERENT BASED ON % CUT OFF DEFINITIONS,
BOTH 100% AND 95 % CUT OFF'S.*/
options nocenter linesize=72;
libname saurabh 'c:\Windows\Desktop\saurabh';
data saurabh3;
set saurabh.hivsurv;
if qii1x= 'bactrim' then qii1x2a=0;
if qii1x= 'acyclovir' then qii1x2a=0;
if qii1x= 'pentamidine' then qii1x2a=0;
if qii1x= 'zoloft' then qii1x2a=0;
if qii1x= 'crixivan' then qii1x2a=0;
if qii1x= 'ritonavir' then qii1x2a=0;
if qii1x= 'saquinavir' then qii1x2a=0;

if qii1x2a=0 then qii1x13=.;
if qii1x13=99 then qii1x2a=.;
if qii1x2a=1 then qii1x2a=8;
if qii1x2a=2 then qii1x2a=12;
if qii1x2a=3 then qii1x2a=15;
if qii1x2a=4 then qii1x2a=30;
if qii1x2a=5 then qii1x2a=60;
if qii1x2a=6 then qii1x2a=90;
if qii1x2a=7 then qii1x2a=160;
if qii1x2a=8 then qii1x2a=200;

med1= qii1x13/qii1x2a;
comp1=1-med1;
percomp1=comp1*100;

if qii2x= 'bactrim' then qii2x2a=0;
if qii2x= 'dapsone' then qii2x2a=0;
if qii2x= 'leucovorin' then qii2x2a=0;
if qii2x= 'ms contin' then qii2x2a=0;
if qii2x= 'theodur' then qii2x2a=0;
if qii2x= 'crixivan' then qii2x2a=0;
if qii2x= 'saquinavir' then qii2x2a=0;
if qii2x= 'indinavir' then qii2x2a=0;
if qii2x= 'ritonavir' then qii2x2a=0;

if qii2x2a=0 then qii2x13=.;
if qii2x13=99 then qii2x2a=.;

if qii2x2a=1 then qii2x2a=8;
if qii2x2a=2 then qii2x2a=12;
if qii2x2a=3 then qii2x2a=15;
if qii2x2a=4 then qii2x2a=30;
if qii2x2a=5 then qii2x2a=60;
if qii2x2a=6 then qii2x2a=90;
if qii2x2a=7 then qii2x2a=160;
if qii2x2a=8 then qii2x2a=200;

med2= qii2x13/qii2x2a;
comp2=1-med2;
```

```
percomp2=comp2*100;

if qii3x= 'acyclovir' then qii3x2a=0;
if qii3x= 'bactrim' then qii3x2a=0;
if qii3x= 'biaxin' then qii3x2a=0;
if qii3x= 'clotrimazole' then qii3x2a=0;
if qii3x= 'compazine' then qii3x2a=0;
if qii3x= 'dapsone' then qii3x2a=0;
if qii3x= 'diltiazem' then qii3x2a=0;
if qii3x= 'fluconazole' then qii3x2a=0;
if qii3x= 'mellaril' then qii3x2a=0;
if qii3x= 'minocycline' then qii3x2a=0;
if qii3x= 'motrin' then qii3x2a=0;
if qii3x= 'oxandrin' then qii3x2a=0;
if qii3x= 'vasotec' then qii3x2a=0;
if qii3x= 'zantac' then qii3x2a=0;
if qii3x= 'zovirax' then qii3x2a=0;
if qii3x= 'crixivan' then qii3x2a=0;
if qii3x= 'indinavir' then qii3x2a=0;
if qii3x= 'invirase' then qii3x2a=0;

if qii3x= 'norvir' then qii3x2a=0;
if qii3x= 'ritonavir' then qii3x2a=0;
if qii3x= 'saquinavir' then qii3x2a=0;

if qii3x2a=0 then qii3x13=.;
if qii3x13=99 then qii3x2a=.;

if qii3x2a=1 then qii3x2a=8;
if qii3x2a=2 then qii3x2a=12;
if qii3x2a=3 then qii3x2a=15;
if qii3x2a=4 then qii3x2a=30;
if qii3x2a=5 then qii3x2a=60;
if qii3x2a=6 then qii3x2a=90;
if qii3x2a=7 then qii3x2a=160;
if qii3x2a=8 then qii3x2a=200;

med3= qii3x13/qii3x2a;
comp3=1-med3;
percomp3=comp3*100;

if percomp1=. then percomp1=0;
if percomp2=. then percomp2=0;
if percomp3=. then percomp3=0;

totcomp= percomp1+percomp2+percomp3;

if percomp1=0 and percomp2 NE 0 and percomp3 NE 0 then totcomp= totcomp/2;
if percomp1 NE 0 and percomp2= 0 and percomp3 NE 0 then totcomp= totcomp/2;
if percomp1 NE 0 and percomp2 NE 0 and percomp3= 0 then totcomp=totcomp/2;

if percomp1 NE 0 and percomp2 NE 0 and percomp3 NE 0 then totcomp=totcomp/3;
if percomp1 NE 0 and percomp2=0 and percomp3= 0 then totcomp= totcomp;
if percomp1=0 and percomp2 NE 0 and percomp3= 0 then totcomp= totcomp;
if percomp1=0 and percomp2=0 and percomp3 NE 0 then totcomp= totcomp;
if totcomp=0 then delete;
```

```
if totcomp =100 then  totcomp=1;
else if totcomp LT 100 then totcomp=0;

if qvi1=0 then qvi1=99;
if qvi2=0 then qvi2=99;
if qvi3=0 then qvi3=99;
if qvi4=0 then qvi4=99;
if qvi5=0 then qvi5=99;
if qvi6=0 then qvi6=99;
if qvi7=0 then qvi7=99;
if qvi8=0 then qvi8=99;
if qvi9=0 then qvi9=99;
if qvi10=0 then qvi10=99;
if qvi11=0 then qvi11=99;
if qvi12=0 then qvi12=99;
if qvi13=0 then qvi13=99;
if qvi14=0 then qvi14=99;
if qvi15=0 then qvi15=99;
if qvi16=0 then qvi16=99;
if qvi17=0 then qvi17=99;
if qvi18=0 then qvi18=99;
if qvi19=0 then qvi19=99;
if qvi20=0 then qvi20=99;
if qvi21=0 then qvi21=99;
if qvi22=0 then qvi22=99;
if qvi23=0 then qvi23=99;
if qvi24=0 then qvi24=99;
if qvi25=0 then qvi25=99;
if qvi26=0 then qvi26=99;
if qvi27=0 then qvi27=99;
if qvi28=0 then qvi28=99;
if qvi29=0 then qvi29=99;
if qvi30=0 then qvi30=99;
if qvi31=0 then qvi31=99;
if qvi32=0 then qvi32=99;
if qvi33=0 then qvi33=99;
if qvi34=0 then qvi34=99;
if qvi35=0 then qvi35=99;
if qvi36=0 then qvi36=99;
if qvi37=0 then qvi37=99;
if qvi38=0 then qvi38=99;
if qvi39=0 then qvi39=99;
if qvi40=0 then qvi40=99;
if qvi41=0 then qvi41=99;
if qvi42=0 then qvi42=99;
if qvi43=0 then qvi43=99;
if qvi44=0 then qvi44=99;
if qvi45=0 then qvi45=99;
if qvi46=0 then qvi46=99;
if qvi47=0 then qvi47=99;
if qvi48=0 then qvi48=99;
if qvi49=0 then qvi49=99;
if qvi50=0 then qvi50=99;

sss1=qvi4+qvi34+qvi22+qvi20+qvi16+qvi49+qvi13+qvi31+qvi6+qvi19+qvi1;
```

```
dis1=qvi40+qvi30+qvi33+qvi9+qvi10+qvi11+qvi50+qvi37+qvi15+qvi32+qvi48+qvi52;
fop1=qvi26+qvi27+qvi17+qvi41+qvi21+qvi28+qvi14+qvi47;
bea1=qvi29+qvi23+qvi24+qvi35+qvi39+qvi18+qvi5+qvi3+qvi25;
cea1=qvi7+qvi44+qvi45+qvi42+qvi43+qvi46+qvi8+qvi51+qvi12;

if sss1 GT 149 then sss1=0;
if dis1 GT 154 then dis1=0;
if fop1 GT 134 then fop1=0;
if bea1 GT 139 then bea1=0;
if cea1 GT 139 then cea1=0;

run;

