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THE DETERMINANTS OF PERCEIVED HEALTH AND LABOUR FORCE PARTICIPATION OF PEOPLE WITH HIV/ AIDS IN KHAYELITSHA, SOUTH AFRICA

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The Determinants of Perceived Health and Labour Force Participation of People with HIV/AIDS in Khayelitsha, South Africa[1]

Abstract

This paper examines the impact of Highly Active Antiretroviral Treatment (HAART) on perceived health and labour force participation of people living with HIV/AIDS in Khayelitsha, South Africa. Cox Proportional Hazard Models with stratum effects for three medical clinics, and Accelerated Failure Time Models with individual specific unobserved shared effects (frailty), are estimated for transitions to improved perceptions of health, and transition in and out of the labour market, using a longitudinal data set. We find that HAART has a positive impact on perceived health, and restored health leads to greater activity in the labour market.

Introduction

More than one in five adults in South Africa is HIV-positive, and AIDS deaths are expected to rise sharply until 2010. Over a million children could be orphaned by 2015 as a result of HIV/AIDS. In 1999, the first routine programme in South Africa to prevent the transmission of HIV from mother to child was initiated at two health centres in Khayelitsha that provided maternity

[1]We have benefited from the comments of the participants at presentations at the School of Economics and Centre for Social Science Research, University of Cape Town, especially Professor Nicoli Nattrass. Any remaining errors are our own.

services. Dedicated services for adults and children with HIV were established in April 2000 through collaboration between the provincial government and the international non-governmental organisation Médecins Sans Frontières (MSF). Three HIV/AIDS clinics were opened and began to offer Highly Active Antiretroviral Therapy (HAART) free of charge.

Prior to April 2004, HIV-positive individuals in South Africa could only access antiretroviral treatment through private medical aid schemes, through workplace programmes run by some large companies, through research projects and through NGO-funded interventions such as the international non-governmental organisation Médecins Sans Frontières (MSF) clinics in Khayelitsha, Cape Town. Access to antiretroviral treatment for South Africans who needed it was the exception rather than the norm. Given the positive association between poverty and HIV transmission in Africa (Stillwaggon, 2000), and the fact that in South Africa the unemployed are twice as likely to be poor as opposed to the employed (Seekings, 2003), it meant that the unemployed who most likely needed antiretroviral treatment were least likely to have access to it. Employment and income created a "treatment-divide" that prevented many poor and unemployed infected South Africans who needed treatment from accessing HAART.

Approximately 110 000 South Africans are accessing HAART through the public sector (JCSMF March 2006)[2]. In the Operational Plan of 2003 the Cabinet set a target of having 350 000 patients on treatment by December 2005 (Department of Health, 2003). The public rollout of HAART has fallen significantly short of reaching many individuals in need of treatment. Given South Africa's high income inequality, high unemployment rate and the strong connection between HIV-infection and unemployment, and thus poverty; the slow rollout of treatment means that the burden of AIDS continues to be borne by the poor. In this sense, there is a need for reforming health services in South Africa. For experiences of Sweden in this area see Culyer (1991).

Our analysis focuses on changing perceptions of health after receiving HAART, and the relationship between subjective perceptions of health and transitions between inactivity and various labour market states. We first study the effect of HAART on perceptions of health for people living with HIV/AIDS, and then

[2] The South African Department of Health progress report (2006) was unable to measure the number of individuals on treatment. JCSMF were however able to estimate the number of individuals on treatment through contacting each clinic to find the number of patients that they have on treatment.

look at transitions from inactivity to unemployment (moving from being outside of the labour force, into the labour force); and transitions from unemployment to employment.

