JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH

How to cite this article:
BOURNE P A. Disparities In Self-Rated Health, Health Care Utilization, Illness, Chronic Illness And Other Socioeconomic Characteristics Of The Insured And The Uninsured.Journal of Clinical and Diagnostic Research [serial online] 2010 August [cited: 2010 August 21]; 4:2804-2816.

Availablefrom:
http://www.jcdr.net/back_issues.asp?issn=0973-709x&year=2010&month=August &volume=4&issue=4&page=2804-2816 &id=910

## ORIGINAL ARTICLE

# Disparities In Self-Rated Health, Health Care Utilization, Illness, Chronic Illness And Other Socioeconomic Characteristics Of The Insured And The Uninsured

**BOURNE P A ***

**ABSTRACT**

**Background:** Previous studies which have examined health status as regards the insured and the uninsured have used a piecemeal approach.
**Aims**: This study elucidates information on the self-rated health status, health care utilization, income distribution and health insurance status of Jamaicans. It also models self-rated health status, health care utilization and income distribution and how these differ between the insured and the uninsured.
**Methods And Material**: Cross-sectional data from the 2007 Jamaica Survey of Living Conditions (JSLC) were used to analyze the information for this study.
**Statistical Analyses Used**: The statistics were analyzed by using the Statistical Package for the Social Sciences for Windows, Version 16.0. Analytic models using multiple logistic and linear regressions were used to determine factors which explained self-rated health status, health care utilization and income distribution.
**Result**: The majority of health insurance was owned by those in the upper class, (65%), as compared to 19% for those in the lower socio-economic strata. No significant statistical difference was found between the average medical expenditure of those who had insurance coverage and the non-insured. Insured respondents were 1.5 times (Odds ratio, OR, 95% CI = 1.06 – 2.15) more likely to rate their health as moderate-to-very good as compared to the uninsured, and they were 1.9 times (95% CI = 1.31-2.64) more likely to seek medical care, 1.6 times (95% CI = 1.02-2.42) more likely to report having chronic illness and more likely to have greater income than the uninsured. Illness is a strong predictor of why Jamaicans seek medical care ($R^2$ = 71.2%) and health insurance coverage accounted for less than half a percent of the variance in health care utilization. Health care utilization is a strong predictor of self-reported illness, but it was weaker than illness in explaining health care utilization (61.1% of 66.5%). Public health insurance was mostly acquired by those with chronic illnesses: (76%) as compared to 44% private health coverage and 38% without coverage.
**Conclusion**: The findings highlighted that any reduction in the health care budget in developing nations means that vulnerable groups will seek less care and this will further increase the mortality among those cohorts.

**Key Words:** Health, Health status, health care utilization, illness, chronically ill, insured, uninsured.

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## Introduction

This study examined the self-rated health status, health care utilization, income distribution, and health insurance status of Jamaicans and the disparity between the insured and the uninsured. It also modelled self-rated health status, health care utilization and income distribution and how these differed between the insured and the uninsured. The current findings revealed that 20.2% of the Jamaicans had health insurance coverage, suggesting that a large percentage of the population was obliged to make out-of-pocket payments or use government assistance to pay their medical bills.

The health of individuals within a society goes beyond the individual to the socio-economic development, the standard of living and production and the productivity of the nation. The health of individuals is therefore the crux of human development and survivability and explains the rationale as to why people seek medical care on the onset of ill-health. In seeking to preserve life, people demand and utilize health care services. Western societies are structured so that people meet health care utilization with a mixture of approaches. These approaches can be any combination of out-of-pocket payments, health insurance coverage, government assistance and assistance from the family.

In Latin America and the Caribbean, health care is substantially an out-of-pocket expenditure aided by health insurance policies and the government's health care regime. Within the context of the realities in those nations, the health of the populace is primarily based on the choices, decisions, responsibilities and burdens of the individual. Survival in developing nations is distinct from Developed Western Nations, as the Latin American and Caribbean peoples' willingness, frequency and demands for health care, as well as their health choices, are based on affordability. Affordability of health care is assisted by health insurance coverage, as the provisions of care offered by governmental policies mean that the public health care system will be required to meet the needs of many people. Those people will be mostly children, the elderly and those who belong to other vulnerable groups.

The public health care system in many societies often involves long queues, extended waiting times, frustrated patients and poor people who are dependent on the service. In order to circumvent the public health care system, people purchase health insurance policies as a means of reducing future health care costs and also as an avoidance of the utilization of public health care. Not having insurance in any society means a dependency on the public health care system, premature mortality, vulnerability of disadvantaged groups and often, public humiliation. The insured, on the other hand, are able to circumvent many of the experiences of the poor, the elderly, children and other vulnerable cohorts who rely on the public health care system. Insurance in developing nations, and in particular Jamaica, is a private arrangement between the individual and a private insurance company. Such a reality excludes the retired, the elderly, the unemployed, the unemployable and the children of those cohorts. In seeking to understand health care non-utilization and high mortality in developing nations, insurance coverage (or lack of) becomes crucial in any health discourse.

