

A theoretical framework of the good health status of Jamaicans: using econometric analysis to model good health status over the life course

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Background: In recent times, the World Health Organization has increasingly drawn attention to the pivotal role of social conditions in determining health status. The non-biological factors produced inequalities in health and need to be considered in health development. In spite of this, extensive review of health status in the Caribbean revealed that no study has examined health status over the life course of Jamaicans. With the value of research in public health, this study is timely and will add value to understand the elderly, middle-aged and young adults in Jamaica. **Objective:** The aim of this study is to develop models that can be used to examine (or evaluate) the health of Jamaican elderly, middle-aged and young adults. **Method:** The current study used data from a cross-sectional survey which was conducted between July and October of 2002. Stratified random probability sampling technique was used to collect the data from 25,018 respondents across the island. The non-response rate for the survey was 29.7% with 20.5% who did not respond to particular questions, 9.0% who did not participate in the survey and another 0.2% who were rejected due to data cleaning. Logistic regression analyses were used to model the health status of Jamaican young adults, middle-aged adults and the elderly. The predictive power of the model was tested using the Omnibus Test of Model Coefficients and the Hosmer-Lemeshow Test (24) was used to examine goodness of fit of the model. The correlation matrix was examined in order to ascertain whether autocorrelation (or multi-collinearity) existed between variables. **Results:** Using logistic regression analysis, eleven variables emerged as statistically significant predictors of current good health status of Jamaicans ($p < 0.05$). The factors are retirement income (95% CI=0.487-0.958), logged medical expenditure (95% Confidence Interval, CI=0.907-0.993), marital status (separated or widowed or divorced: 95% CI=0.309-0.464; married: 95% CI=0.495-0.667; never married), health insurance (95% CI=0.029-0.046), area of residence (other towns: 95% CI=1.052-1.455; rural area:), education (secondary: 95% CI=1.167-1.576; tertiary: 95% CI=1.466-2.820; primary or below: OR=1.00), social support (95% CI=0.745-0.964), gender (95% CI=1.281-1.706), psychological affective conditions (negative affective: 95% CI=0.939-0.980; positive affective: 95% CI:1.047-1.107), number of males in household (95% CI:1.066-1.235), number of children in household (95% CI=1.117-1.266) and previous health status. **Conclusion:** The study concludes that good health status across the three age cohorts can be modeled using data for Jamaicans. Health status is determined by a number of non-biological factors, and poor health status is difficult to model as a low proportion of the data was correctly classified. Public health requires research with which to make more informed decisions, which means that this study offers an understanding of Jamaicans as well as young adults; middle-aged adults and the elderly. (Borne PA. A theoretical framework of good health status of Jamaicans: using econometric analysis to model good health status over the life course. *North Am J Med Sci* 2009; 1: 86 - 95).

Keywords: Health status; elderly; middle age; young adults; Jamaica

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Introduction

Health is a multidimensional construct which goes beyond dysfunctions (illnesses, ailments or injuries) [1-14]. Although the World Health Organization (WHO) began this broad conceptual framework in the late 1940s [1], Engel [3] was the first to develop the biopsychosocial model that can be used to examine and treat the health of mentally ill patients. Engel's biopsychosocial model was both in keeping with the WHO's perspective of health and again a conceptual model of health. Both the WHO and Engel's works were considered by some scholar to be too

broad and as such difficult to measure [15]; although this perspective has some merit, scholars have ventured into using different proxy to evaluate the ideal conceptual definition forwarded by the WHO for some time now. Psychologists have argued that the use of diseases to proxy health is unidirectional (or negative) [2], and that the inclusion of social, economic and psychological conditions in health is broader and more in keeping with the WHO's definition of health than diseases. Diener was the first psychologist to forward the use of happiness to proxy health (or wellbeing) of an individual [16, 17]. Instead of debating along the traditional cosmology of health, Diener

took the discussion into subjective wellbeing. He opined that happiness is a good proxy for subjective wellbeing of a person, and embedded therein is a wider scope for health than diseases. Unlike classical economists who developed Gross Domestic Product per capita (GDP) to examine standard of living (or objective wellbeing) of people as well this being an indicator of health status along with other indicators such as life expectancy, Diener and others believe that people are the best judges of their state. This is no longer a debate, as some economists have used happiness as a proxy of health and wellbeing [18-20], and they argued that it is a good measurement tool of the concept.