The contribution of this paper to existing literature is three-fold: First, we approach measuring transitions to restored health from the patient's subjective experience of restored health. A longitudinal data set of patients who were receiving HAART was collected in Khayelitsha. The positive impact that HAART has had on these Khayelitsha clinic attendees, through increasing their CD4 counts and decreasing their viral loads, has been established by Coetzee et al. (2004).We use a socio-economic longitudinal dataset, collected from the same clinic attendees, which provides us with the opportunity to look at improved health, not through examining CD4 counts, but by examining patients' reported changing perceptions of health over time. We employ advanced Cox Proportional Hazard Models with stratum effects and Accelerated Failure Time Models with individual specific unobserved effects in our analysis.

Second, we find that HAART does have a positive effect on the perceived health of people living with HIV/AIDS. This result provides additional evidence of the positive impact of HAART on the lives of HIV-positive individuals. This contribution is significant in the South African context, where the positive impact of HAART on the lives of HIV-positive individuals is debated. Arguments have been put forward that HAART is poisonous and ineffective and the use of alternative types of treatment, to substitute the use of HAART, has been promoted to South Africans dying of AIDS. For a more detailed discussion of the debates raging around the efficacy of HAART in South Africa see Nattrass (2004), Geffen (2006), Nattrass (2006a) and Nattrass (2006b).

Third, we find that perceiving that one's health has been restored after receiving HAART increases the individual's chances of transiting from not being economically active, to wanting a job and being classified as unemployed. The effect of job search being successful could not be estimated significantly for the transition from unemployment to employment, since the time period was too short to study the impact of perceptions of restored health on this transition.

The evidence found in this study raises some policy implications. Firstly, individuals who enjoy better health as a result of HAART, regain their ability to work and transit from inactivity to unemployment. In the context of the South African labour market, the desire and the ability to work does not necessarily translate into obtaining employment. This highlights the South African problem, where unemployment is high and in the past five years formal employment has

predominantly grown through the market demanding semi-skilled and skilled labour (Statistics South Africa, 2006). Our findings emphasise the need for economic-policies that increase employment levels so that people who are unskilled and have had their health restored because of HAART can find employment easily.

Secondly, since restored health does not in and of itself translate into employment, unemployed individuals who have had their health restored by HAART may find themselves facing very difficult life-sustaining decisions. Those who previously had access to a disability grant[3] may lose it as a result of regaining their health, and may find themselves without an income to support themselves. Such individuals could face a terrible choice: not to take antiretrovirals, and keep the disability grant for the short time they have left to live; or take the antiretrovirals, live longer but without an income. In order to spare individuals from having to make the difficult choice between health and income, access to antiretroviral medication should, at the very least, be accompanied by welfare relief for those in poverty. The results in this study informs the discussion on linking a full scale AIDS prevention and treatment intervention to the introduction of a basic income grant for all South Africans (Nattrass, 2004; Simchowitz, 2004) .

The next section describes the results from previous research. Section 3 describes the data, while Section 4 develops the statistical models of different transitions: the transition Sickness to Healthy States (controlling the transitions in the other direction), the transition from Inactivity to Unemployment; and lastly from Unemployment to Employment. The last section summarises the results and draws conclusions.

Previous studies and evidence regarding HAART

South Africa has witnessed high-level government officials debating the science of HIV transmission and using HAART in the treatment of HIV/AIDS. The Minister of Health and the South African President, Thabo Mbeki, have directly

[3] A government means-tested disability grant of a maximum of R700 a month was available to all ‘severely physically and mentally disabled people’ older than 18. This includes people living with AIDS.

and tacitly given their support to pseudo-scientists' denial of HIV causing AIDS, and the use of various remedies as an alternative to using HAART (Geffen, 2006; Nattrass, 2006a, Nattrass 2006b). The toxicity of HAART has been emphasised and its efficacy questioned, while its established positive impact on morbidity and mortality downplayed. If HAART indeed holds no health benefits for people living with HIV/AIDS, one would expect that patients on treatment would have a negative perception of the impact that HAART has had on their health.