data saurabh7;
set saurabh3;
if qvi1=99 then qvi1=0;
if qvi2=99 then qvi2=0;
if qvi3=99 then qvi3=0;
if qvi4=99 then qvi4=0;
if qvi5=99 then qvi5=0;
if qvi6=99 then qvi6=0;
if qvi7=99 then qvi7=0;
if qvi8=99 then qvi8=0;
if qvi9=99 then qvi9=0;
if qvi10=99 then qvi10=0;
if qvi11=99 then qvi11=0;
if qvi12=99 then qvi12=0;
if qvi13=99 then qvi13=0;
if qvi14=99 then qvi14=0;
if qvi15=99 then qvi15=0;
if qvi16=99 then qvi16=0;
if qvi17=99 then qvi17=0;
if qvi18=99 then qvi18=0;
if qvi19=99 then qvi19=0;
if qvi20=99 then qvi20=0;
if qvi21=99 then qvi21=0;
if qvi22=99 then qvi22=0;
if qvi23=99 then qvi23=0;
if qvi24=99 then qvi24=0;
if qvi25=99 then qvi25=0;
if qvi26=99 then qvi26=0;
if qvi27=99 then qvi27=0;
if qvi28=99 then qvi28=0;
if qvi29=99 then qvi29=0;
if qvi30=99 then qvi30=0;
if qvi31=99 then qvi31=0;
if qvi32=99 then qvi32=0;
if qvi33=99 then qvi33=0;
if qvi34=99 then qvi34=0;
if qvi35=99 then qvi35=0;
if qvi36=99 then qvi36=0;
if qvi37=99 then qvi37=0;
if qvi38=99 then qvi38=0;
if qvi39=99 then qvi39=0;
if qvi40=99 then qvi40=0;
if qvi41=99 then qvi41=0;
```

```
if qvi42=99 then qvi42=0;
if qvi43=99 then qvi43=0;
if qvi44=99 then qvi44=0;
if qvi45=99 then qvi45=0;
if qvi46=99 then qvi46=0;
if qvi47=99 then qvi47=0;
if qvi48=99 then qvi48=0;
if qvi49=99 then qvi49=0;
if qvi50=99 then qvi50=0;
sss=qvi4+qvi34+qvi22+qvi20+qvi16+qvi49+qvi13+qvi31+qvi6+qvi19+qvi1;
dis=qvi40+qvi30+qvi33+qvi9+qvi10+qvi11+qvi50+qvi37+qvi15+qvi32+qvi48+qvi52;
fop=qvi26+qvi27+qvi17+qvi41+qvi21+qvi28+qvi14+qvi47;
bea=qvi29+qvi23+qvi24+qvi35+qvi39+qvi18+qvi5+qvi3+qvi25;
cea=qvi7+qvi44+qvi45+qvi42+qvi43+qvi46+qvi8+qvi51+qvi12;

if sss1=0 then sss=.;
if dis1=0 then dis=.;
if fop1=0 then fop=.;
if bea1=0 then bea=.;
if cea1=0 then cea=.;

label totcomp= 'adherence to AV drugs';
label qi1= 'age';
label qi2='gender';
label qi3= 'health status';
label qi4='ethnicity';
label qi5='education';
label qi6='employment';
label qi7='living arrangement';
label qi18a ='insurance';
label qi19='income';
label qi24='body pain';
label qi29='how long ago diagnosed';
label qi31='t cell count';

/* new variable 'gender' created*/
gender=.;
if qi2= 'm' then gender=1;
else if qi2= 'f' then gender=2;

/* variable age categorized into three categories*/
if qi1 lt 35 then qi1=3;
else if qi1 ge 35 and qi1 le 41 then qi1=2;
else if qi1 ge 42 then qi1=1;

/* variable ethnicity dichotomized to whites or non whites*/
if qi4=0 then qi4=.;
else if qi4=1 then qi4=1;
else if qi4=2 or qi4=3 or qi4=4 or qi4=5 or qi4=6 then qi4=0;

/* variable education dichotomized */
if qi5=0 then qi5=.;
else if qi5 lt 12 then qi5=1;
else if qi5 ge 12 then qi5=0;

/* variable employment dichotomized */
```

```
if qi6=0 then qi6=.;
else if qi6=1 or qi6=2 then qi6=0;
else if qi6=3 then qi6=1;

/* variable living arrangement dichotomized */
if qi7=0 then qi7=.;
else if qi7=1 then qi7=1;
else if qi7=2 then qi7=0;

/* variable health status dichotomized */
if qi3=0 then qi3=.;
else if qi3=1 or qi3=2 or qi3=3 then qi3=0;
else if qi3=4 or qi3=5 then qi3=1;

/* variable insurance dichotomized */
if qi18a=0 then qi18a=.;
if qi18a=2 then qi18a=1;
else if qi18a=1 then qi18a=0;

/* variable income dichotomized */
if qi19=0 then qi19=.;
else if qi19=1 then qi19=1;
else if qi19=2 or qi19=3 or qi19=4 or qi19=5 then qi19=0;

/* variable body pain dichotomized */
if qi24=0 then qi24=.;
else if qi24=1 or qi24=2 or qi24=3 then qi24=0;
else if qi24=4 or qi24=5 or qi24=6 then qi24=1;

/* variable how long ago diagnosed categorized*/
if qi29=0 then qi29=.;
else if qi29= 1 or qi29=2 or qi29=3 or qi29=4 then qi29=3;
else if qi29=5 then qi29=2;
else if qi29=6 then qi29=1;

/* variable T cell count dichotomized*/
if qi31=0 then qi31=.;
else if qi31= 1 or qi31=2 then qi31=0;
else if qi31= 3 or qi31=4 then qi31=1;

sssmed=.;
if sss lt 30 or sss ge 37 then sssmed= 0;
else if sss ge 30 and sss lt 37 then sssmed=1;
if sss1=0 then sssmed=.;

ssshigh=.;
if sss ge 37 then ssshigh=1;
else if sss lt 37 then ssshigh=0;
if sss1=0 then ssshigh=.;

fophigh=.;
if fop GE 29 then fophigh=1;
else if fop LT 29 then fophigh=0;
if fop1=0 then fophigh=.;

fopmed=.;
```

```
if fop GE 23 and fop LT 29 then fopmed=1;
else if fop GE 29 or fop LT 23 then fopmed=0;
if fop1=0 then fopmed=.;

dishigh=.;
if dis GE 39 then dishigh=1;
else if dis LT 39 then dishigh=0;
if dis1=0 then dishigh=.;

dismed=.;
if dis GE 33 and dis LT 39 then dismed=1;
else if dis GE 39 or dis LT 33 then dismed=0;
if dis1=0 then dismed=.;

beahigh=.;
if bea GE 24 then beahigh=1;
else if bea LT 24 then beahigh=0;
if bea1=0 then beahigh=.;

beamed=.;
if bea GE 19 and bea LT 24 then beamed=1;
else if bea GE 24 or bea LT 19 then beamed=0;
if bea1=0 then beamed=.;

ceahigh=.;
if cea GE 31 then ceahigh=1;
else if cea LT 31 then ceahigh=0;
if cea1=0 then ceahigh=.;

ceamed=.;
if cea GE 25 and cea LT 31 then ceamed=1;
else if cea GE 31 or cea LT 25 then ceamed=0;
if cea1=0 then ceamed=.;

proc format;
value adherence 1= 'adherent'
0= 'nonadherent';

proc univariate normal plot;
var  qi1  qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31;

proc freq;
tables totcomp  qi1 qi2 qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31 ssshigh sssmed;
format totcomp adherence.;

proc logistic descending;
model totcomp= ssshigh sssmed qi1  gender qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31/ ctable pprob= (0 to 1 by .1) lackfit risklimits; run;
```