There is a high proportion of uninsured cohorts in the United States and this is equally the reality in many developing nations, particularly in Jamaica [1],[2],[3],[4],[5],[6]. According to the World Health Organization (WHO), 80% of the chronic illnesses are in the low and middle income countries and 60% of global mortality is caused by chronic illnesses [7]. It can be extrapolated from the WHO's findings that

uninsurance is critical in answering some of the health disparities within and among the different groups and sexes in the society. The realities of health inequalities between the poor and the wealthy and the sexes in a society, with those in the lower income strata contracting more illnesses and in particular chronic conditions [7],[8],[9],[10],[11],[12], are embedded in financial deprivation.

The WHO stated that "In reality, low and middle income countries are at the centre of both old and new public health challenges" [7]. The high risk of death in low-income countries is owing to food insecurity, low water quality and low sanitation, coupled with inadequate access to financial resources [11], [13]. Poverty makes it impossible for poor people to respond to illness, unless health care services are free. The WHO captures this aptly "...People who are already poor are the most likely to suffer financially from chronic diseases, which often deepen poverty and damage long-term economic prospects" [7]. This goes back to the inverse correlation between poverty and higher level education, poverty and non-access to financial resources and now, poverty and illness. According to the WHO [7], "In Jamaica 59% of the people with chronic diseases experienced financial difficulties because of their illnesses..." and this emphasizes the importance of health insurance coverage and the public health care system for vulnerable groups.

Previous studies showed that health insurance coverage is associated with health care utilization [1],[2],[3],[4],[5],[6] and this provides some understanding of the health care demand (or the lack of) in developing countries. Studies which have been conducted on the general health of the insured and/or uninsured, health care utilization and other health related issues [1],[2],[3],[4],[5],[6],[7] have used a piecemeal approach, which means that there is a gap in the literature that could provide more insight into the insured and the uninsured. This study elucidates information on the self-rated health status, health care utilization, income distribution and the health insurance status of Jamaicans. It also models self-rated health status, health care utilization, income distribution, and how these differ between the insured and the uninsured.

## Methods And Material

### Data Methods

This study was based on data from the 2007 Jamaica Survey of Living Conditions (JSLC), which was conducted by the Planning Institute of Jamaica (PIOJ) and the Statistical Institute of Jamaica (STATIN). The JSLC is an annual and nationally representative cross-sectional survey that collects information on the consumption, education, health status, health conditions, health care utilization, health insurance coverage, non-food consumption expenditure, housing conditions, inventory of durable goods, social assistance, demographical characteristics and other issues [14]. The information is from the civilian and the non-institutionalized population of Jamaica. It is a modification of the World Bank's Living Standards Measurement Study (LSMS) household survey [15].

Overall, the response rate for the 2007 JSLC was 73.8%. Over 1,994 households of individuals nationwide were included in the entire database of all ages [16]. A total of 620 households were interviewed from urban areas, 439 from other towns and 935 from the rural areas. This sample represents 6,783 non-institutionalized civilians living in Jamaica at the time of the survey. The JSLC used a complex sampling design, which was weighted to reflect the population of Jamaica.

### Statistical Analyses

Statistical analyses were performed by using the Statistical Packages for the Social Sciences, Version 16.0 (SPSS Inc; Chicago, IL, USA) for Windows. Descriptive statistics such as mean, standard deviation (SD), frequency and percentage were used to analyze the socio-demographic characteristics of the sample. Chi-square was used to examine the association between the non-metric variables and an Analysis of Variance (ANOVA) was used to test the equality of means among the non-dichotomous categorical variables. Means and frequency distribution, as well as Chi-square,

independent sample t-tests, analysis of variance f tests, multiple logistic and linear regressions were considered in this study.

In analyzing the multiple logistic and linear regressions, correlation matrices were examined to determine multicollinearity. Where collinearity existed ($r > 0.7$), the variables were entered independently into the model to determine those that should be retained during the final model construction. To derive accurate tests of statistical significance, we used the SUDDAN statistical software (Research Triangle Institute, Research Triangle Park, NC) and this was adjusted for the survey's complex sampling design. A p-value $< 0.05$ (two-tailed) was used to establish statistical significance.

## Analytic Models

Cross-sectional analyses of the 2007 JSLC were performed to compare within and between sub-populations and frequencies. Logistic regression examined the relationship between the dichotomous binary dependent variables and some predisposed independent (explanatory) variables.