Literature grounded in psychology highlights the fact that HAART may have an ambiguous impact on perceived health. For a person living with HIV/AIDS, their clinical health status and all other spheres of life and well being (i.e. mental, social and emotional) are all intertwined. Hays *et al* (2000) found that disease progression, with the accompanying deteriorating physical functioning, is attended by poor emotional well being. HIV infected individuals are particularly vulnerable to experiencing poor emotional well-being shortly after being diagnosed, when HIV-related symptoms first appear, and in the later stages of disease when physical functioning begins to be impaired, and after suffering multiple AIDS-related losses in their social network (Siegel and Lekas, 2002).

Physical illnesses, particularly those that are debilitating and life-threatening, can be associated with increased suicide risk (Hem *et al* (2004); Gielen *et al* (2005)). Feelings of hopelessness, isolation and depression are some factors that elevate the risk of suicide for persons living with HIV/AIDS (Hedge, 1990; Pugh and O' Donnell, 1993; Rabkin and Remein, 1993; Marzuk *et al,* 1997; Chandra, Desai and Ranjan, 2005; Gielen *et al,* 2005).

HAART may contribute to psychological deterioration through introducing additional stressors into the lives of people living with HIV/AIDS. HAART can introduce stress related to: the need to maintain a high level of adherence to medication regimens; having to attempt to manage the adverse side effects that may result from HAART, and of tolerating the uncertainty regarding how long one will continue to benefit from HAART medications. Furthermore, in the era of HAART, individuals may continue to confront stressors that predated HAART, such as stigmatisation of AIDS, possible traumas associated with disclosure of their HIV status to others, depression and resisting suicidal tendencies.

According to "Uncertainty in Illness theory" (Mishell, 1998, 1990 in Brashers, 1999), renewed health as a result of HAART can be accompanied by

uncertainty. This theory states that patients that have chronic and acute illnesses often experience uncertainty relating to various aspects of their life when they have improvements in their clinical health. This uncertainty is the result of ambiguous symptom patterns, complex systems of care and treatment, insufficient information about diagnosis and unpredictable disease progression and prognosis (Brashers, 2001). Brashers *et al* (1999) found that uncertainty specifically related to the lack of information regarding the long-term effects and efficacy of HAART, the unpredictable nature of individual response to treatment, the potential to develop drug resistant strains of the virus and uncertainty related to financial security in the future was common among patients in their study.

Wariness of being hopeful about the future is supported by Lee *et al*'s (2002) study, which found that patients receiving HAART felt that they could only build a tentative future because they believed that their restored health was fragile. Some HIV-positive individuals receiving HAART even feel that they have no control over their health and that good health is simply due to chance (Siegel and Schrimshaw, 2005). This fear - that the renewed health that HAART provides may not be sustained - is similar to the fear that cancer patients receiving chemotherapy experience regarding the recurrence of cancer[4]. Individuals receiving HAART who experience improvements in their health may believe that they are hanging onto life by a thread. In the Lee *et al* (2002) study, patients receiving HAART felt that their renewed health was simply a stay of execution, and death always loomed over their lives.

Illness and labour market outcomes

In the absence of HAART, HIV/AIDS will negatively impact labour productivity. A Canadian study by Auld (2002) of a group of HIV-positive patients on HAART found that being diagnosed HIV-positive decreased the probability of employment by 25 percent. Fox *et al.'s* (2004) retrospective study of tea pickers in Kenya who had died of AIDS (none of whom were receiving HAART) found that in the last 365 days before they died (relative to a comparative group of tea pickers) farm workers who died of AIDS were: absent from the job 31 days more; on average picked 7.1kg percent less tea per day; and spent 22 more days on less strenuous duties. In the absence of HAART the

[4] In cancer patients this fear is called the `Damocles Syndrome' because in Greek mythology, Damocles was invited to dine with a king and was seated beneath a sword suspended by single horsehair (Bashers, 1999).

progression of HIV disease reduces workers' productive capacity, increases absenteeism, forces them to give up their jobs and ultimately results in their death (Nandakumar *et al,* 2000; Drimie, 2002; Vass, 2002; Rosen *et al,* 2003).