```
/*SAS PROGRAM TO DICHOTOMIZE PATIENTS ON ANTIRETROVIRAL DRUGS AS
BEING ADHERENT OR NON ADHERENT
BASED ON MEDICATION ADHERENCE SCALE.*/

options nocenter linesize=72;
libname saurabh 'c:\Documents and Settings\Erabus\DESKTOP\saurabh';
data saurabh3;
set saurabh.hivsurv;

if  qii1x4=0 then qii1x4=99;
if qii1x5=0 then qii1x5=99;
if qii1x6=0 then qii1x6=99;
if qii1x7=0 then qii1x7=99;
if qii1x8=0 then qii1x8=99;
if qii1x9=0 then qii1x9=99;
if qii2x4=0 then qii2x4=99;
if qii2x5=0 then qii2x5=99;
if qii2x6=0 then qii2x6=99;
if qii2x7=0 then qii2x7=99;
if qii2x8=0 then qii2x8=99;
if qii2x9=0 then qii2x9=99;
if qii3x4=0 then qii3x4=99;
if qii3x5=0 then qii3x5=99;
if qii3x6=0 then qii3x6=99;
if qii3x7=0 then qii3x7=99;
if qii3x8=0 then qii3x8=99;
if qii3x9=0 then qii3x9=99;

mas1x= qii1x4+qii1x5+qii1x6+qii1x7+qii1x8+qii1x9;
if mas1 GE 109 then mas1=0;
mas2x= qii2x4+qii2x5+qii2x6+qii2x7+qii2x8+qii2x9;
if mas2x GE 109 then mas2=0;
mas3x= qii3x4+qii3x5+qii3x6+qii3x7+qii3x8+qii3x9;
if mas3x GE 109 then mas3=0;

data saurabh6;
set saurabh3;

if  qii1x4=99 then qii1x4=0;
if qii1x5=99 then qii1x5=0;
if qii1x6=99 then qii1x6=0;
if qii1x7=99 then qii1x7=0;
if qii1x8=99 then qii1x8=0;
if qii1x9=99 then qii1x9=0;

mas1=qii1x4+qii1x5+qii1x6+qii1x7+qii1x8+qii1x9;

if mas1x=0 then mas1=0;
if qii2x4=99 then qii2x4=0;
if qii2x5=99 then qii2x5=0;
if qii2x6=99 then qii2x6=0;
if qii2x7=99 then qii2x7=0;
if qii2x8=99 then qii2x8=0;
if qii2x9=99 then qii2x9=0;

mas2=qii2x4+qii2x5+qii2x6+qii2x7+qii2x8+qii2x9;
```

```
if mas2x=0 then mas2=0;
if qii3x4=99 then qii3x4=0;
if qii3x5=99 then qii3x5=0;
if qii3x6=99 then qii3x6=0;
if qii3x7=99 then qii3x7=0;
if qii3x8=99 then qii3x8=0;
if qii3x9=99 then qii3x9=0;

mas3=qii3x4+qii3x5+qii3x6+qii3x7+qii3x8+qii3x9;

if mas3x=0 then mas3=0;
if qii1x=  'bactrim' then mas1=0;
if qii1x=  'acyclovir' then mas1=0;
if qii1x=  'pentamidine' then mas1=0;
if qii1x=  'zoloft' then mas1=0;
if qii1x=  'crixivan' then mas1=0;
if qii1x=  'ritonavir' then mas1=0;
if qii1x=  'saquinavir' then mas1=0;
if qii2x= 'bactrim' then mas2=0;
if qii2x= 'dapsone' then mas2=0;
if qii2x= 'leucovorin' then mas2=0;
if qii2x= 'ms contin' then mas2=0;
if qii2x= 'theodur' then mas2=0;
if qii2x= 'crixivan' then mas2=0;
if qii2x= 'saquinavir' then mas2=0;
if qii2x= 'indinavir' then mas2=0;
if qii2x= 'ritonavir' then mas2=0;
if qii3x= 'acyclovir' then mas3=0;
if qii3x= 'bactrim' then mas3=0;
if qii3x= 'biaxin' then mas3=0;
if qii3x= 'clotrimazole' then mas3=0;
if qii3x= 'compazine' then mas3=0;
if qii3x= 'dapsone' then mas3=0;
if qii3x= 'diltiazem' then mas3=0;
if qii3x= 'fluconazole' then mas3=0;
if qii3x= 'mellaril' then mas3=0;
if qii3x= 'minocycline' then mas3=0;
if qii3x= 'motrin' then mas3=0;
if qii3x= 'oxandrin' then mas3=0;
if qii3x= 'vasotec' then mas3=0;
if qii3x= 'zantac' then mas3=0;
if qii3x= 'zovirax' then mas3=0;
if qii3x= 'crixivan' then mas3=0;
if qii3x= 'indinavir' then mas3=0;
if qii3x= 'invirase' then mas3=0;
if qii3x= 'norvir' then mas3=0;
if qii3x= 'ritonavir' then mas3=0;
if qii3x= 'saquinavir' then mas3=0;

totmas=mas1+mas2+mas3;

if mas1 NE 0 and mas2 NE 0 and mas3 NE 0 then totmas= totmas/3;
if mas1 NE 0 and mas2= 0 and mas3 NE 0 then totmas= totmas/2;
if mas1=0 and mas2 NE 0 and mas3 NE 0 then totmas= totmas/2;
if mas1 NE 0 and mas2 NE 0 and mas3=0 then totmas= totmas/2;
```

```
if mas1 NE 0 and mas2=0 and mas3=0 then totmas=totmas;
if mas1=0 and mas2 NE 0 and mas3=0 then totmas=totmas;
if mas1=0 and mas2=0 and mas3 NE 0 then totmas=totmas;
if totmas LT 6 then delete;
totmas1=12-totmas;

if totmas1 =6 then totmas1=1;
else if totmas1 LT 6 then totmas1=0;

if qvi1=0 then qvi1=99;
if qvi2=0 then qvi2=99;
if qvi3=0 then qvi3=99;
if qvi4=0 then qvi4=99;
if qvi5=0 then qvi5=99;
if qvi6=0 then qvi6=99;
if qvi7=0 then qvi7=99;
if qvi8=0 then qvi8=99;
if qvi9=0 then qvi9=99;
if qvi10=0 then qvi10=99;
if qvi11=0 then qvi11=99;
if qvi12=0 then qvi12=99;
if qvi13=0 then qvi13=99;
if qvi14=0 then qvi14=99;
if qvi15=0 then qvi15=99;
if qvi16=0 then qvi16=99;
if qvi17=0 then qvi17=99;
if qvi18=0 then qvi18=99;
if qvi19=0 then qvi19=99;
if qvi20=0 then qvi20=99;
if qvi21=0 then qvi21=99;
if qvi22=0 then qvi22=99;
if qvi23=0 then qvi23=99;
if qvi24=0 then qvi24=99;
if qvi25=0 then qvi25=99;
if qvi26=0 then qvi26=99;
if qvi27=0 then qvi27=99;
if qvi28=0 then qvi28=99;
if qvi29=0 then qvi29=99;
if qvi30=0 then qvi30=99;
if qvi31=0 then qvi31=99;
if qvi32=0 then qvi32=99;
if qvi33=0 then qvi33=99;
if qvi34=0 then qvi34=99;
if qvi35=0 then qvi35=99;
if qvi36=0 then qvi36=99;
if qvi37=0 then qvi37=99;
if qvi38=0 then qvi38=99;
if qvi39=0 then qvi39=99;
if qvi40=0 then qvi40=99;
if qvi41=0 then qvi41=99;
if qvi42=0 then qvi42=99;
if qvi43=0 then qvi43=99;
if qvi44=0 then qvi44=99;
if qvi45=0 then qvi45=99;
if qvi46=0 then qvi46=99;
if qvi47=0 then qvi47=99;
```

```
if qvi48=0 then qvi48=99;
if qvi49=0 then qvi49=99;
if qvi50=0 then qvi50=99;


sss1=qvi4+qvi34+qvi22+qvi20+qvi16+qvi49+qvi13+qvi31+qvi6+qvi19+qvi1;
dis1=qvi40+qvi30+qvi33+qvi9+qvi10+qvi11+qvi50+qvi37+qvi15+qvi32+qvi48+qvi52;
fop1=qvi26+qvi27+qvi17+qvi41+qvi21+qvi28+qvi14+qvi47;
bea1=qvi29+qvi23+qvi24+qvi35+qvi39+qvi18+qvi5+qvi3+qvi25;
cea1=qvi7+qvi44+qvi45+qvi42+qvi43+qvi46+qvi8+qvi51+qvi12;

if sss1 GT 149 then sss1=0;
if dis1 GT 154 then dis1=0;
if fop1 GT 134 then fop1=0;
if bea1 GT 139 then bea1=0;
if cea1 GT 139 then cea1=0;

run;
data saurabh7;
set saurabh6;

if qvi1=99 then qvi1=0;
if qvi2=99 then qvi2=0;
if qvi3=99 then qvi3=0;
if qvi4=99 then qvi4=0;
if qvi5=99 then qvi5=0;
if qvi6=99 then qvi6=0;
if qvi7=99 then qvi7=0;
if qvi8=99 then qvi8=0;
if qvi9=99 then qvi9=0;
if qvi10=99 then qvi10=0;
if qvi11=99 then qvi11=0;
if qvi12=99 then qvi12=0;
if qvi13=99 then qvi13=0;
if qvi14=99 then qvi14=0;
if qvi15=99 then qvi15=0;
if qvi16=99 then qvi16=0;
if qvi17=99 then qvi17=0;
if qvi18=99 then qvi18=0;
if qvi19=99 then qvi19=0;
if qvi20=99 then qvi20=0;
if qvi21=99 then qvi21=0;
if qvi22=99 then qvi22=0;
if qvi23=99 then qvi23=0;
if qvi24=99 then qvi24=0;
if qvi25=99 then qvi25=0;
if qvi26=99 then qvi26=0;
if qvi27=99 then qvi27=0;
if qvi28=99 then qvi28=0;
if qvi29=99 then qvi29=0;
if qvi30=99 then qvi30=0;
if qvi31=99 then qvi31=0;
if qvi32=99 then qvi32=0;
if qvi33=99 then qvi33=0;
if qvi34=99 then qvi34=0;
if qvi35=99 then qvi35=0;
```

