

## Original Research Article

### **Factors contributing to delayed breast cancer presentation: A prospective study at Parirenyatwa group of hospitals, Harare, Zimbabwe 2010-2013.**

#### **Abstract**

**Background:** Breast cancer is one of the most common female cancers in Zimbabwe. A considerable proportion of patients delay presentation, leading to high morbidity and mortality. Delay in presentation can either be provider or patient delay. Survival is related to the stage at presentation. Delayed presentation is associated with lower survival. Understanding the reasons for delay may help in reducing delays and morbidity and mortality. This study addresses these concerns.

**Aim:** To determine factors contributing to delayed breast cancer presentation at Parirenyatwa Group of Hospitals

**Methods:** A prospective observational study of patients with the clinical and histological diagnosis of breast cancer attending Surgical Outpatient clinics awaiting surgery, or operated on from January 2010 to December 2013 were included. Patients were interviewed and specific questions relating to breast cancer risk and delay factors were recorded. Relevant investigations, including Human Immune Deficiency Virus (HIV) testing, were done and recorded. Final histology results were collected from Histopathology Department, analyzed and recorded. In addition to chi-square test for associated factors of delay and proportionate z test for percentage differences, the researchers validated the observed factors using discriminant analysis. Discriminant analysis was used to model the reasons and delay period with a cut-off point 3 months (< 3 months / ≥ 3 months).

**Results:** Seventy three patients were enrolled in the study. Forty nine (62.1%) were of rural domicile. Time to breast cancer presentation ranged from 1 to 52 months. The most common reason for delay (66%) was ignorance and secondly (18%) poverty. Fifty three (72.6%) patients were unemployed (p<0.05). Primary school was the highest level of education in 23 patients (31.5%), with 38 (52.1%) having attained

34 secondary level education. Fifty-seven (78.1%) patients presented with a mass  
35 ( $p < 0.05$ ) with pain occurring in 29 (39.7%) of patients. Fifty four patients (74%)  
36 knowledge of breast self-examination (BSE) and 37 (51%) of these patients were of rural  
37 domicile ( $p < 0.05$ ). Of the 37 rural patients with no knowledge of BSE 35 (94.5%), had  
38 primary level education ( $p < 0.005$ ). Fifty one (69.9%) patients consented to HIV testing, 7 (13.7%)  
39 were HIV positive. A low level of education, ignorance of breast cancer, poor socio-  
40 economic status, rural residence and lack of knowledge of BSE were important predictors of  
41 breast cancer delay to presentation. Old age, HIV status, level of education and family  
42 history were major reasons associated with breast cancer presentation delay.

43  
44 **Conclusion:** The overwhelming majority of breast cancer patients attending Parire  
45 nyatwa Group of Hospitals presented with advanced disease. These patients were  
46 mostly of low socio-economic status. Current health education campaigns seem to  
47 be ineffective in improving breast cancer awareness. Strategies to reduce delays in  
48 presentation, through various interventions focused on education and poverty allev-  
49 iation need to be formulated.

50  
51 **Key words:** breast cancer, presentation, delay, factors, developing countries

## 52 53 Introduction

54 Breast cancer is the most common malignancy in females worldwide. It is the leading  
55 cause of cancer related mortality<sup>1</sup>. Over 1-2 million cases are diagnosed every year,  
56 affecting 10 to 12% of the female population, and accounting for more than 500,000  
57 deaths per year worldwide<sup>2,3</sup>. The Zimbabwe National Cancer Registry 2012 Report  
58<sup>3</sup> highlighted that 11% of cancer deaths were due to breast cancer, with an incidence  
59 of 7%. Breast cancer mostly affects women and only a very small percentage of  
60 men.<sup>2,3</sup> Factors contributing to delayed breast cancer presentation have been stu-  
61 died elsewhere but not in Zimbabwe, despite the large number of deaths due to  
62 breast cancer.