The classic labour supply model has individuals choosing between hours spent in work and hours spent in leisure. Our analysis makes use of the concept of 'constructed identity', (i.e. how an individual defines himself or herself), as a means of probing the motivating factors that influence HIV-positive individuals' allotment of hours to either work or leisure. Individuals assume many roles which all form an integral part of their constructed identity. Most HIV-positive patients receiving HAART have to reconcile two important roles. The first role that a HIV-positive person may assume is created when he or she experiences the major negative life event of being diagnosed HIV-positive. Since the individual will always be infected with the virus, even if they receive HAART, he or she will always be able to assume the role of 'a person with a chronic illness' (Nixon and Renwick, 2003).

The second dominant role, which most individuals feel pressure to assume, is the role of a productive member of society. For any working aged individual, societal pressure most likely forces one to define fulfillment of the role of a productive member of society, by assuming the role of 'a worker'. There are negative connotations attached to not being employed. A working-aged individual who devotes all his or her time to leisure might be considered lazy, lacking in ambition, or even a burden to the household that needs to support him or her. As patients receiving HAART experience improvements in their clinical health, they would most likely feel pressured, both by themselves and others, to assume 'a worker' role (Nixon and Renwick, 2003). Various factors can influence which role a person living with HIV/AIDS chooses to assume.

The role of 'a person with a chronic illness', living with HIV-disease and HAART-related side effects, may provide some social legitimacy to working-aged HIV-positive individuals abstaining from supplying labour. However, as stated earlier, the societal and personal value attached to the role of 'a worker', places pressure on working aged HIV-positive individuals to supply labour. They may also worry about being stigmatised because they are not contributing productively to their households or society (Maughan-Brown, 2004).

When HIV-positive patients who are receiving HAART decide whether or not to return to work, their perceptions of their health feed into their decision. If patients believe that the restoration of their health is unsustainable and that they will not be healthy long enough to maintain a job, they can decide to spare

themselves the financial cost of searching for a job (i.e. phone calls, transport to interviews, buying a newspaper) and remain out of the labour force. Simply looking for a job can be a stressful exercise, and patients may feel that this stress will negatively affect their already fragile health. Patients may feel that the cost of searching for a job (recurring illness as a result of stress) might be greater than the benefit of income from a job that subsequent ill health might prevent them from maintaining.

Patients receiving HAART who are uncertain about their renewed health can choose to exclusively assume the role of 'a person with a chronic illness'. If an individual chooses to assume exclusively the role of 'a person with a chronic illness', he or she would choose to devote all their time to leisure and not supply any labour. If an individual chooses to assume the role of 'a worker', he or she would divide his or her time between supplying labour and leisure. These two roles can be regarded as both mutually exclusive and conflicting, or they can be reconciled and assumed successfully. Whether or not an individual is able to reconcile these two roles would depend on the characteristics that the individual is endowed with.

The data

In January 2002 researchers from the MSF and the University of Cape Town embarked on a socio-economic longitudinal study of adults[5] in Khayelitsha who had not been exposed to prior antiretroviral treatment. Khayelitsha is a township in Cape Town, South Africa, with a population of approximately 400 000. It is Cape Town's largest African township and is home to many unemployed people, with unemployment rates considerably higher than the national average. According to Census 2001 only 34 percent of Khayelitsha residents are employed and approximately 98 percent of households in Khayelitsha earn a monthly income of less than R3, 200. Most residents in Khayelitsha rely on health services delivered by the state. The HIV prevalence in public-sector antenatal clinics in this health district in 2002 was 24.9 percent (Coetzee *et al.*, 2004).

[5] I would like to acknowledge the following people who were involved in the design and implementation of the surveys used in this paper: The ARV Survey: Marta Darder, Toby Kaspar, Eric Goemere, EmiLou MacLean and Nicoli Nattrass. Marta Darder and EmiLou MacLean finalised the survey design and managed the data collection.