Whether the proxy of health (or wellbeing) is happiness, self-reported health status, self-rated health conditions, life satisfaction or ill-being, it was not until the 1970s that econometric analyses were employed in the study of health. Grossman [9] used econometrics to capture factors that simultaneously determine health stock of a population. Grossman's work transformed the conceptual framework outlined by the WHO and Engel into a theoretical framework for the study of health. Using data for the world, Grossman established an econometric model that captures determinants of health. The model read (Model 1):

$$H_t = f(H_{t-1}, G_o, B_t, MC_t, ED) \quad \text{Model (1)}$$

where H_t – current health in time period t , stock of health (H_{t-1}) in previous period, B_t – smoking and excessive drinking, and good personal health behaviors (including exercise – G_o), MC_t – use of medical care, education of each family member (ED), and all sources of household income (including current income).

Grossman's model was good at the time. However, one of the drawbacks to this model was the fact that some crucial factors were omitted by the aforementioned model. Based on that limitation, using literature, Smith and Kington [10] refined, expanded and modified Grossman's work as it omitted important variables such as the price of other inputs and family background or genetic endowment which are crucial to health status. They refined Grossman's work to include socioeconomic variables as well as some other factors [Model (2)].

$$H_t = H^*(H_{t-1}, P_{mc}, P_o, ED, E_t, R_t, A_t, G_o) \quad \text{Model (2)}$$

Model (2) expresses current health status, H_t , as a function of stock of health (H_{t-1}), price of medical care, P_{mc} , the price of other inputs, P_o , education of each family member (ED), all sources of household income (E_t), family background or genetic endowments (G_o), retirement related income (R_t), asset income (A_t).

It is Grossman's work that accounts for economists like Veenhoven [20] and Easterlin's [19] works, which used econometric analysis to model factors that determine subjective wellbeing. Like Veenhoven [20], Easterlin [19] and Smith and Kington [10], Hambleton et al. [6] used the same theoretical framework developed by Grossman to

examine determinants of health of the elderly (ages 65+ years) in Barbados. The work of Hambleton et al. refined the work of Grossman and added some different factors such as geriatric depression index, past and current nutrition, crowding, number of children living outside of the household, and living alone. Unlike Grossman's study, he found that current disease conditions accounted for 67.2% of the explained variation in the health status of elderly Barbadians, with lifestyle risk factors accounting for 14.2%, and social factors 18.6%. One of the additions to Grossman's work based on Hambleton et al.'s study was the actual proportion of each factor on health status and lifestyle risk factors.

A study published in 2004, using life satisfaction and psychological wellbeing to proxy wellbeing of 2,580 Jamaicans, Hutchinson et al. [21] employed the principles in econometric analysis to examine social and health factors of Jamaicans. Other studies conducted by Bourne on different groups and sub-groups of the Jamaican population have equally used the principles of econometric analysis to determine factors that explain health, quality of life or wellbeing [5, 8, 22, 23]. Despite the contribution of Hutchinson et al. and Bourne's works to the understanding of wellbeing, there is a gap in the literature on a theoretical framework that explains good health status of the life course of Jamaicans. The current study will model predictors of good health status of Jamaicans as well as good health status of young adults, middle-aged adults and the elderly in order to provide a better understanding of the factors that influence each cohort.

Material & Methods

Participants and questionnaire

The current research used a national cross-sectional survey of 25,018 respondents from the 14 parishes in Jamaica. The survey used stratified random probability sampling techniques to draw the 25,018 respondents. The non-response rate for the survey was 29.7% with 20.5% who did not respond to particular questions, 9.0% who did not participate in the survey and another 0.2% who were rejected due to data cleaning. The study used secondary cross-sectional data from the Jamaica Survey of Living Conditions (JSLC). The JSLC was commissioned by the Planning Institute of Jamaica (PIOJ) and the Statistical Institute of Jamaica (STATIN). These two organizations are responsible for planning, data collection and policy guidelines for Jamaica.