63  
64 Patients who present late (figures 1) have lower survival rates<sup>4</sup>. An association be-  
65 tween stage at diagnosis and survival has been established<sup>4</sup>. Delayed patient pres-  
66 entation refers to a prolonged interval between the discovery of initial symptoms and  
67 evaluation by a service provider. Delayed presentation is typically defined as an in-

68 **terval** greater than 12 weeks <sup>5</sup>. Provider delay is when patients are **referred late**. This  
69 could either be due to wrong diagnoses being made or to failures in the referral sys-  
70 tem, **as commonly experienced in developing countries like Zimbabwe**. In Zimbabwe  
71 **general medical practitioners and local clinics refer cases** of breast cancer directly to  
72 **central** hospitals. A proportion of patients are delayed at this level. In provider delay,  
73 patients who present early are managed late **there by** worsening their outcome. **In**  
74 **patient delay, for various reasons patients procrastinate so by the time they seek**  
75 **medical help, the disease may be advanced**. Patient delay plays a major role in  
76 breast cancer related morbidity and mortality <sup>5</sup>. Patients with delays of 3 to 6 months  
77 have worse survival rates than those with delays of less than 3 months <sup>6</sup>.

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79 During the patient delay process <sup>6-10</sup>, the time from the individual detecting the symp-  
80 tom until they seek medical attention is termed "appraisal delay" <sup>7</sup> or "passive detec-  
81 tion"<sup>8</sup>. The time from the individual recognizing the symptom to seeking help is called  
82 "action appraisal" <sup>9</sup>, or behavioral delay<sup>7</sup>. Negative attitudes towards healthcare pro-  
83 viders are among the determinants of behavioral delay <sup>10-20</sup>. Knowledge of breast  
84 cancer symptoms and self-breast examination (BSE) have been associated with less  
85 appraisal and behavioral delays <sup>8, 12, 13, 20-30</sup>. Patient delay may be related to poor  
86 socioeconomic status, cultural beliefs, and level of education, ignorance and **acces-**  
87 **sibility to healthcare facilities** <sup>14, 22, 30-40</sup> among other factors.

88  
89 The **Zimbabwe National Cancer Registry (2012) report** showed on average 1,800  
90 women are affected annually by **breast cancer**. Approximately 1,200 **die from this**  
91 **disease annually**.<sup>2, 3</sup> **In Zimbabwe, breast cancer affects one in every 10 women.**<sup>3, 41-</sup>  
92 <sup>46</sup> **This study was carried out to provide scientific data on factors associated with de-**  
93 **layed breast cancer presentation in Zimbabwe. The aim was to identify possible**  
94 **strategies to shorten these delays thus reducing breast cancer mortality in Zim-**  
95 **babwe.**

96  
97 **AIM:** This **study** aimed to determine the factors associated with delay to breast can-  
98 cer presentation

99  
100 **Objectives:**

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- 102 To determine the magnitude and reasons for delayed breast cancer presentation at  
103 Parirenyatwa Group of Hospitals.  
104 To determine any association between level of education and delay in presentation.  
105 To determine the stage at presentation of breast cancer.  
106 To determine the presenting symptoms.  
107 To determine any association between HIV infection and advanced breast cancer.

108

109 **Study design:** A prospective observational study

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## 111 **Sampling Procedure and Sample Size**

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### 113 **Sample Size Estimation**

114 The minimum sample size n was obtained using the formula developed by Cochran  
115 in 2006 which is used in populations that are large:

116

$$117 \quad n = \frac{z^2 p(1-p)}{\epsilon^2}$$

118 Where,

119 p = Proportion of breast cancer patients who delayed for more than three months, p  
120 = 94%, calculated from a proportion of breast cancer patients delayed for more than  
121 three months in a study done by Muguti *et al.*, (1993)<sup>46</sup> in Zimbabwe

122  $\epsilon$  = margin of error set at 6 %

123 Z= standard normal deviate set at 1.96 for 95% confidence level

124 n= population size = 61

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126

## 127 **Materials and Methods**

128 All patients with a clinical and histological diagnosis of breast cancer attending Sur-  
129 gical Outpatient Department clinics, admitted, awaiting surgery or operated on from  
130 January 2010 to December 2013 were included in the study. Patients were inter-  
131 viewed and specific questions relating to breast cancer risk and delay factors rec-  
132 orded. Relevant investigations including HIV testing were done and recorded. Final  
133 histology results were collected analyzed and recorded. Delayed patient presentation

134 was defined as a prolonged interval between the discovery of the initial symptom to  
135 presentation to a provider, typically greater than 12 weeks (3 months).<sup>5,21,22</sup> Discrimi-  
136 nant analysis was used to model delay period with a cut-off point 3 months (< 3  
137 months / ≥ 3 months).