The study obtained ethical approval from the Health Sciences Research Ethics Committee. Clinical criteria for selection into the MSF programme meant that at baseline, patients were very ill. At baseline patients were interviewed and the idea was to re-interview each person on a six-monthly basis in order to explore the socio-economic impact of providing HAART. Patients willingly completed questionnaires and consented to being interviewed. A total of two hundred and sixty one patients had nearly semi-annual health and economic assessments over a period of sixty-four months.

Table 1: Baseline descriptive statistics for the study sample

Descriptive Statistics	
Number of respondents	261
Number of observations	569
Median number of interviews	2
Female	71%
Male	29%
Average age	34
Average age when diagnosed HIV+	31
Average level of education	Grade 9
Recipient of a disability grant	72%
Average number of household members	4
Percentage living in informal dwellings (shack)	59%
Households with children	59%
Households that have had a child younger than 6	36%
Households that have had a child aged 7-14	42%
Average monthly household income	R 1342
Respondent's average monthly income (wages+grants+remittances)	R 859
Average monthly household income from the respondent's income	77%
Average monthly household income from the respondent's wages	57%

Table 1 reflects that more than two-thirds of the sample (71 percent) was comprised of women. All respondents in the sample were Xhosa-speaking. The greater proportion of women in the sample might reflect women being more willing to visit clinics, because they face less stigma attached to clinic attendance than men, since women are expected to visit clinics when they are pregnant and have children (Beck, 2004). Across all 'waves' of the panel study the average monthly income that the respondent received (which consists of grant, wage and remittance income) is R859. Disability grant income is an important source of income in this sample, given that 72 percent of respondents are recipients of disability grants. Table 1 can be used to construct a profile of the average respondent in the sample. The average respondent is a 34-year-old

female with a grade 9 level of education who receives a disability grant. Her income contributes 77 percent towards the total household income. More than half (57 percent) of the total household income is comprised of her wage income and she lives in a shack with 3 other people, and one household member is most likely a child. This profile suggests that patients in the sample might be important contributors to household income and possibly provide care to children.

Statistical modeling of various transitions

Transiting from sickness to restored-health state, from inactivity to unemployment, and from unemployment to employment states are modeled in a single transition risk framework, and in an accelerated failure time models framework. We assumed a priori that the occurrence of each type of transition had a different causal structure. The same covariates might be relevant but each transition could have an independent set of parameters, see Kalbfleisch and Prentice (1980 and 2002).

When time T is continuous and measured precisely so that there are no ties, such continuous time survival procedures can be adopted: let x be a vector of covariates. A cause-specific or type-specific model can be represented by

$$h\ (t;\mathbf{x}) = \lim_{dt\to 0} dt^{-1} P(t \le T < t+dt,\ |\ T \ge t,\ \mathbf{x})$$

where $t > 0;$ $h_j(t;\mathbf{x})$ denotes the instantaneous risk of experiencing a transition of type j in the time interval $(t \le T < t+dt)$ given that no transition occurred before $T = t$.

The survivor function is

$$S(t;\ \mathbf{x}) = P(T > t\,|\,\mathbf{x}) = \exp\left(-\int_0^t h(u;\ \mathbf{x})\,du\right)$$

and the density-function for the transition is then

$$\begin{aligned} f(t;\mathbf{x}) &= \lim_{dt\to 0} dt^{-1} P(t \le T < t+dt, |\ \mathbf{x}) \\ &= h(t;\ \mathbf{x})\, S(t;\ \mathbf{x}) \end{aligned}$$

If $t_1 < t_2 < ... < t_{n_j}$ represents the n uncensored durations, then the likelihood-function may be rewritten as

$$L = \prod_{k=1}^{n_j} h\ (t_k;\ \mathbf{x}_k) \prod_{i=1}^{n} S\ (t_i; \mathbf{x}_i)$$

where x_i is the covariate of an individual with the observed non-censored duration t_k.

The log-likelihood function can be maximized given that the hazard rates $h\ (t \mid \mathbf{x})$ are dependent upon the parameter-vector θ, where the θ 's have no common components. In particular, a parametric model $h\ (t;\ \mathbf{x},\ \theta)$ can be specified for the hazards (see, Cox and Oakes, 1984).