The JSLC is a self-administered questionnaire where respondents are asked to recall detailed information on particular activities. The questionnaire covers demographic variables, health, immunization of children 0 to 59 months, education, daily expenses, non-food consumption expenditures, housing conditions, inventory of durable goods, and social assistance. Interviewers are trained to collect the data from household members. The survey is conducted between April and July annually.

Model

The multivariate model used in this study is a modification of those of Grossman and Smith & Kington which captures the multi-dimensional concept of health and health status. The present study further refines the two aforementioned works and in the process adds some new factors such as psychological conditions, crowding, house tenure, number of people per household and a deconstruction of the numbers by particular characteristics, i.e., males, females and children (ages ≤ 14 years). Another fundamental difference of the current research and those of Grossman, and Smith and Kington is that it is area-specific as it is focused on Jamaican residents.

The proposed model that this research seeks to evaluate is displayed below [Model (3)]:

$$H_i = f(H_{t-1}, P_{mc}, ED_i, R_i, A_i, Q_i, HH_i, C_i, En_i, MS_i, HI_i, HT_i, SS_i, LL_i, X_i, CR_i, D_i, O_i, \Sigma(NP_i, PP_i), M_i, N_i, FS_i, A_i, W_i, \epsilon_i)$$

Model (3)

The current health status of a Jamaica, H_t , is a function of 23 explanation variables, where H_t is current health status of person i , if good or above (i.e., no reported health conditions in the four weeks leading up to the survey period), 0 if poor (i.e., reported at least one health condition); H_{t-1} is stock of health for previous period; $\ln P_{mc}$ is logged cost of medical care of person i ; ED_i is educational level of person i , 1 if secondary, 1 if tertiary and the reference group is primary and below; R_t is retirement income of person i , 1 if receiving private and/or government pension, 0 if otherwise; HI_i is health insurance coverage of person i , 1 if they have a health insurance policy, 0 if otherwise; HT_i is house tenure of person i , 1 if paying rent, 0 if squatting; X_i is gender of person i , 1 if female, 0 if male; CR_i is crowding in the household of person i ; $\Sigma(NP_i, PP_i)$ NP_i is the summation of all negative affective psychological conditions and PP_i is the summation of all positive affective psychological conditions; M_i is the number of males in the household of person i and F_i is the number of females in the household of person i ; A_i is the age of person i and N_i is the number of children in the household of person i ; LL_i is living arrangements where 1= living with family members or relatives, and 0=otherwise, and social standing (or social class), W_i .

Statistical Analysis

Statistical analyses were performed using Statistical Packages for the Social Sciences (SPSS) 16.0 software for Widows. A single hypothesis was tested, which was "health status of rural resident is a function of demographic, social, psychological and economic variables." The entered method in logistic regression was used to test the hypothesis in order to determine those factors that influence the health status of rural residents if the dependent variable is a binary one; and linear multiple regression in the event that the dependent variable was a normally distributed metric variable. The final model was established based on those variables that are statistically significant (i.e. $p < 0.05$) – i.e., 95% confidence interval

(CI), and all other variables were removed from the final model ($p > 0.05$). Continuing, categorical variables were coded using the "dummy coding" scheme.

The predictive power of the model was tested using the Omnibus Test of Model Coefficients and the Hosmer-Lemeshow Test [24] was used to examine goodness of fit of the model. The correlation matrix was examined in order to ascertain whether autocorrelation (or multicollinearity) existed between variables. Cohen and Holliday [25] stated that correlation can be low/weak (0 to 0.39); moderate (0.4-0.69), or strong (0.7-1.0). This was used in this study to exclude (or allow) a variable in the model. Finally, Wald statistics was used to determine the magnitude (or contribution) of each statistically significant variable in comparison with the others, and the odds ratio (OR) for the interpreting of each significant variable.

Results

Modeling the current good health status of Jamaican elderly, middle-aged and young adults

Predictors of current good health status of Jamaicans: Using logistic regression analyses, eleven variables emerged as statistically significant predictors of current good health status of Jamaicans ($p < 0.05$, see Model 4). The factors are retirement income, logged medical expenditures, marital status, health insurance, area of residence, education, social support, gender, psychological affective conditions, number of males in the household, number of children in the household and previous health status (Table 1).

$$H_t = f(H_{t-1}, R_t, P_{mc}, ED_i, MS_i, HI_i, SS_i, AR_i, X_i, \Sigma(NP_i, PP_i), M_i, N_i, \epsilon_i)$$

Model (4)

The model [i.e., Model (4)] had statistically significant predictive power ($\chi^2(27) = 1860.639$, $p < 0.001$; Hosmer-Lemeshow goodness of fit $\chi^2 = 4.703$, $p = 0.789$) and overall correctly classified 85.7% of the sample (correctly classified 98.3% of cases of good health status and correctly classified 33.9% of cases of dysfunctions).