```
if qvi36=99 then qvi36=0;
if qvi37=99 then qvi37=0;
if qvi38=99 then qvi38=0;
if qvi39=99 then qvi39=0;
if qvi40=99 then qvi40=0;
if qvi41=99 then qvi41=0;
if qvi42=99 then qvi42=0;
if qvi43=99 then qvi43=0;
if qvi44=99 then qvi44=0;
if qvi45=99 then qvi45=0;
if qvi46=99 then qvi46=0;
if qvi47=99 then qvi47=0;
if qvi48=99 then qvi48=0;
if qvi49=99 then qvi49=0;
if qvi50=99 then qvi50=0;
sss=qvi4+qvi34+qvi22+qvi20+qvi16+qvi49+qvi13+qvi31+qvi6+qvi19+qvi1;
dis=qvi40+qvi30+qvi33+qvi9+qvi10+qvi11+qvi50+qvi37+qvi15+qvi32+qvi48+qvi52;
fop=qvi26+qvi27+qvi17+qvi41+qvi21+qvi28+qvi14+qvi47;
bea=qvi29+qvi23+qvi24+qvi35+qvi39+qvi18+qvi5+qvi3+qvi25;
cea=qvi7+qvi44+qvi45+qvi42+qvi43+qvi46+qvi8+qvi51+qvi12;

if sss1=0 then sss=.;
if dis1=0 then dis=.;
if fop1=0 then fop=.;
if bea1=0 then bea=.;
if cea1=0 then cea=.;

label totmas1= 'adherence to AV drugs';
label qi1= 'age';
label qi2='gender';
label qi3= 'health status';
label qi4='ethnicity';
label qi5='education';
label qi6='employment';
label qi7='living arrangement';
label qi18a ='insurance';
label qi19='income';
label qi24='body pain';
label qi29='how long ago diagnosed';
label qi31='t cell count';

/* new variable 'gender' created*/
gender=.;
if qi2= 'm' then gender=1;
else if qi2= 'f' then gender=2;

/* variable age categorized into three categories*/
if qi1 lt 35 then qi1=3;
else if qi1 ge 35 and qi1 le 41 then qi1=2;
else if qi1 ge 42 then qi1=1;

/* variable ethnicity dichotomized to whites or non whites*/
if qi4=0 then qi4=.;
else if qi4=1 then qi4=1;
else if qi4=2 or qi4=3 or qi4=4 or qi4=5 or qi4=6 then qi4=0;
```

```
/* variable education dichotomized */
if qi5=0 then qi5=.;
else if qi5 lt 12 then qi5=1;
else if qi5 ge 12 then qi5=0;

/* variable employment dichotomized */
if qi6=0 then qi6=.;
else if qi6=1 or qi6=2 then qi6=0;
else if qi6=3 then qi6=1;

/* variable living arrangement dichotomized */
if qi7=0 then qi7=.;
else if qi7=1 then qi7=1;
else if qi7=2 then qi7=0;

/* variable health status dichotomized */
if qi3=0 then qi3=.;
else if qi3=1 or qi3=2 or qi3=3 then qi3=0;
else if qi3=4 or qi3=5 then qi3=1;

/* variable insurance dichotomized */
if qi18a=0 then qi18a=.;
if qi18a=2 then qi18a=1;
else if qi18a=1 then qi18a=0;

/* variable income dichotomized */
if qi19=0 then qi19=.;
else if qi19=1 then qi19=1;
else if qi19=2 or qi19=3 or qi19=4 or qi19=5 then qi19=0;

/* variable body pain dichotomized */
if qi24=0 then qi24=.;
else if qi24=1 or qi24=2 or qi24=3 then qi24=0;
else if qi24=4 or qi24=5 or qi24=6 then qi24=1;

/* variable how long ago diagnosed categorized*/
if qi29=0 then qi29=.;
else if qi29= 1 or qi29=2 or qi29=3 or qi29=4 then qi29=3;
else if qi29=5 then qi29=2;
else if qi29=6 then qi29=1;

/* variable T cell count dichotomized*/
if qi31=0 then qi31=.;
else if qi31= 1 or qi31=2 then qi31=0;
else if qi31= 3 or qi31=4 then qi31=1;

sssmed=.;
if sss lt 30 or sss ge 37 then sssmed= 0;
else if sss ge 30 and sss lt 37 then sssmed=1;
if sss1=0 then sssmed=.;

ssshigh=.;
if sss ge 37 then ssshigh=1;
else if sss lt 37 then ssshigh=0;
if sss1=0 then ssshigh=.;
```

```
fophigh=.;
if fop GE 29 then fophigh=1;
else if fop LT 29 then fophigh=0;
if fop1=0 then fophigh=.;

fopmed=.;
if fop GE 22 and fop LT 29 then fopmed=1;
else if fop GE 29 or fop LT 22 then fopmed=0;
if fop1=0 then fopmed=.;

dishigh=.;
if dis GE 39 then dishigh=1;
else if dis LT 39 then dishigh=0;
if dis1=0 then dishigh=.;

dismed=.;
if dis GE 33 and dis LT 39 then dismed=1;
else if dis GE 39 or dis LT 33 then dismed=0;
if dis1=0 then dismed=.;

beahigh=.;
if bea GE 24 then beahigh=1;
else if bea LT 24 then beahigh=0;
if bea1=0 then beahigh=.;

beamed=.;
if bea GE 19 and bea LT 24 then beamed=1;
else if bea GE 24 or bea LT 19 then beamed=0;
if bea1=0 then beamed=.;

ceahigh=.;
if cea GE 31 then ceahigh=1;
else if cea LT 31 then ceahigh=0;
if cea1=0 then ceahigh=.;

ceamed=.;
if cea GE 25 and cea LT 31 then ceamed=1;
else if cea GE 31 or cea LT 25 then ceamed=0;
if cea1=0 then ceamed=.;

proc format;
value adherence 1= 'adherent'
0= 'nonadherent';

proc univariate normal plot;
var  qi1  qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31;

proc freq;
tables totmas1  qi1 qi2 qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31 ssshigh sssmed;

format totmas1 adherence.;
proc logistic descending;
model totmas1= ssshigh sssmed qi1  gender qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31/ ctable pprob= (0 to 1 by .1) lackfit risklimits; run;
```

```
/*SAS PROGRAM TO DICHOTOMIZE PATIENTS ON PROTEASE INHIBITOR
DRUGS AS BEING ADHERENT OR NON ADHERENT BASED ON PERCENTAGE
ADHERENCE DEFINITIONS.*/

options nocenter linesize=72;
libname saurabh 'c:\Documents and Settings\Erabus\DESKTOP\saurabh';
data saurabh3;
set saurabh.hivsurv;

if qii1x= 'bactrim' then qii1x2a=0;
if qii1x= 'acyclovir' then qii1x2a=0;
if qii1x= 'pentamidine' then qii1x2a=0;
if qii1x= 'zoloft' then qii1x2a=0;
if qii1x= '3tc' then qii1x2a=0;
if qii1x= 'azt' then qii1x2a=0;
if qii1x= 'd4t' then qii1x2a=0;
if qii1x= 'ddc' then qii1x2a=0;
if qii1x= 'ddi' then qii1x2a=0;
if qii1x= 'zerit' then qii1x2a=0;
if qii1x= 'epivir' then qii1x1a=0;
if qii1x2a=0 then qii1x13=.;
if qii1x13=99 then qii1x2a=.;
if qii1x2a=1 then qii1x2a=8;
if qii1x2a=2 then qii1x2a=12;
if qii1x2a=3 then qii1x2a=15;
if qii1x2a=4 then qii1x2a=30;
if qii1x2a=5 then qii1x2a=60;
if qii1x2a=6 then qii1x2a=90;
if qii1x2a=7 then qii1x2a=160;
if qii1x2a=8 then qii1x2a=200;