For the transitions above we fitted Cox proportional-hazards models. Since Cox's method does not require some particular probability distribution to represent survival times, it is considerably robust. It can also accommodate both discrete and continuous measurements of transition times. The hazard functions mentioned above, can be modeled by using Cox model in the following way:

$$h[t; \mathbf{x}_i] = h_0(t) \exp[\mathbf{x}_i' \beta\ ],$$

where $\mathbf{x}_i$ is a vector of covariates, h_0 and β are the baseline hazards and the regression coefficients respectively which vary arbitrarily over transition types. As before, let $t_1 < t_2 < ... < t_{n_j}$ represent the n uncensored durations. The corresponding partial likelihood is

$$L(\beta_1, ...\beta_m) = \prod_{i=1}^{k_j} \frac{\exp[x_i \beta\ ]}{\sum_{l \in R(t_{ji})} \exp[\mathbf{x}_i' \beta\ ]}$$

the arbitrary baseline hazard function has been eliminated and the resulting likelihood can be used for inferences about β.

The modeling issues above rely on the implicit assumption that the exogenous variables were measured without any error and that there were not any omitted variables in the model. In other terms, there was an implicit assumption that the error term in the model had white noise characteristics. If we have any omitted variable in the model, the omission of such an effect can introduce important biases on the estimates of the parameters of interest (Gourieroux, 1989). The results based on the Information Matrix Test detected such unobserved heterogeneity in the case of transitions from different states. As a result, we introduced a stratum type unobserved heterogeneity term to the semi-parametric

specification mentioned above, which is the survival-data analog to regression models with fixed effects. Such unobserved heterogeneity is a latent random effect that enters multiplicatively on the hazard function.

Accelerated Failure Time Models (AFTM) are very similar to the usual regression analysis, where the logarithm of waiting time of the above mentioned spells in various states are treated as dependent variables, controlling for unobserved heterogeneity as individual specific frailties. For this reason the parameter signs are opposite in Cox and AFTM.

Results

Transitions from Sickness to Restored Health

Non-Parametric analysis using Kaplan-Meier estimates revealed that perceptions of health are consistent with clinical results from nonparametric analysis in the adherence study by Coetzee *et al* (2004). In the Coetzee *et al* (2004) study, the most rapid increase in CD4 counts was observed within the first three months of treatment. In our study, the risk of making a transition to perceptions of improved health is greatest between three and seven months on HAART. Improvements in general perceptions of health mirror, to some extent, improved clinical outcomes. Improvements in clinical health appear to be antecedent to perceptions of improved health.

Results of the Cox and AFTM for the transition from perceptions of illness to restored health are provided in Table 2. Demographic and household characteristics affect the individual perception of health. The results in both Cox and AFTM are consistent for whether the patient is living in a household with a resident child younger than fourteen years old. Patients living in such households have lower chances of making the transition to perceived restored health. The significance of this parameter in both models is indicative of the additional stress and the emotional toll that caring for children may place on individuals living with HIV/AIDS. The physical and emotional demands of caring for a child might place a strain on the patient's already fragile health (Wood, Tobias and McCree, 2004), and lead to perceived poorer health.

Table 2: Estimation results from Cox Proportional Hazard models and Accelerated Failure Time Models for individuals who made the transition from sickness to restored health