There was a moderately strong statistical correlation between age, marital status, education, retirement income, per capita income quintiles and property ownership, and so these were omitted from the initial model (i.e., model 3). Based on that fact, three age groups were classified (young adults, age 15 to 29 years; middle-aged adults, age 30 to 59 years; and the elderly, age 60+ years) and the initial model was once again tested. There were some modifications of the initial model in keeping with the age group. For young adults, the initial model was amended by excluding retirement income; property ownership; divorced, separated or widowed status; number of children in the household; and house tenure. The exclusion was based on the fact that there were more than 15% of cases missing in some categories and a high correlation between variables.

Predictors of current good health status of elderly Jamaicans: From the logistic regression analyses that were used on the data, eight variables were found to be statistically significant in predicting good health Status of elderly Jamaicans ($p < 0.5$) (see Model 5). These factors were education, marital status, health insurance, area of residence, gender, psychological conditions, number of males in the household, number of children in the household and previous health status (see Table 2).

$$H_t = f(H_{t-1}, ED_i, MS_i, HI_i, AR_i, X_i, \Sigma (PP_i), M_i, Ni, \epsilon_i) \text{ Model (5)}$$

The model had statistically significant predictive power (model $\chi^2 (27) = 595.026$, $p < 0.001$; Hosmer-Lemeshow goodness of fit $\chi^2 = 5.736$, $p = 0.677$) and overall correctly classified 75.5% of the sample (correctly classified 94.6% of cases of good or beyond health status and correctly classified 44.7% of cases of dysfunctions).

Predictors of current good health status of middle-aged Jamaicans: Using logistic regression, six variables emerged as statistically significant predictors of current good health status of middle-aged Jamaicans ($p < 0.05$) (Model 6). These factors are logged medical expenditure, physical environment, health insurance, gender of respondents, psychological condition, number of children in the household and previous health status (see Table 3).

$$H_t = f(H_{t-1}, P_{mc}, En_i, HI_i, X_i, \Sigma (NP_i), Ni, \epsilon_i) \text{ Model (6)}$$

Based on table 3, the model had statistically significant predictive power (model $\chi^2 (27) = 547.543$, $p < 0.001$; Hosmer-Lemeshow goodness of fit $\chi^2 = 4.318$, $p = 0.827$) and overall correctly classified 87.2% of the sample (correctly classified 98.3% of cases of good or beyond health status and correctly classified 28.2% of cases of dysfunctions).

Predictors of current good health status of young adults in Jamaica: Using logistic regression, two variables emerged as statistically significant predictors of current good health status of young adults in Jamaica ($p < 0.05$) (Model 7). These are health insurance coverage, psychological condition, social class and previous health status (Table 4).

$$H_t = f(H_{t-1}, W_i, HI_i, \Sigma (NP_i), \epsilon_i) \text{ Model (7)}$$

From table 3, the model had statistically significant predictive power (model $\chi^2 (19) = 453.733$, $p < 0.001$; Hosmer-Lemeshow goodness of fit $\chi^2 = 5.185$, $p = 0.738$) and overall correctly classified 92.6% of the sample (correctly classified 99.0% of cases of good or beyond health status and correctly classified 28.2% of cases of dysfunctions).