med1= qii1x13/qii1x2a;
comp1=1-med1;
percomp1=comp1*100;

if qii2x= 'bactrim' then qii2x2a=0;
if qii2x= 'dapsone' then qii2x2a=0;
if qii2x= 'leucovorin' then qii2x2a=0;
if qii2x= 'ms contin' then qii2x2a=0;
if qii2x= 'theodur' then qii2x2a=0;
if qii2x= '3tc' then qii2x2a=0;
if qii2x= 'azt' then qii2x2a=0;
if qii2x= 'd4t' then qii2x2a=0;
if qii2x= 'ddc' then qii2x2a=0;
if qii2x= 'ddi' then qii2x2a=0;
if qii2x= 'epivir' then qii2x2a=0;
if qii2x= 'zerit' then qii2x2a=0;
if qii2x2a=0 then qii2x13=.;
if qii2x13=99 then qii2x2a=.;
if qii2x2a=1 then qii2x2a=8;
if qii2x2a=2 then qii2x2a=12;
if qii2x2a=3 then qii2x2a=15;
if qii2x2a=4 then qii2x2a=30;
if qii2x2a=5 then qii2x2a=60;
if qii2x2a=6 then qii2x2a=90;
if qii2x2a=7 then qii2x2a=160;
```

```
if qii2x2a=8 then qii2x2a=200;

med2= qii2x13/qii2x2a;
comp2=1-med2;
percomp2=comp2*100;

if qii3x= 'acyclovir' then qii3x2a=0;
if qii3x= 'bactrim' then qii3x2a=0;
if qii3x= 'biaxin' then qii3x2a=0;
if qii3x= 'clotrimazole' then qii3x2a=0;
if qii3x= 'compazine' then qii3x2a=0;
if qii3x= 'dapsone' then qii3x2a=0;
if qii3x= 'diltiazem' then qii3x2a=0;
if qii3x= 'fluconazole' then qii3x2a=0;
if qii3x= 'mellaril' then qii3x2a=0;
if qii3x= 'minocycline' then qii3x2a=0;
if qii3x= 'motrin' then qii3x2a=0;
if qii3x= 'oxandrin' then qii3x2a=0;
if qii3x= 'vasotec' then qii3x2a=0;
if qii3x= 'zantac' then qii3x2a=0;
if qii3x= 'zovirax' then qii3x2a=0;
if qii1x=  'azt' then qii1x2a=0;
if qii1x=  '3tc' then qii1x2a=0;
if qii1x=  'd4t' then qii1x2a=0;
if qii1x=  'epivir' then qii1x2a=0;

if qii3x2a=0 then qii3x13=.;

if qii3x13=99 then qii3x2a=.;

if qii3x2a=1 then qii3x2a=8;
if qii3x2a=2 then qii3x2a=12;
if qii3x2a=3 then qii3x2a=15;
if qii3x2a=4 then qii3x2a=30;
if qii3x2a=5 then qii3x2a=60;
if qii3x2a=6 then qii3x2a=90;
if qii3x2a=7 then qii3x2a=160;
if qii3x2a=8 then qii3x2a=200;

med3= qii3x13/qii3x2a;
comp3=1-med3;
percomp3=comp3*100;

if percomp1=. then percomp1=0;
if percomp2=. then percomp2=0;
if percomp3=. then percomp3=0;

totcomp= percomp1+percomp2+percomp3;

if percomp1=0 and percomp2 NE 0 and percomp3 NE 0 then totcomp= totcomp/2;
if percomp1 NE 0 and percomp2= 0 and percomp3 NE 0 then totcomp= totcomp/2;
if percomp1 NE 0 and percomp2 NE 0 and percomp3= 0 then totcomp=totcomp/2;
if percomp1 NE 0 and percomp2 NE 0 and percomp3 NE 0 then totcomp=totcomp/3;
if percomp1 NE 0 and percomp2=0 and percomp3= 0 then totcomp= totcomp;
if percomp1=0 and percomp2 NE 0 and percomp3= 0 then totcomp= totcomp;
if percomp1=0 and percomp2=0 and percomp3 NE 0 then totcomp= totcomp;
```

```
if totcomp=0 then delete;
if totcomp =100 then totcomp=1;
else if totcomp LT 100 then totcomp=0;

if qvi1=0 then qvi1=99;
if qvi2=0 then qvi2=99;
if qvi3=0 then qvi3=99;
if qvi4=0 then qvi4=99;
if qvi5=0 then qvi5=99;
if qvi6=0 then qvi6=99;
if qvi7=0 then qvi7=99;
if qvi8=0 then qvi8=99;
if qvi9=0 then qvi9=99;
if qvi10=0 then qvi10=99;
if qvi11=0 then qvi11=99;
if qvi12=0 then qvi12=99;
if qvi13=0 then qvi13=99;
if qvi14=0 then qvi14=99;
if qvi15=0 then qvi15=99;
if qvi16=0 then qvi16=99;
if qvi17=0 then qvi17=99;
if qvi18=0 then qvi18=99;
if qvi19=0 then qvi19=99;
if qvi20=0 then qvi20=99;
if qvi21=0 then qvi21=99;
if qvi22=0 then qvi22=99;
if qvi23=0 then qvi23=99;
if qvi24=0 then qvi24=99;
if qvi25=0 then qvi25=99;
if qvi26=0 then qvi26=99;
if qvi27=0 then qvi27=99;
if qvi28=0 then qvi28=99;
if qvi29=0 then qvi29=99;
if qvi30=0 then qvi30=99;
if qvi31=0 then qvi31=99;
if qvi32=0 then qvi32=99;
if qvi33=0 then qvi33=99;
if qvi34=0 then qvi34=99;
if qvi35=0 then qvi35=99;
if qvi36=0 then qvi36=99;
if qvi37=0 then qvi37=99;
if qvi38=0 then qvi38=99;
if qvi39=0 then qvi39=99;
if qvi40=0 then qvi40=99;
if qvi41=0 then qvi41=99;
if qvi42=0 then qvi42=99;
if qvi43=0 then qvi43=99;
if qvi44=0 then qvi44=99;
if qvi45=0 then qvi45=99;
if qvi46=0 then qvi46=99;
if qvi47=0 then qvi47=99;
if qvi48=0 then qvi48=99;
if qvi49=0 then qvi49=99;
if qvi50=0 then qvi50=99;
```

```
sss1=qvi4+qvi34+qvi22+qvi20+qvi16+qvi49+qvi13+qvi31+qvi6+qvi19+qvi1;
dis1=qvi40+qvi30+qvi33+qvi9+qvi10+qvi11+qvi50+qvi37+qvi15+qvi32+qvi48+qvi52;
fop1=qvi26+qvi27+qvi17+qvi41+qvi21+qvi28+qvi14+qvi47;
bea1=qvi29+qvi23+qvi24+qvi35+qvi39+qvi18+qvi5+qvi3+qvi25;
cea1=qvi7+qvi44+qvi45+qvi42+qvi43+qvi46+qvi8+qvi51+qvi12;

if sss1 GT 149 then sss1=0;
if dis1 GT 154 then dis1=0;
if fop1 GT 134 then fop1=0;
if bea1 GT 139 then bea1=0;
if cea1 GT 139 then cea1=0;

run;
data saurabh7;
set saurabh3;

if qvi1=99 then qvi1=0;
if qvi2=99 then qvi2=0;
if qvi3=99 then qvi3=0;
if qvi4=99 then qvi4=0;
if qvi5=99 then qvi5=0;
if qvi6=99 then qvi6=0;
if qvi7=99 then qvi7=0;
if qvi8=99 then qvi8=0;
if qvi9=99 then qvi9=0;
if qvi10=99 then qvi10=0;
if qvi11=99 then qvi11=0;
if qvi12=99 then qvi12=0;
if qvi13=99 then qvi13=0;
if qvi14=99 then qvi14=0;
if qvi15=99 then qvi15=0;
if qvi16=99 then qvi16=0;
if qvi17=99 then qvi17=0;
if qvi18=99 then qvi18=0;
if qvi19=99 then qvi19=0;
if qvi20=99 then qvi20=0;
if qvi21=99 then qvi21=0;
if qvi22=99 then qvi22=0;
if qvi23=99 then qvi23=0;
if qvi24=99 then qvi24=0;
if qvi25=99 then qvi25=0;
if qvi26=99 then qvi26=0;
if qvi27=99 then qvi27=0;
if qvi28=99 then qvi28=0;
if qvi29=99 then qvi29=0;
if qvi30=99 then qvi30=0;
if qvi31=99 then qvi31=0;
if qvi32=99 then qvi32=0;
if qvi33=99 then qvi33=0;
if qvi34=99 then qvi34=0;
if qvi35=99 then qvi35=0;
if qvi36=99 then qvi36=0;
if qvi37=99 then qvi37=0;
if qvi38=99 then qvi38=0;
if qvi39=99 then qvi39=0;
```