Parameters	Cox		AFTM	
	Hazard Rate	Standard Error	Coefficient	Standard Error
The patient's age when they were diagnosed HIV+	0.98	(0.04)	0.00	(0.00) **
The patient's gender (Male=1)	2.00	(1.25)	0.03	(0.02)
The patient's marital status	2.18	(1.40)	-0.10	(0.02) ***
The patient's level of education	0.63	(0.33)	0.05	(0.03)
The patient stopped working for HIV-related reasons	0.93	(0.57)	0.03	(0.03)
The number of household members that are employed	1.42	(0.37)	0.00	(0.01)
Whether the patient receives a disability grant	0.83	(0.57)	-0.04	(0.03)
Household income	1.00	(0.00)	-0.00	(0.00)
Whether there is a child younger than 14 in the household	0.16	(0.10)**	0.13	(0.03) ***
Whether the patient lives in a shack	3.76	(2.58)**	0.02	(0.03)
Public disclosure of HIV+ status	1.18	(1.58)	-0.04	(0.05)
The number of days that has passed since the patient was diagnosed HIV+	0.99	(0.00)	-4.52	(0.00)
The length of time that a patient received HAART before their first interview	0.96	(0.073)	-0.00	(0.00)

The standard error is reported in brackets
** indicates significance at the 10% level and ** at the 5% level *** at the 1% level*

Results from the AFTM model reveals that individuals who are unmarried; and the younger the patient is when they are diagnosed HIV-positive, increases the patient's chance of making the transition to perceptions of restored health. Cox finds that individuals living in a shack have a greater chance of improvements in their perception of their health. Patients who are married might feel that they face a lower risk of contracting HIV. Married patients may therefore be tested and diagnosed HIV-positive at much later stages in their HIV disease. If patients who are diagnosed HIV-positive and initiate HAART very late have poorer clinical health outcomes, then this may explain married patients having poorer clinical health outcomes, and therefore perceptions that their health is poor.

Transition from Unemployment to Employment

The sign for the coefficient in the AFTM and the hazard rate for Cox are consistent in Table 3. They indicate that patients who stopped working for HIV-related reasons have a greater chance of making the transition from being unemployed to finding employment. This result makes intuitive sense. If the reason that the respondent stopped working and chose to abstain from supplying labour was because deteriorating health forced them to discontinue work, then improvements in health are likely to persuade them to desire to work again. If deteriorating health was the dominant factor that influenced a patient's decision to leave the labour market, improvements in health will most likely be the dominant factor that influences his or her decision to return to the labour market. Patients who stopped working because of their HIV-disease might be more likely to want to supply labour since their past history of employment informs them that there has been a demand for their labour. This knowledge may encourage such individuals to return to the labour market. Furthermore, they may have obtained skills and experience from their past work, which give them an advantage over those who have never worked. Additionally, there is evidence that a lot of recruitment of workers in South Africa is done through networks (Seekings, 2003). Individuals who stopped working because of HIV-related reasons might have stronger networks in the labour market, through previous work experience and employers and colleagues, and the existence and utilisation of these networks might translate into a greater likelihood of making the transition to the role of 'a worker' when their health improves.

Table 3: Estimation results from Cox Proportional Hazard models and Accelerated Failure Time Models for individuals who made the transition from unemployment to employment

Parameters	Cox		AFTM	
	Hazard Rate	Standard Error	Coefficient	Standard Error
The patient's age when they were diagnosed HIV+	0.97	(0.02)	0.02	(0.02)
The patient's gender (Male=1)	0.96	(0.35)	-0.28	(0.27)
The patient's marital status	1.11	(0.41)	0.08	(0.27)
The patient's level of education	1.62	(0.83)	-0.17	(0.34)
The patient stopped working for HIV-related reasons	2.80	(0.94) ***	-0.62	(0.20) ***
The number of household members that are employed	1.31	(0.27)	-0.08	(0.14)
Whether the patient receives a disability grant	1.80	(0.86)	-0.32	(0.32)
Household income	1.00	(0.00)	-9.96	(0.00)
Whether there is a child younger than 14 in the household	0.96	(0.32)	0.00	(0.22)
Whether the patient lives in a shack	0.99	(0.36)	0.05	(0.23)
Public disclosure of HIV+ status	0.96	(0.52)	0.02	(0.33)
The number of days that has passed since the patient was diagnosed HIV+	1.00	(0.00)	0.00	(0.00)
The length of time that a patient received HAART before their first interview	0.99	(0.00)	0.01	(0.00)
Whether the patient has made the transition from feeling a little sick or very sick to not feeling sick	1.03	0.44	0.10	(0.28)