Limitations to the Models

Good health status of Jamaicans [*i.e.*, Model 4], the elderly [*i.e.*, Model 5], middle-aged adults [*i.e.*, Model 6], and young adults [*i.e.*, Model 7] are derivatives of Model (3). Good health status [*i.e.*, Model 4 – Model 7] cannot be distinguished and tested over different time periods, person differential, and these are important components of good health.

$$H_t = f(H_{t-1}, R_t, P_{mc}, ED_i, MS_i, HI_i, SS_i, AR_i, X_i, \Sigma (NP_i, PP_i), M_i, Ni, \epsilon_i) \text{ Model (4)}$$

The current work is a major departure from Grossman's theoretical model as he assumed that factors affecting good health status over the life course are the same; this study disagreed with his fundamental assumption. This study revealed that predictors of good health status are not necessarily the same across the life course, and vary greatly from that of the general populace. Despite those critical findings, healthy time gained can increase good health status directly and indirectly but this cannot be examined by using a single cross-sectional study. Health does not remain constant over any specified period, and to assume that this is captured in age is to assume that good or bad health change over year(s). Health stock changes over short time intervals, and so must be incorporated within any health model.

People are different even across the same ethnicity, nationality, next of kin and socialization. This was not accounted for in the Grossman's work or the current work, as this is one of the assumptions. Neither Grossman's study nor the current research recognized the importance of differences in individuals owing to culture, socialization and genetic composition. Each individual is different even if that person's valuation for good health status is the same as someone else who shares similar characteristics. Hence, a variable P representing the individual should be introduced to this model in a parameter α (p). Secondly, the individual's good (or bad) health is different throughout the course of the year and so time is an important factor. Thus, the researcher is proposing the inclusion of a time-dependent parameter in the model. The general proposition for further studies is that the function should incorporate α (p, t) a parameter depending on the individual and time.

An unresolved assumption of this work which continues from Grossman's model is that people choose health stock so that desired health is equal to actual health. The current data cannot test this difference in the aforementioned health status and so the researcher recommends that future study to account for this disparity so we can identify factors of actual health and difference between the two models.

Table 1 Good health status of Jamaicans by some explanatory variables

Variable	Coefficient	Std Error.	Wald	P value	Odds Ratio	95.0% C.I.	
						Lower	Upper
Middle Quintile	-0.029	0.095	0.090	0.764	0.972	0.806	1.171
Two Wealthiest Quintiles Poorest-to-poor Quintiles*	-0.110	0.098	1.262	0.261	0.896	0.739	1.085
Retirement Income	-0.381	0.173	4.882	0.027	0.683	0.487	0.958
Household Head	0.174	0.286	0.370	0.543	1.190	0.679	2.084
Logged Medical Expenditure	-0.053	0.023	5.100	0.024	0.949	0.907	0.993
Average Income	0.000	0.000	1.557	0.212	1.000	1.000	1.000
Average Consumption	0.000	0.000	0.160	0.689	1.000	1.000	1.000
Environment	0.010	0.072	0.019	0.891	1.010	0.877	1.163
Separated or Divorced or Widowed	-0.971	0.104	87.360	0.000	0.379	0.309	0.464
Married	-0.554	0.076	53.048	0.000	0.575	0.495	0.667
Never married*							
Health Insurance	-3.314	0.119	776.639	0.000	0.036	0.029	0.046
Other Towns	0.213	0.083	6.642	0.010	1.237	1.052	1.455
Urban Area	-0.008	0.126	0.004	0.952	0.992	0.776	1.270
Rural Area*							
House Tenure - Rent	-1.076	0.884	1.482	0.224	0.341	0.060	1.928
House Tenure - Owned	-0.415	0.546	0.578	0.447	0.660	0.226	1.926
House Tenure- Squatted*							
Secondary Education	0.305	0.077	15.807	0.000	1.356	1.167	1.576
Tertiary Education	0.710	0.167	18.086	0.000	2.033	1.466	2.820
Primary and below*							
Social Support	-0.166	0.066	6.333	0.012	0.847	0.745	0.964
Living Arrangement	-0.057	0.129	0.195	0.659	0.945	0.734	1.216
Crowding	-0.012	0.042	0.084	0.772	0.988	0.910	1.072
Land ownership	-0.070	0.073	0.904	0.342	0.933	0.808	1.077
Gender	0.391	0.073	28.667	0.000	1.478	1.281	1.706
Negative Affective	-0.042	0.011	14.958	0.000	0.959	0.939	0.980
Positive Affective	0.074	0.014	26.260	0.000	1.077	1.047	1.107
Number of males in household	0.137	0.038	13.364	0.000	1.147	1.066	1.235
Number of females in household	0.058	0.038	2.364	0.124	1.060	0.984	1.142
Number of children in household	0.173	0.032	29.161	0.000	1.189	1.117	1.266
Constant	1.885	0.654	8.310	0.004	6.586		

$\chi^2(27) = 1860.639$, $p < 0.001$; $n = 8,274$

-2 Log likelihood = 6331.085

Hosmer and Lemeshow goodness of fit $\chi^2 = 4.703$, $p = 0.789$.