```
if qvi40=99 then qvi40=0;
if qvi41=99 then qvi41=0;
if qvi42=99 then qvi42=0;
if qvi43=99 then qvi43=0;
if qvi44=99 then qvi44=0;
if qvi45=99 then qvi45=0;
if qvi46=99 then qvi46=0;
if qvi47=99 then qvi47=0;
if qvi48=99 then qvi48=0;
if qvi49=99 then qvi49=0;
if qvi50=99 then qvi50=0;
sss=qvi4+qvi34+qvi22+qvi20+qvi16+qvi49+qvi13+qvi31+qvi6+qvi19+qvi1;
dis=qvi40+qvi30+qvi33+qvi9+qvi10+qvi11+qvi50+qvi37+qvi15+qvi32+qvi48+qvi52;
fop=qvi26+qvi27+qvi17+qvi41+qvi21+qvi28+qvi14+qvi47;
bea=qvi29+qvi23+qvi24+qvi35+qvi39+qvi18+qvi5+qvi3+qvi25;
cea=qvi7+qvi44+qvi45+qvi42+qvi43+qvi46+qvi8+qvi51+qvi12;

if sss1=0 then sss=.;
if dis1=0 then dis=.;
if fop1=0 then fop=.;
if bea1=0 then bea=.;
if cea1=0 then cea=.;

label totmas1= 'adherence to AV drugs';
label qi1= 'age';
label qi2='gender';
label qi3= 'health status';
label qi4='ethnicity';
label qi5='education';
label qi6='employment';
label qi7='living arrangement';
label qi18a ='insurance';
label qi19='income';
label qi24='body pain';
label qi29='how long ago diagnosed';
label qi31='t cell count';

/* new variable 'gender' created*/
gender=.;
if qi2= 'm' then gender=1;
else if qi2= 'f' then gender=2;

/* variable age categorized into three categories*/
if qi1 lt 35 then qi1=3;
else if qi1 ge 35 and qi1 le 41 then qi1=2;
else if qi1 ge 42 then qi1=1;

/* variable ethnicity dichotomized to whites or non whites*
if qi4=0 then qi4=.;
else if qi4=1 then qi4=1;
else if qi4=2 or qi4=3 or qi4=4 or qi4=5 or qi4=6 then qi4=0;

/* variable education dichotomized */
if qi5=0 then qi5=.;
else if qi5 lt 12 then qi5=1;
else if qi5 ge 12 then qi5=0;
```

```
/* variable employment dichotomized */
if qi6=0 then qi6=.;
else if qi6=1 or qi6=2 then qi6=0;
else if qi6=3 then qi6=1;

/* variable living arrangement dichotomized */
if qi7=0 then qi7=.;
else if qi7=1 then qi7=1;
else if qi7=2 then qi7=0;

/* variable health status dichotomized */
if qi3=0 then qi3=.;
else if qi3=1 or qi3=2 or qi3=3 then qi3=0;
else if qi3=4 or qi3=5 then qi3=1;

/* variable insurance dichotomized */
if qi18a=0 then qi18a=.;
if qi18a=2 then qi18a=1;
else if qi18a=1 then qi18a=0;

/* variable income dichotomized */
if qi19=0 then qi19=.;
else if qi19=1 then qi19=1;
else if qi19=2 or qi19=3 or qi19=4 or qi19=5 then qi19=0;

/* variable body pain dichotomized */
if qi24=0 then qi24=.;
else if qi24=1 or qi24=2 or qi24=3 then qi24=0;
else if qi24=4 or qi24=5 or qi24=6 then qi24=1;

/* variable how long ago diagnosed categorized*/
if qi29=0 then qi29=.;
else if qi29= 1 or qi29=2 or qi29=3 or qi29=4 then qi29=3;
else if qi29=5 then qi29=2;
else if qi29=6 then qi29=1;

/* variable T cell count dichotomized*/
if qi31=0 then qi31=.;
else if qi31= 1 or qi31=2 then qi31=0;
else if qi31= 3 or qi31=4 then qi31=1;

sssmed=.;
if sss lt 29 or sss ge 35 then sssmed= 0;
else if sss ge 29 and sss lt 35 then sssmed=1;
if sss1=0 then sssmed=.;

ssshigh=.;
if sss ge 35 then ssshigh=1;
else if sss lt 35 then ssshigh=0;
if sss1=0 then ssshigh=.;

fophigh=.;
if fop GE 29 then fophigh=1;
else if fop LT 29 then fophigh=0;
if fop1=0 then fophigh=.;
```

```
fopmed=.;
if fop GE 23 and fop LT 29 then fopmed=1;
else if fop GE 29 or fop LT 23 then fopmed=0;
if fop1=0 then fopmed=.;

dishigh=.;
if dis GE 39 then dishigh=1;
else if dis LT 39 then dishigh=0;
if dis1=0 then dishigh=.;

dismed=.;
if dis GE 33 and dis LT 39 then dismed=1;
else if dis GE 39 or dis LT 33 then dismed=0;
if dis1=0 then dismed=.;

beahigh=.;
if bea GE 24 then beahigh=1;
else if bea LT 24 then beahigh=0;
if bea1=0 then beahigh=.;

beamed=.;
if bea GE 19 and bea LT 24 then beamed=1;
else if bea GE 24 or bea LT 19 then beamed=0;
if bea1=0 then beamed=.;

ceahigh=.;
if cea GE 30 then ceahigh=1;
else if cea LT 30 then ceahigh=0;
if cea1=0 then ceahigh=.;

ceamed=.;
if cea GE 24 and cea LT 30 then ceamed=1;
else if cea GE 31 or cea LT 24 then ceamed=0;
if cea1=0 then ceamed=.;

proc format;
value adherence 1= 'adherent'
0= 'nonadherent';

proc univariate normal plot;
var  qi1  qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31;

proc freq;
tables totcomp  qi1 qi2 qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31 ssshigh sssmed;

format totcomp adherence.;

proc logistic descending;
model totcomp= ssshigh sssmed qi1  gender qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31/ ctable pprob= (0 to 1 by .1) lackfit risklimits;   run;
```

```
/*SAS PROGRAM TO DICHOTOMIZE PATIENTS ON PROTEASE INHIBITOR
DRUGS AS BEING ADHERENT OR NON ADHERENT
BASED ON MEDICATION ADHERENCE SCALE.*/

options nocenter linesize=72;
libname saurabh 'c:\Documents and Settings\Erabus\DESKTOP\saurabh';
data saurabh3;
set saurabh.hivsurv;

if  qii1x4=0 then qii1x4=99;
if qii1x5=0 then qii1x5=99;
if qii1x6=0 then qii1x6=99;
if qii1x7=0 then qii1x7=99;
if qii1x8=0 then qii1x8=99;
if qii1x9=0 then qii1x9=99;
if qii2x4=0 then qii2x4=99;
if qii2x5=0 then qii2x5=99;
if qii2x6=0 then qii2x6=99;
if qii2x7=0 then qii2x7=99;
if qii2x8=0 then qii2x8=99;
if qii2x9=0 then qii2x9=99;
if qii3x4=0 then qii3x4=99;
if qii3x5=0 then qii3x5=99;
if qii3x6=0 then qii3x6=99;
if qii3x7=0 then qii3x7=99;
if qii3x8=0 then qii3x8=99;
if qii3x9=0 then qii3x9=99;

mas1x= qii1x4+qii1x5+qii1x6+qii1x7+qii1x8+qii1x9;
if mas1x GE 109 then mas1=0;

mas2x= qii2x4+qii2x5+qii2x6+qii2x7+qii2x8+qii2x9;
if mas2x GE 109 then mas2=0;

mas3x= qii3x4+qii3x5+qii3x6+qii3x7+qii3x8+qii3x9;
if mas3x GE 109 then mas3=0;

data saurabh5;
set saurabh3;

if  qii1x4=99 then qii1x4=0;
if qii1x5=99 then qii1x5=0;

if qii1x6=99 then qii1x6=0;
if qii1x7=99 then qii1x7=0;
if qii1x8=99 then qii1x8=0;
if qii1x9=99 then qii1x9=0;

mas1=qii1x4+qii1x5+qii1x6+qii1x7+qii1x8+qii1x9;

if mas1x=0 then mas1=0;
if qii2x4=99 then qii2x4=0;
if qii2x5=99 then qii2x5=0;
if qii2x6=99 then qii2x6=0;
if qii2x7=99 then qii2x7=0;
if qii2x8=99 then qii2x8=0;
```