The standard error is reported in brackets
** indicates significance at the 10% level and ** at the 5% level *** at the 1% level*

Transition from Inactivity to Unemployment

Results from Table 4 reveal that the decision between choosing the role of exclusively being a person with a chronic illness' and 'a worker' is influenced by a myriad of individual characteristics. The signs in AFTM and Cox are consistent and plausible and indicate that age, education and previous work experience are particularly significant in explaining shorter spells of inactivity. For parameters that are significant in either Cox or AFTM, the hazard rate for Cox and the sign of the coefficient in AFTM is consistent.

Table 4: Estimation results from Cox Proportional Hazard models and Accelerated Failure Time Models for individuals who made the transition from inactivity to unemployment

Parameters	Cox		AFTM	
	Hazard Rate	Standard Error	Coefficient	Standard Error
The patient's age when they were diagnosed HIV+	0.95	(0.03) *	0.03	(0.01) ***
The patient's gender (Male=1)	1.40	(0.84)	-0.24	(0.16)
The patient's marital status	0.73	(0.40)	0.05	(0.19)
The patient's level of education	3.76	(1.93) ***	-0.48	(0.19) ***
The patient stopped working for HIV-related reasons	4.36	(2.00) ***	-0.50	(0.14) ***
The number of household members that are employed	1.57	(0.42) *	-0.09	(0.08)
Whether the patient receives a disability grant	0.99	(0.56)	0.56	(0.19) **
Household income	1.00	(0.00)	-0.00	(0.00)
Whether there is a child younger than 14 in the household	0.69	(0.27)	0.03	(0.13)
Whether the patient lives in a shack	1.74	(0.83)	-0.28	(0.16) *
Public disclosure of HIV+ status	1.34	(0.75)	-0.04	(0.26)
The number of days that has passed since the patient was diagnosed HIV+	0.99	(0.00)	0.00	(0.00)
The length of time that a patient received HAART before their first interview	0.98	(0.02)	-0.01	(0.00) **
Whether the patient has made the transition from feeling a little sick or very sick to not feeling sick	0.26	(0.24)	-0.82	(0.46) *

The standard error is reported in brackets
** indicates significance at the 10% level and ** at the 5% level *** at the 1% level*

Once again prior work experience is significant in affecting activity in the labour market. This combined with the significance of living in a household in which someone is employed, points to the role that networks play in job search and in finding a job. Patients with a secondary or tertiary level of education spend less time being inactive before deciding to enter the labour market. Patients with higher levels of education might perceive that demand for educated labour exists and is rewarded. This might explain their significantly greater risk of making the transition from choosing to abstain from the labour market to wanting employment.

A Western Kenyan longitudinal study found that within six months of initiating HAART there was a 20 percent increase in the likelihood of the patient participating in the labour force and a 35 percent increase in weekly hours worked (Thirumurthy, Graff-Zivin and Goldstein, 2005). Similarly, our results find that over time HAART has a positive impact on activity in the labour market. The individual's perception of his or her health feeds into their constructed identity, such that patients who have had their health restored as a result of HAART spend less time in inactivity before making the transition to unemployment. Positive perceptions of health translate into greater chances of being active in the labour market.

Summary and conclusions

Within the South African context of promoting the substitution of HAART with alternative remedies, and within the context of ambiguity surrounding the impact of HAART on perceived health, we found that over time HIV-positive patients receiving HAART report that their health has been restored. Using subjective health as a measure of the impact that HAART has had on the health provides us with insight into the experience of recovery. Our results provide additional evidence that outside of the positive impact that HAART has had on clinical health, the subjective health experience of individuals on HAART has been also been positive. In a debate where the positive impact of HAART is minimised, our findings indicate that life-sustaining treatment allows individuals to feel that their health has improved, and that this perception encourages them to want to enter the labour market.

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