138

#### 139 **Inclusion Criteria:**

140 All female patients with a clinical and histological diagnosis of breast cancer over 15  
141 years age attending clinics or admitted to Parirenyatwa University Teaching Hospital

142

#### 143 **Exclusion Criteria:**

144 Male patients with breast cancer

145 Patients with breast cancer <15 years

146 Patients who did not have histological confirmation of breast cancer

147

#### 148 **Statistical analysis**

149 All data was entered in Epidata Entry version 3.1 software and cleaned before anal-  
150 ysis. Statistical analysis was carried out by SPSS version 16 statistical package.

151 Discriminant analysis was used to model the reasons for delay in months. Descrip-  
152 tive statistics: means, standard deviations, canonical discriminant parameters were  
153 determined as discriminant analysis procedure. The significance levels used to indi-  
154 cate effect were  $p < 0.05$ .

155

#### 156 **Model validation**

157 Among other diagnostics parameters used were Wilk's lambda (preferred the smal-  
158 lest value), and Box's M. We used a 50% Bernoulli (0.5) random sampling of the 73  
159 patients to create a discriminant analysis model, setting the remaining (50%) patients  
160 aside to validate the analysis. We then used the model to classify the 50% of the pa-  
161 tients as delayed or not delayed.

#### 162 **Ethics statement**

163 Ethical approval was sought from Parirenyatwa and College of Health Sciences Joint  
164 Research (JREC). Written consent to participate in the study and publish pictures  
165 was obtained

166

167 **Conflict of Interest**

168 **The authors declare no conflict of interest.** The study was self-funded.

169

170 **Results**

171

172 **Descriptive analysis**

173 In this study of 73 patients, 53 (72.6%) presented with advanced breast cancer, 8  
174 (11%) were stage 1, 12 (16.4%) were stage 2, 23 (31.5%) were stage 3 and 30  
175 (41.1%) were stage 4. Forty-three patients (59%) self-delayed in seeking breast can-  
176 cer treatment whilst only 30 (41%) were treated within the recommended period  
177 (within 3 months from the first symptom onset)<sup>5, 21, 22</sup>. Of the 73 study patients, 49  
178 (67.1%) were of rural and 24 (32.9%) urban domicile (figure 2). Thirty-seven of the  
179 53 patients with stage 3 and 4 disease were from rural areas and 16 were urban,  
180  $p=0.05$ . Time to breast cancer presentation ranged from 1 to 52 months. The most  
181 common reason for delay (48 patients, 66%) was ignorance and secondly poverty  
182 (13 patients, 18%). Twenty-three (31.5%) of patients attained a primary school edu-  
183 cation and 38 (52.1%) went to secondary school (figure 4). The presenting symptom  
184 in 57 (78.1%) patients was a mass ( $p<0.05$ ) and pain occurred in 39.7% of patients  
185 (table 2). Knowledge of BSE was associated with level of education (table 3). Fifty-  
186 four (74%) patients had no knowledge of BSE and 37 (68.5%) of these patients were  
187 of rural domicile,  $p<0.05$  (table 1). Of the 37 rural patients with no knowledge of BSE,  
188 35 (94.6%) had only a primary education ( $p<0.005$ ). Most patients, 20 (27.4%), were  
189 within an age range of 51-60 years and 15 (20.5%), aged between 41-50 years (fig-  
190 ure 3). Fifty-one patients (69.9%) consented to HIV testing, of which 7 (13.7%) were  
191 positive.