```
if qii2x9=99 then qii2x9=0;

mas2=qii2x4+qii2x5+qii2x6+qii2x7+qii2x8+qii2x9;

if mas2x=0 then mas2=0;
if qii3x4=99 then qii3x4=0;
if qii3x5=99 then qii3x5=0;
if qii3x6=99 then qii3x6=0;
if qii3x7=99 then qii3x7=0;
if qii3x8=99 then qii3x8=0;
if qii3x9=99 then qii3x9=0;

mas3=qii3x4+qii3x5+qii3x6+qii3x7+qii3x8+qii3x9;

if mas3x=0 then mas3=0;
if qii1x=  'bactrim' then mas1=0;
if qii1x=  'acyclovir' then mas1=0;
if qii1x=  'pentamidine' then mas1=0;
if qii1x=  'zoloft' then mas1=0;
if qii1x=  '3tc' then mas1=0;
if qii1x=  'azt' then mas1=0;
if qii1x=  'd4t' then mas1=0;
if qii1x=  'ddi' then mas1=0;
if qii1x=  'ddc' then mas1=0;
if qii1x=  'epivir' then mas1=0;
if qii1x=  'zerit' then mas1=0;

if qii2x= 'bactrim' then mas2=0;
if qii2x= 'dapsone' then mas2=0;
if qii2x= 'leucovorin' then mas2=0;
if qii2x= 'ms contin' then mas2=0;
if qii2x= 'theodur' then mas2=0;
if qii2x= '3tc' then mas2=0;
if qii2x= 'azt' then mas2=0;
if qii2x= 'd4t' then mas2=0;
if qii2x= 'ddc' then mas2=0;
if qii1x= 'ddi' then mas1=0;
if qii1x=  'epivir' then mas1=0;
if qii1x=  'zerit' then mas1=0;
if qii3x= 'acyclovir' then mas3=0;
if qii3x= 'bactrim' then mas3=0;
if qii3x= 'biaxin' then mas3=0;
if qii3x= 'clotrimazole' then mas3=0;
if qii3x= 'compazine' then mas3=0;
if qii3x= 'dapsone' then mas3=0;
if qii3x= 'diltiazem' then mas3=0;
if qii3x= 'fluconazole' then mas3=0;
if qii3x= 'mellaril' then mas3=0;
if qii3x= 'minocycline' then mas3=0;
if qii3x= 'motrin' then mas3=0;
if qii3x= 'oxandrin' then mas3=0;
if qii3x= 'vasotec' then mas3=0;
if qii3x= 'zantac' then mas3=0;
if qii3x= 'zovirax' then mas3=0;
if qii3x= '3tc' then mas3=0;
if qii3x= 'azt' then mas3=0;
```

```
if qii3x= 'd4t' then mas3=0;
if qii3x= 'epivir' then mas3=0;

totmas=mas1+mas2+mas3;

if mas1 NE 0 and mas2 NE 0 and mas3 NE 0 then totmas= totmas/3;
if mas1 NE 0 and mas2= 0 and mas3 NE 0 then totmas= totmas/2;
if mas1=0 and mas2 NE 0 and mas3 NE 0 then totmas= totmas/2;
if mas1 NE 0 and mas2 NE 0 and mas3=0 then totmas= totmas/2;
if mas1 NE 0 and mas2=0 and mas3=0 then totmas=totmas;
if mas1=0 and mas2 NE 0 and mas3=0 then totmas=totmas;
if mas1=0 and mas2=0 and mas3 NE 0 then totmas=totmas;

if totmas LT 6 then delete;
totmas1=12-totmas;
if totmas1 = 6 then totmas1 =1;
else if totmas1 LE 6 then totmas1 =0;

if qvi1=0 then qvi1=99;
if qvi2=0 then qvi2=99;
if qvi3=0 then qvi3=99;
if qvi4=0 then qvi4=99;
if qvi5=0 then qvi5=99;
if qvi6=0 then qvi6=99;
if qvi7=0 then qvi7=99;
if qvi8=0 then qvi8=99;
if qvi9=0 then qvi9=99;
if qvi10=0 then qvi10=99;
if qvi11=0 then qvi11=99;
if qvi12=0 then qvi12=99;
if qvi13=0 then qvi13=99;
if qvi14=0 then qvi14=99;
if qvi15=0 then qvi15=99;
if qvi16=0 then qvi16=99;
if qvi17=0 then qvi17=99;
if qvi18=0 then qvi18=99;
if qvi19=0 then qvi19=99;
if qvi20=0 then qvi20=99;
if qvi21=0 then qvi21=99;
if qvi22=0 then qvi22=99;
if qvi23=0 then qvi23=99;
if qvi24=0 then qvi24=99;
if qvi25=0 then qvi25=99;
if qvi26=0 then qvi26=99;
if qvi27=0 then qvi27=99;
if qvi28=0 then qvi28=99;
if qvi29=0 then qvi29=99;
if qvi30=0 then qvi30=99;
if qvi31=0 then qvi31=99;
if qvi32=0 then qvi32=99;
if qvi33=0 then qvi33=99;
if qvi34=0 then qvi34=99;
if qvi35=0 then qvi35=99;
if qvi36=0 then qvi36=99;
if qvi37=0 then qvi37=99;
if qvi38=0 then qvi38=99;
```

```
if qvi39=0 then qvi39=99;
if qvi40=0 then qvi40=99;
if qvi41=0 then qvi41=99;
if qvi42=0 then qvi42=99;
if qvi43=0 then qvi43=99;
if qvi44=0 then qvi44=99;
if qvi45=0 then qvi45=99;
if qvi46=0 then qvi46=99;
if qvi47=0 then qvi47=99;
if qvi48=0 then qvi48=99;
if qvi49=0 then qvi49=99;
if qvi50=0 then qvi50=99;

sss1=qvi4+qvi34+qvi22+qvi20+qvi16+qvi49+qvi13+qvi31+qvi6+qvi19+qvi1;
dis1=qvi40+qvi30+qvi33+qvi9+qvi10+qvi11+qvi50+qvi37+qvi15+qvi32+qvi48+qvi52;
fop1=qvi26+qvi27+qvi17+qvi41+qvi21+qvi28+qvi14+qvi47;
bea1=qvi29+qvi23+qvi24+qvi35+qvi39+qvi18+qvi5+qvi3+qvi25;
cea1=qvi7+qvi44+qvi45+qvi42+qvi43+qvi46+qvi8+qvi51+qvi12;

if sss1 GT 149 then sss1=0;
if dis1 GT 154 then dis1=0;
if fop1 GT 134 then fop1=0;
if bea1 GT 139 then bea1=0;
if cea1 GT 139 then cea1=0;

run;
data saurabh7;
set saurabh5;

if qvi1=99 then qvi1=0;
if qvi2=99 then qvi2=0;
if qvi3=99 then qvi3=0;
if qvi4=99 then qvi4=0;
if qvi5=99 then qvi5=0;
if qvi6=99 then qvi6=0;
if qvi7=99 then qvi7=0;
if qvi8=99 then qvi8=0;
if qvi9=99 then qvi9=0;
if qvi10=99 then qvi10=0;
if qvi11=99 then qvi11=0;
if qvi12=99 then qvi12=0;
if qvi13=99 then qvi13=0;
if qvi14=99 then qvi14=0;
if qvi15=99 then qvi15=0;
if qvi16=99 then qvi16=0;
if qvi17=99 then qvi17=0;
if qvi18=99 then qvi18=0;
if qvi19=99 then qvi19=0;
if qvi20=99 then qvi20=0;
if qvi21=99 then qvi21=0;
if qvi22=99 then qvi22=0;
if qvi23=99 then qvi23=0;
if qvi24=99 then qvi24=0;
if qvi25=99 then qvi25=0;
if qvi26=99 then qvi26=0;
if qvi27=99 then qvi27=0;
```