Nagelkerke $R^2 = 0.320$

Overall correct classification = 85.7% (N=7,089)

Correct classification of cases of good or beyond health status = 98.3% (N=6,539)

Correct classification of cases of dysfunctions = 33.9% (N=550); *Reference group

Table 2 Good health status of elderly Jamaicans by some explanatory variables

	Coefficient	Std Error	Wald	P value	Odds Ratio	95.0% C.I.	
						Lower	Upper
Middle Quintile	-0.104	0.153	0.466	0.495	0.901	0.668	1.215
Two Wealthiest Quintiles	0.116	0.168	0.474	0.491	1.123	0.807	1.562
Poorest-to-poor quintiles							
Retirement Income	-0.217	0.217	1.000	0.317	0.805	0.526	1.231
Household Head	0.891	0.653	1.864	0.172	2.438	0.678	8.763
Logged Medical Expenditure	-0.055	0.037	2.157	0.142	0.946	0.880	1.019
Average Income	0.000	0.000	0.928	0.335	1.000	1.000	1.000
Environment	-0.157	0.117	1.798	0.180	0.855	0.680	1.075
Separated or Divorced or Widowed	-0.492	0.148	10.998	0.001	0.611	0.457	0.818
Married	-0.328	0.149	4.824	0.028	0.720	0.538	0.965
Never married*	-3.352	0.216	241.878	0.000	0.035	0.023	0.053
Health Insurance							
Other Towns	0.326	0.141	5.323	0.021	1.385	1.050	1.826
Urban	0.399	0.214	3.481	0.062	1.491	0.980	2.269
Rural areas*							
House tenure - rented	-20.373	40192.9	0.000	1.000	0.000	0.000	
House tenure - owned	1.218	1.242	0.962	0.327	3.382	0.296	38.601
House tenure – squatted*							
Secondary Education	-0.456	0.114	16.057	0.000	0.634	0.507	0.792
Tertiary Education	0.814	0.349	5.446	0.020	2.256	1.139	4.469
Primary or below*							
Social support	-0.075	0.110	0.465	0.495	0.928	0.748	1.151
Living arrangement	0.260	0.179	2.111	0.146	1.297	0.913	1.842
Crowding	-0.049	0.091	0.286	0.593	0.953	0.797	1.138
Landownership	0.174	0.133	1.716	0.190	1.190	0.917	1.544
Gender	0.471	0.123	14.665	0.000	1.601	1.258	2.037
Negative Affective	-0.027	0.019	1.971	0.160	0.974	0.938	1.011
Positive Affective	0.071	0.023	9.262	0.002	1.074	1.026	1.124
Number of male	0.177	0.068	6.746	0.009	1.193	1.044	1.363
Number of females	0.051	0.073	0.487	0.485	1.052	0.912	1.213
Number of children	0.217	0.062	12.085	0.001	1.242	1.099	1.404
Constant	-1.317	1.444	0.832	0.362	0.268		

$\chi^2 (27) = 595.026$, $p < 0.001$; $n = 2,002$

-2 Log likelihood = 2,104.66

Hosmer and Lemeshow goodness of fit $\chi^2 = 5.736$, $p = 0.677$.

Nagelkerke $R^2 = 0.347$

Overall correct classification = 75.5% (N=1,492)

Correct classification of cases of good or beyond health status = 94.6% (N=1,131)

Correct classification of cases of dysfunctions = 44.7% (N=361);