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193

194 **Discriminant analysis**

195

196 HIV positive status and a low level of education or ignorance (“a lack of knowledge,  
197 understanding, or education”)<sup>23</sup> are among the main reasons for breast cancer  
198 treatment delay (table 4 and table 5). Figure 4 and figure 5 show lack of education as

199 the main indicator of delay. Thus ignorance<sup>23</sup> or “a lack of knowledge, understand-  
200 ing, or education” is another major reason of breast cancer presentation delay.

201  
202 Coefficients with large absolute values correspond to variables with greater discrimi-  
203 nating ability as factors associated with patients who had delayed presentation  
204 ,namely old age (Coefficient; 1.061), HIV status (Coefficient; 0.89), level of education  
205 (Coefficient; 0.679), and family history (Coefficient; 0.221) (table 5)

206

## 207 Discussion

208

209 Breast cancer is a common health problem in our environment and patients present  
210 late. Factors causing delayed presentation are both patient and system related. In  
211 our study the major reasons for patient delay were old age, HIV status, and low level  
212 of education. In this study 43 (59%) of delays were patient related. This correlates  
213 with other studies which looked at reasons for patient delay<sup>6, 17, 30</sup>. A large proportion  
214 of our patients were of low socioeconomic background and had low educational  
215 backgrounds. Knowledge of BSE was lacking. It is recommended that campaigns  
216 must be directed at this population group with a view to provide education regarding  
217 the early signs and symptoms of breast cancer so as to change and improve their  
218 health seeking behavior<sup>8, 12, 13, 14-22</sup>. Burgess et al concluded in their study that pa-  
219 tients presenting late had competing demands and priorities, fears about cancer  
220 treatments and anxieties about “bothering the doctor”<sup>11</sup>. These psychosocial factors  
221 were noted in our study and need to be addressed in health education campaign  
222 programmes. Although only small percentage of patients were HIV positive, the ma-  
223 jority of these presented with advanced breast cancer. The stigma associated with  
224 HIV is a risk factor for delayed presentation<sup>20</sup>. This correlates with Brazilian studies  
225<sup>40, 41, and 42</sup>, one study reviewed breast cancer in a cohort of HIV infected women. The  
226 median age at diagnosis was 46 years. The median survival after breast cancer di-  
227 agnosis was 12 months and breast cancer diagnosis was made within 2 to 15 years  
228 of HIV-infection diagnosis. All patients were diagnosed late with breast cancer and  
229 thus had a worse prognosis<sup>40, 41, 42</sup>.

230

231 Most breast cancer patients attending Parirenyatwa Group of Hospitals present with  
232 advanced disease. Current health education campaigns seem not to be interdiscipli-  
233 nary and effective in improving breast cancer awareness; People living with HIV are  
234 suffering stigma and eventually delay due to low self-esteem<sup>20</sup>. It is our collective  
235 responsibility to reduce this delay through various interventions focused on educa-  
236 tion and poverty alleviation. Follow-up studies regarding management of these pa-  
237 tients need to be done so as to recommend and formulate local guidelines

238

### 239 **Conclusion**

240 Factors causing delayed presentation are both patient and system related. In our  
241 study the major reasons for delay were older age, HIV status, and low level of edu-  
242 cation respectively. Most were patient delays with low socio-economic background  
243 and low educational background. Knowledge of BSE is lacking. Education cam-  
244 paigns must be directed at this population group with a view to provide education re-  
245 garding the early signs and symptoms of breast cancer so as to change and improve  
246 their health seeking behavior. The majority of HIV-positive patients presented with  
247 advanced breast cancer and HIV stigma was a risk factor for delayed presentation.

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249 Current health education campaigns seem not to be inter-disciplinary and effective in  
250 improving breast cancer awareness; People living with HIV suffering stigma and  
251 eventually delay due to low self-esteem. It is our collective responsibility to reduce  
252 this delay through various interventions focused on education and poverty allevia-  
253 tion.