```
if qvi28=99 then qvi28=0;
if qvi29=99 then qvi29=0;
if qvi30=99 then qvi30=0;
if qvi31=99 then qvi31=0;
if qvi32=99 then qvi32=0;
if qvi33=99 then qvi33=0;
if qvi34=99 then qvi34=0;
if qvi35=99 then qvi35=0;
if qvi36=99 then qvi36=0;
if qvi37=99 then qvi37=0;
if qvi38=99 then qvi38=0;
if qvi39=99 then qvi39=0;
if qvi40=99 then qvi40=0;
if qvi41=99 then qvi41=0;
if qvi42=99 then qvi42=0;
if qvi43=99 then qvi43=0;
if qvi44=99 then qvi44=0;
if qvi45=99 then qvi45=0;
if qvi46=99 then qvi46=0;
if qvi47=99 then qvi47=0;
if qvi48=99 then qvi48=0;
if qvi49=99 then qvi49=0;
if qvi50=99 then qvi50=0;
sss=qvi4+qvi34+qvi22+qvi20+qvi16+qvi49+qvi13+qvi31+qvi6+qvi19+qvi1;
dis=qvi40+qvi30+qvi33+qvi9+qvi10+qvi11+qvi50+qvi37+qvi15+qvi32+qvi48+qvi52;
fop=qvi26+qvi27+qvi17+qvi41+qvi21+qvi28+qvi14+qvi47;
bea=qvi29+qvi23+qvi24+qvi35+qvi39+qvi18+qvi5+qvi3+qvi25;
cea=qvi7+qvi44+qvi45+qvi42+qvi43+qvi46+qvi8+qvi51+qvi12;

if sss1=0 then sss=.;
if dis1=0 then dis=.;
if fop1=0 then fop=.;
if bea1=0 then bea=.;
if cea1=0 then cea=.;

label totmas1= 'adherence to AV drugs';
label qi1= 'age';
label qi2='gender';
label qi3= 'health status';
label qi4='ethnicity';
label qi5='education';
label qi6='employment';
label qi7='living arrangement';
label qi18a ='insurance';
label qi19='income';
label qi24='body pain';
label qi29='how long ago diagnosed';
label qi31='t cell count';

/* new variable 'gender' created*/
gender=.;
if qi2= 'm' then gender=1;
else if qi2= 'f' then gender=0;

/* variable age categorized into three categories*/
if qi1 lt 35 then qi1=3;
```

```
else if qi1 ge 35 and qi1 le 41 then qi1=2;
else if qi1 ge 42 then qi1=1;

/* variable ethnicity dichotomized to whites or non whites*/
if qi4=0 then qi4=.;
else if qi4=1 then qi4=1;
else if qi4=2 or qi4=3 or qi4=4 or qi4=5 or qi4=6 then qi4=0;

/* variable education dichotomized */
if qi5=0 then qi5=.;
else if qi5 lt 12 then qi5=1;
else if qi5 ge 12 then qi5=0;

/* variable employment dichotomized */
if qi6=0 then qi6=.;
else if qi6=1 or qi6=2 then qi6=0;
else if qi6=3 then qi6=1;

/* variable living arrangement dichotomized */
if qi7=0 then qi7=.;
else if qi7=1 then qi7=1;
else if qi7=2 then qi7=0;

/* variable health status dichotomized */
if qi3=0 then qi3=.;
else if qi3=1 or qi3=2 or qi3=3 then qi3=0;
else if qi3=4 or qi3=5 then qi3=1;

/* variable insurance dichotomized */
if qi18a=0 then qi18a=.;
if qi18a=2 then qi18a=1;
else if qi18a=1 then qi18a=0;

/* variable income dichotomized */
if qi19=0 then qi19=.;
else if qi19=1 then qi19=1;
else if qi19=2 or qi19=3 or qi19=4 or qi19=5 then qi19=0;

/* variable body pain dichotomized */
if qi24=0 then qi24=.;
else if qi24=1 or qi24=2 or qi24=3 then qi24=0;
else if qi24=4 or qi24=5 or qi24=6 then qi24=1;

/* variable how long ago diagnosed categorized*/
if qi29=0 then qi29=.;
else if qi29= 1 or qi29=2 or qi29=3 or qi29=4 then qi29=3;
else if qi29=5 then qi29=2;
else if qi29=6 then qi29=1;

/* variable T cell count dichotomized*/
if qi31=0 then qi31=.;
else if qi31= 1 or qi31=2 then qi31=0;
else if qi31= 3 or qi31=4 then qi31=1;

sssmed=.;
if sss lt 30 or sss ge 35 then sssmed= 0;
```

```
else if sss ge 30 and sss lt 35 then sssmed=1;
if sss1=0 then sssmed=.;

ssshigh=.;
if sss ge 35 then ssshigh=1;
else if sss lt 35 then ssshigh=0;
if sss1=0 then ssshigh=.;

fophigh=.;
if fop GE 29 then fophigh=1;
else if fop LT 29 then fophigh=0;
if fop1=0 then fophigh=.;

fopmed=.;
if fop GE 23 and fop LT 29 then fopmed=1;
else if fop GE 29 or fop LT 23 then fopmed=0;
if fop1=0 then fopmed=.;

dishigh=.;
if dis GE 39 then dishigh=1;
else if dis LT 39 then dishigh=0;
if dis1=0 then dishigh=.;

dismed=.;
if dis GE 34 and dis LT 39 then dismed=1;
else if dis GE 39 or dis LT 34 then dismed=0;
if dis1=0 then dismed=.;

beahigh=.;
if bea GE 25 then beahigh=1;
else if bea LT 25 then beahigh=0;
if bea1=0 then beahigh=.;

beamed=.;
if bea GE 20 and bea LT 25 then beamed=1;
else if bea GE 25 or bea LT 20 then beamed=0;
if bea1=0 then beamed=.;

ceahigh=.;
if cea GE 30 then ceahigh=1;
else if cea LT 30 then ceahigh=0;
if cea1=0 then ceahigh=.;

ceamed=.;
if cea GE 24 and cea LT 30 then ceamed=1;
else if cea GE 30 or cea LT 24 then ceamed=0;
if cea1=0 then ceamed=.;

proc format;
value adherence 1= 'adherent'
0= 'nonadherent';

proc univariate normal plot;
var  qi1  qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31;
```

```
proc freq;
tables totmas1  qi1 qi2 qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31 ssshigh sssmed;

format totmas1 adherence.;

proc logistic descending;
model totmas1= ssshigh sssmed qi1  gender qi3 qi4 qi5 qi6 qi7 qi18a qi19
qi24 qi29 qi31/ ctable pprob= (0 to 1 by .1) lackfit risklimits;

run;
```

Appendix-III- Ways of coping with HIV

Response options for the scale:

1- Never
2- Rarely
3- Occasionally
4- Often
5- Very often

Here are some ways that different people may cope with HIV and its treatment. There are no right or wrong answer.

In the last month, HOW OFTEN did you think, feel, or do each item? (Please circle one number for each item.

In the last month, I

1. concentrate on the next step
2. felt the only thing to do was wait
3. did something just to do something
4. talked to someone to find out more
5. criticized or lectured myself
6. tried not to close off options
7. hoped a miracle would happen
8. went along with faith
9. went on as if nothing had happened
10. tried to keep my feelings to myself
11. looked for the silver lining; looked on the bright side
12. slept more than usual
13. looked for sympathy and understanding
14. was inspired to be creative
15. tried to forget the whole thing
16. tried to get professional help
17. changed or grew as a person in a good way
18. waited to see what would happen before acting
19. made a plan of action and followed it
20. let my feelings out somehow
21. came out of the experience better than before
22. talked to someone who could do something
23. tried to make myself feel better by eating, drinking, smoking, or drug use
24. took a big chance and did something risky
25. tried not to act too hastly
26. found new faith
27. rediscovered what is important in life
28. changed something so thing will turn out

29. avoided being with people
30. didn't let it get to me; refused to think about it
31. asked a friend or relative for advise
32. kept others from knowing how bad things were
33. made light of it; refused to get too serious
34. talked to someone about how I was feeling
35. took it out on other people
36. drew on past experiences from similar situations
37. knew what had to be done, so increased efforts
38. refused to believe it was happening
39. came up with different solutions
40. tried to keep my feelings from interfering
41. changed something about myself
42. wished the situation would go away or be over
43. had fantasies/ wishes about how it might turn out
44. prayed
45. prepared for the worst
46. went over in my mind what I would say or do
47. though of how a person I admire would act
48. reminded myself how much worst things could be
49. tried to find out as much as I could
50. treated the illness as a challenge

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