Analytic models using multiple logistic and linear regressions were used to ascertain the factors which are associated with **(1)** self-rated health status, **(2)** health care utilization, **(3)** self-reported illness, **(4)** self-reported diagnosed chronic illness, and income. For the regressions, design or dummy variables were used for all categorical variables (using the reference group which was listed last). Overall, the model fit was determined by using log likelihood ratio statistics, and odds ratios. Stepwise regressions were used to determine the contribution of each significant variable to the overall model. All confidence intervals (CIs) for odds ratios (ORs) were calculated at 95%.

## Results

## Demographic Characteristics Of Sample

The sample was 6,783 respondents (48.7% males and 51.3% females). Children constituted 31.3%; other aged adults -31.3%; young adults-25.9%; and the elderly -11.9%. The latter comprised 7.7% young-old respondents, 3.2% of old-old and 1.0% of the oldest-old. The majority of the sample had no formal education (61.8%); primary, 25.5%; secondary, 10.8% and tertiary, 2.0%. Two-thirds of the sample had sought health care in the last 4 weeks; 69.2% were never married; 23.3% were married; 1.7% were divorced; 0.9% were separated and 4.9% were widowed respondents. Almost 15% reported an illness in the last 4 weeks (43.3% had chronic conditions, 30.4% had acute conditions and 26.3% did not specify the condition). Of those who reported an illness in the last 4 weeks, 87.9% provided information on the typology of the conditions: colds- 16.7%; diarrhoea- 3.0%; asthma- 10.7%; diabetes mellitus -13.8%; hypertension- 23.1%; arthritis- 6.3%; and specified conditions- 26.3%. Marginally, more people were in the upper class (40.3%) as compared to the lower socio-economic strata (39.8%). Only 20.2% of respondents had health insurance coverage (private -12.4%; NI Gold, public -5.3%; other public -2.4%). The majority of health insurance was owned by those in the upper class (65%) and 19% by those in the lower socio-economic strata.

## Bivariate Analyses

Sixty-one percent of those with chronic conditions were elderly as compared to 16.6% of those with other conditions (including acute ailments). Only 39% of those with chronic conditions were non-elderly as compared to 83.4% of those with other conditions – ($\chi 2 = 187.32$, $P < 0.0001$).

Thirty-three percent of those with chronic illnesses had health insurance coverage as compared to 17.8% of those with acute and other conditions - ($\chi 2 = 26.65$, $P < 0.0001$). Furthermore examination of self-reported health conditions by health insurance status revealed that diabetics recorded the greatest percentage of health insurance coverage (43.9%) as compared to hypertensives -(28.2%); people with arthritis -(25.5%); those with acute conditions -(17.0%) and respondents with other health conditions-(18.8%). Sixty-seven percent of the respondents who reported being diagnosed with chronic conditions had sought medical care in the last 4 weeks as compared to 60.4% of those with acute

and other conditions ($\chi2$ = 4.12, *P* < 0.042). Those with primary education or that below it were more likely to have chronic illnesses (45.0%) as compared to secondary level (6.1%) and tertiary level graduates (11.1%) - ($\chi2$ = 23.50, P < 0.0001). There was no statistical association between the typology of illness and the social class - ($\chi2$ = 0.63, P = 0.730): upper class -44.6%; middle class -41.1% and lower class -43.0%.

This study found significant statistical associations between health insurance status and **(1)** educational level ($\chi2$ = 45.06, P < 0.0001), **(2)** social class ($\chi2$ = 441.50, P < 0.0001), and **(3)** age cohort ($\chi2$ = 83.13, P < 0.0001). Forty-two percent of those with at the most primary level education, had health insurance coverage as compared to 16.3% of secondary level and 42.2% of tertiary level respondents. Thirty-three percent of upper class respondents had health insurance coverage as compared to 16.7% of those in the middle class and 9.4% of those in the lower socio-economic strata. Almost 33% of the oldest-old had health insurance coverage as compared to 15.1% of children; 18.4% of young adults; 23.6% of other-aged adults; 28.6% of young-old and 24.9% of old-old. A significant statistical association was found between health insurance status and the area of residence ($\chi2$ = 138.80, P < 0.0001). Twenty-eight percent of urban dwellers had health insurance coverage as compared to 22.1% of the semi-urban respondents and 14.5% of the rural residents. Similarly, a significant relationship existed between health care-seeking behaviour and health insurance status ($\chi2$ = 33.61, P < 0.0001). Fourteen percent of those with health insurance had sought medical care in the last 4 weeks as compared to 9.0% of those who did not have health insurance coverage. Likewise, a statistical association was found between health insurance status and the typology of illness ($\chi2$ = 26.65, P < 0.0001). Fifty-eight percent of those with insurance coverage had chronic illnesses as compared to 38.3% of those without health insurance. Concurring with this, 42% of those with insurance coverage had acute or other conditions ascompared to 62% of those who did not have health insurance coverage. Further examination revealed that other public health insurance was mostly taken out by those with chronic illnesses (76%) as compared to NI Gold (public, 65%) and 44% private health coverage ($\chi2$ = 42.62, P < 0.0001). Private health coverage was mostly acquired by those with non-chronic illnesses (56%) as compared to 35% with NI Gold (public) and 25% other public coverage.