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### 255 **Recommendations**

256 Focused public health campaigns aimed at raising breast cancer awareness must  
257 target rural communities. Breast self-examination must be taught to women at all le-  
258 vels. Rural communities need to be encouraged to advance their education levels.  
259 Communities need to be empowered economically in order to improve their health  
260 seeking behaviour with special emphasis on breast cancer. Patients presenting late  
261 have competing demands and priorities, fears about cancer treatments and anxieties  
262 about 'bothering the doctor. These psychosocial factors need to be addressed in



263 health education campaign programs. Follow-up studies regarding management of  
264 these patients need to be done so as to recommend and formulate local guidelines  
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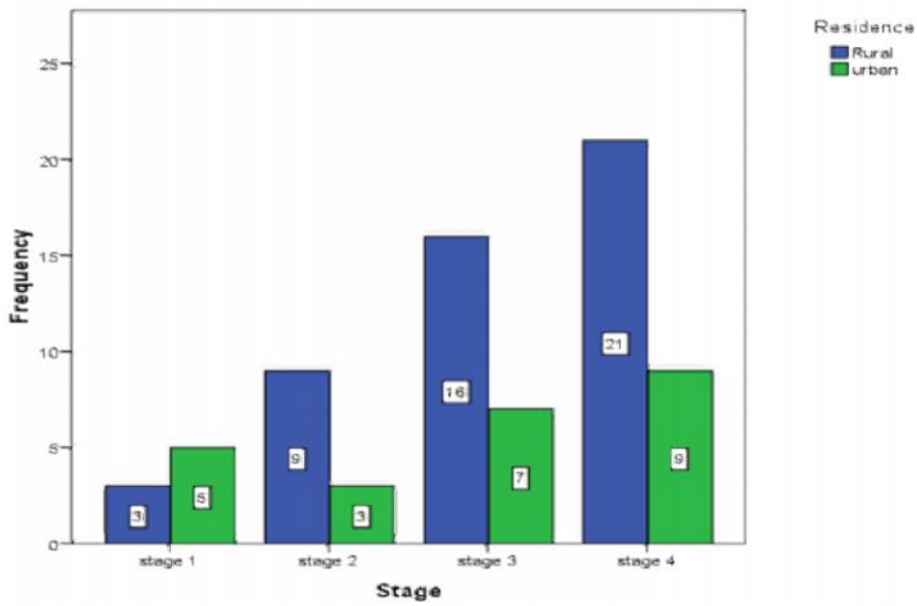
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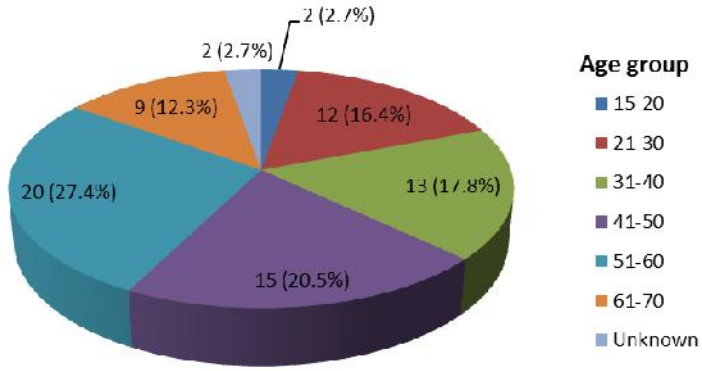
Figure 1: Patient 1 advanced breast cancer (Stage 4)

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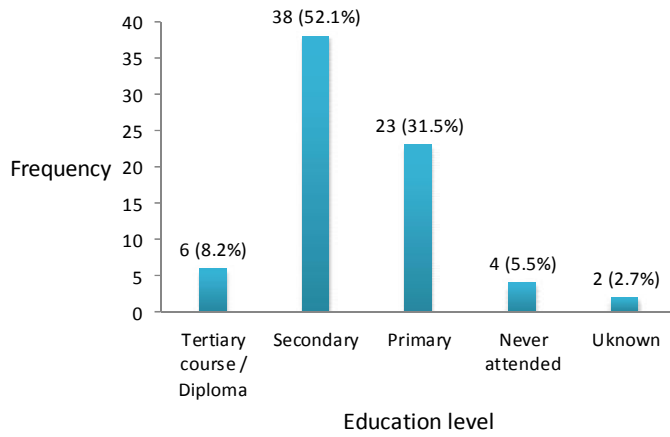