*Reference group

Table 3 Good health status of middle age Jamaicans by some explanatory variables

	Coefficient	Std Error	Wald	P value	Odds Ratio	95.0% C.I.	
						Lower	Upper
Middle Quintile	0.032	0.154	0.044	0.834	1.033	0.764	1.397
Two Wealthiest Quintiles Poorest-to-poor Quintiles*	-0.289	0.151	3.669	0.055	0.749	0.557	1.007
Retirement Income	-0.565	0.362	2.436	0.119	0.569	0.280	1.155
Household Head	0.504	0.452	1.241	0.265	1.655	0.682	4.013
Logged Medical Expenditure	-0.092	0.036	6.439	0.011	0.912	0.850	0.979
Average Income	0.000	0.000	0.534	0.465	1.000	1.000	1.000
Environment	0.313	0.115	7.413	0.006	1.368	1.092	1.713
Separated or Divorced or Widowed	-0.199	0.227	0.772	0.380	0.819	0.525	1.278
Married	-0.178	0.109	2.679	0.102	0.837	0.676	1.036
Never married*							
Health Insurance	-3.040	0.170	320.761	0.000	0.048	0.034	0.067
Other Towns	0.107	0.123	0.750	0.387	1.112	0.874	1.416
Urban	-0.009	0.190	0.002	0.963	0.991	0.683	1.439
Rural areas*							
House tenure - rented	17.938	20029.776	0.000	0.999		0.000	
House tenure - owned	-1.331	1.115	1.426	0.232	0.264	0.030	2.349
House tenure – squatted*							
Secondary education	0.186	0.128	2.114	0.146	1.204	0.937	1.547
Tertiary education	0.343	0.229	2.233	0.135	1.409	0.899	2.208
Primary or below*							
Social support	-0.076	0.101	0.571	0.450	0.927	0.761	1.129
Living Arrangement	-0.192	0.206	0.872	0.351	0.825	0.552	1.235
Crowding	-0.047	0.058	0.652	0.419	0.954	0.851	1.070
Landownership	-0.131	0.108	1.468	0.226	0.877	0.710	1.084
Gender	0.507	0.110	21.405	0.000	1.661	1.340	2.059
Negative Affective	-0.080	0.016	24.663	0.000	0.923	0.895	0.953
Positive Affective	0.048	0.022	4.507	0.034	1.049	1.004	1.096
Number of males in house	0.026	0.055	0.232	0.630	1.027	0.923	1.142
Number of female in house	0.079	0.055	2.085	0.149	1.083	0.972	1.206
Number of children in house	0.102	0.044	5.469	0.019	1.108	1.017	1.207
Constant	3.287	1.252	6.892	0.009	26.767		

$\chi^2 (27) = 547.543$, $p < 0.001$; $n = 3,799$

-2 Log likelihood = 2,776.972

Hosmer and Lemeshow goodness of fit $\chi^2 = 4.318$, $p = 0.827$.

Nagelkerke $R^2 = 0.230$

Overall correct classification = 87.2% (N=3,313)

Correct classification of cases of good or beyond health status = 98.3% (N=3,143)

Correct classification of cases of dysfunctions = 28.2% (N=170); *Reference group

Table 4: Good health status of young adult Jamaicans by some explanatory variables

	Coefficient	Std Error	Wald	P value	Odds Ratio	95.0% C.I.	
						Lower	Upper
Middle Quintile	-0.062	0.191	0.104	0.747	0.940	0.647	1.367
Two Wealthiest Quintiles Poorest-to-poor quintiles*	-0.593	0.178	11.096	0.001	0.553	0.390	0.784
Household Head	-0.253	0.393	0.414	0.520	0.776	0.359	1.679
Logged Medical Expenditure	0.013	0.044	0.093	0.760	1.013	0.930	1.104
Average Income	0.000	0.000	3.292	0.070	1.000	1.000	1.000
Environment	-0.026	0.131	0.041	0.840	0.974	0.754	1.258
Health Insurance	-3.729	0.208	321.509	0.000	0.024	0.016	0.036
Other Towns	0.233	0.150	2.419	0.120	1.262	0.941	1.692
Urban	-0.047	0.175	0.072	0.788	0.954	0.677	1.344
Rural area*							
Secondary education	-0.058	0.405	0.021	0.886	0.943	0.426	2.088
Tertiary education	-0.390	0.467	0.695	0.405	0.677	0.271	1.693
Primary and below*							
Social support	-0.141	0.128	1.221	0.269	0.868	0.676	1.115
Crowding	0.044	0.055	0.649	0.420	1.045	0.939	1.164
Gender	0.185	0.146	1.601	0.206	1.204	0.903	1.604
Negative Affective	-0.040	0.019	4.217	0.040	0.961	0.926	0.998
Positive Affective	0.072	0.027	6.813	0.009	1.074	1.018	1.134
Number of males in house	0.125	0.065	3.669	0.055	1.133	0.997	1.287
Number of females in house	0.058	0.062	0.871	0.351	1.059	0.939	1.195
Married	0.081	0.224	0.132	0.717	1.085	0.699	1.683
Never married*							
Constant	2.745	0.674	16.615	0.000	15.570		