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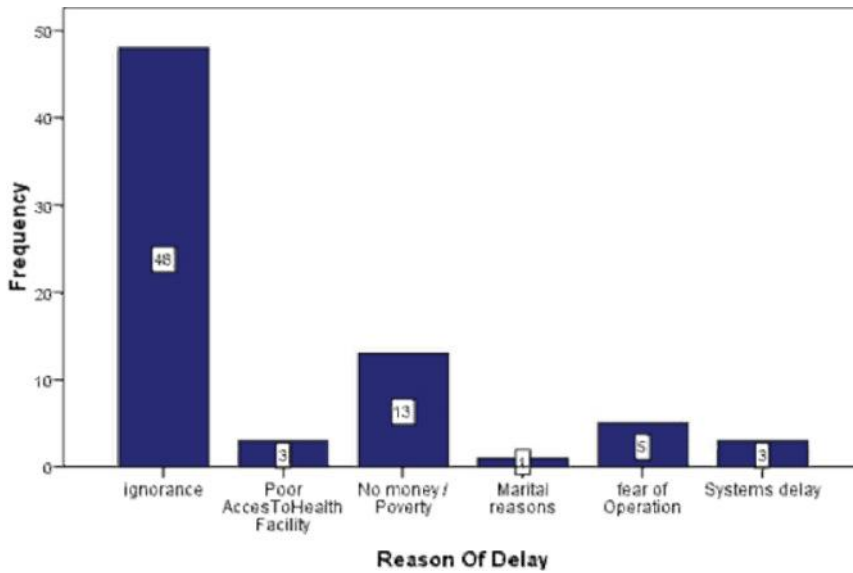
410 **Figure 2: Clinical Stage vs Domicile**  
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 416 **Figure 3: Breast cancer-age distribution**  
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 421 **Figure 4: Highest level of education**  
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424 **Figure 5:** Frequency distribution of patient's perception as reason for delay

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427 **Table 1:** Knowledge of self- breast examination and Residence

Residence	Knowledge of Breast Self-Examination		Total
	Yes (%)	No (%)	
Rural	12 (16.4)	37 (50.7)	49 (67.1)
Urban	7 (9.6)	17 (23.3)	24 (32.9)
<b>Total</b>	<b>19 (26.0)</b>	<b>54 (74.0)</b>	<b>73 (100)</b>

**Note:  $p < 0.05$ , Statistically significant association**

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433 **Table 2:** Symptoms

Symptom	Frequency	Percent
Mass	57	78.1
Nipple Discharge	12	16.4
Nipple Retraction	8	11
Pain	29	39.7
Ulcer	13	17.8

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**Table 3:** Relationship between knowledge of breast self-examination and level of education

Knowledge of Self Breast Cancer	Level of Education				Total
	Tertiary course / Diploma	Secondary	Primary	Never attended	
no	0 (0%)	14 (20.9%)	10 (14.9%)	2 (3.0%)	26 (38.8%)
yes	6 (9.0%)	22 (32.8%)	12 (17.9%)	1 (1.5%)	41 (61.2%)
<b>Total</b>	6 (9.0%)	36 (53.7%)	22 (32.8%)	3 (4.5%)	67 (100.0%)

*Note: p < 0.05, Statistically significant association*

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**Table 4:** Contributions of specific reasons to delayed breast cancer presentation

Reasons	Delayed presentation score	
	No	Yes
HIV Status	20.240	24.526
Age	6.169	7.406
Early Menarche	-1.521	-2.525
Family History	.055	.148
Late Menopause	7.697	4.812
Level of Education	5.269	8.898
(Constant)	-91.994	-115.295

*Note: Classification Function Coefficients determined by Fisher's linear discriminant functions*

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**Table 5:** Standardized discriminant Coefficients of patient perceptions as reason

Reason	Function
HIV Status	.890
Age	1.061
Early Menarche	-.524
Family History	.221
Late Menopause	-.424
Level of Education	.679

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