$\chi^2 (19) = 453.733$, $p < 0.001$; $n = 4,174$

-2 Log likelihood = 2,091.88

Hosmer and Lemeshow goodness of fit $\chi^2 = 5.185$, $p = 0.738$.

Nagelkerke $R^2 = 0.226$

Overall correct classification = 92.6% (N=3,864)

Correct classification of cases of good or beyond health status = 99.0% (N=3,757)

Correct classification of cases of dysfunctions = 28.2% (N=107);

*Reference group

Discussions

This study has modeled the current health status of Jamaicans. Dividing health into two categories (*i.e.*, good – not having reported an acute or illness; or poor – having reported an illness or ailment), this study has found that using logistic regression health status can be modeled for Jamaicans. The findings revealed that the probability of

predicting good health status of Jamaicans was 0.789, using eleven factors, and that approximately 86% of the data was correctly classified in this study. Continuing with Model (4), approximately 98% of those who had reported good health status were correctly classified, suggesting that using logistic regression to examine good health status of the Jamaican population with the eleven factors that

emerged is both a good predictive model and a good evaluate of the current good health status of the Jamaican population. This is not the first study to examine current good health status in the Caribbean or even in Jamaica [6, 21-23], but none of those works have established a general or sub-model of good health over the life course.

In Hambleton et al's work, the scholars identified the factors (*i.e.*, historical, current, lifestyle, diseases) and how much of the level of health they explain ($R^2=38.2\%$). However, they did not examine the goodness of fit of the model or the correctness of fit of the data. Bourne's works [22,23] were similar to that of Hambleton et al's study, as his study identified more factors (psychological conditions; physical environment, number of children or males or females in the household and social support) and had a greater explanatory power (adjusted r square = 0.459), but again the goodness of fit and correctness of fit of the data were omitted. Again, this was the case in Hutchinson et al.'s research.

A major finding of this study is the fact that with the low classification of poor health, logistic regression cannot be used to examine poor health but good health. Given the different age cohort examined in this study, logistic regression cannot be used to evaluate poor health, as less than 30% of cases were correctly classified, suggesting that Jamaicans, irrespective of their true poor health status, compared to good health.

Although the current study has concluded that logistic regression can be used to model good health status and not poor health conditions across the age life cycle of Jamaicans, the factors identified that determine good health status for the elderly had the lowest goodness of fit (approximately 68%) while having the greatest explanatory power ($R^2=35\%$). The findings also revealed low explanatory powers for young adults ($R^2=22.6\%$) and middle-aged adults ($R^2=23\%$), with the latter having a greater goodness of fit for the data, as this owed to having more variables to determine good health. Another important finding is of the eleven factors that emerge to explain the good health status of Jamaicans. When age cohorts were examined it was found that young adults had the least number of predictors (*i.e.*, health insurance, social class and negative affective psychological conditions). This suggests that young adults' social background and health insurance are important factors that determine their good health status and they are less affected by some of the other determinants that affect the elderly and middle-aged adults. It should be noted that young adult is the only age cohort with which social standing is a determinant of good health. Even though the good health status model that emerged from this study is good, the low explanatory power indicates that young adults are unique and further study is needed on this group in order to better understand those factors that account for their good health.

Conclusions

The study concludes that good health status across the

three age cohorts can be modeled using data for Jamaicans. Health status is determined by a number of non-biological factors, and that poor health status is difficult to model as a low proportion of the data was correctly classified. However, good health status can be correctly fitted using data for Jamaica, indicating the value of this study in understanding the health status of the sampled population. In this study, apart from the identification of the variables for each age cohort and that of the general populace, some variables are the same across the three cohorts. Public health requires research so as to make more informed decisions, which means that this study offers an understanding of Jamaicans as well as young adults, middle-aged adults and the elderly.

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