No significant statistical difference was found between the average medical expenditure of those who had insurance coverage and the non-insured (t = 0.365, P = 0.715) – mean average medical expenditure of those without health insurance was USD 10.68 (SD = 33.94) and the mean average medical expenditure of the insured respondents was USD 9.93 (SD = 18.07) - (Ja. $80.47 = US $1.00 at the time of the survey).

There was no significant statistical relationship between health care utilization (public-private health care visits) and health conditions (acute or chronic illnesses) – $\chi^2$ = 0.001, P = 0.975. 49.2% of those who had chronic illnesses used public health care facilities as compared to 49.3% of those with acute conditions.

There was a statistical difference between the mean age of the respondents with non-chronic and chronic illnesses (t-test = - 23.1, P < 0.0001). The mean age of some with chronic illnesses was 62.3 years (SD = 16.2) as compared to 29.3 years (SD = 26.1) for those with non-chronic illnesses. Furthermore, the mean age of the insured respondents with chronic illnesses was 63.8 years (SD = 15.8) as compared to 32.5 years for those with non-chronic conditions. Similarly, the mean age of the uninsured chronically ill respondents was 61.5 years (SD = 16.5) as compared to 28.6 years (SD = 25.9) for those with non-chronic illnesses.

[Table/Fig 1] examines the information on crowding index, total annual food expenditure, annual non-food expenditure, income, age, time in household, length of marriage, length of illness and the number of visits made to the medical practitioner by the health insurance status.

**(Table/Fig 1) Crowding, expenditure, income, age, and other characteristics by health insurance status**

| Characteristics | Health insurance status | | *P* |
|---|---|---|---|
| | Non-insured mean ± SD | Insured mean ± SD | |
| Crowding index | 4.9 ± 2.6 | 4.1±2.1 | t = 10.32, < 0.0001 |
| Total annual food expenditure[1] | 3476.09±2129.97 | 3948.12±2257.97 | t = - 6.81, < 0.0001 |
| Annual non-food expenditure[1] | 3772.91±3332.50 | 6339.40±5597.60 | t = - 21.33, < 0.0001 |
| Income[1] | 7703.62±5620.94 | 12374.89±9713.00 | t = - 22.75, < 0.0001 |
| Age (in year) | 28.7±21.4 | 35.0 ±22.7 | t = - 9.40, < 0.0001 |
| Time in household (in years) | 11.7±1.6 | 11.8±1.3 | t = - 1.62, 0.104 |
| Length of marriage | 16.9±14.3 | 18.3±13.8 | t = - 1.55, 0.122 |
| Length of illness | 14.7±51.1 | 14.1±36.2 | t = - 0.217, 0.828 |
| No. of visits to medical practitioner | 1.4±1.0 | 1.5±1.2 | t = - 0.659, 0.511 |

**[1]Expenditures and income are quoted in USD (Ja. $80.47 = US $1.00 at the time of the survey)**

Self-rated health status, health care seeking behaviour, illness, educational level, social class, area of residence and health conditions and health care utilization by health insurance status are presented in [Table/Fig 2].

**(Table/Fig 2) Health, health care seeking behaviour, illness and particular demographic characteristics by health insurance status**

| Characteristic | Health insurance status | | | | P |
|---|---|---|---|---|---|
| | Coverage | | | No coverage | |
| | Private n (%) | Public, NI Gold n (%) | Other Public n (%) | n (%) | |
| Health conditions | | | | | $\chi^2$ = 42.62, P < 0.0001 |
| Acute and other | 53 (56.4) | 24 (34.8) | 13 (24.5) | 415 (61.7) | |
| Chronic | 41 (43.6) | 45 (65.2) | 40 (75.5) | 258 (38.3) | |
| Health care seeking behaviour | | | | | $\chi^2$ = 70.09, P < 0.0001 |
| No | 724 (89.3) | 283 (81.3) | 118 (75.2) | 4735 (91.0) | |
| Yes | 87 (10.7) | 63 (18.2) | 39 (24.8) | 468 (9.0) | |
| Illness | | | | | $\chi^2$ = 67.14, P < 0.0001 |
| No | 699 (86.2) | 272 (78.6) | 101 (64.3) | 4453 (85.8) | |
| Yes | 112 (13.8) | 74 (21.4) | 56 (35.7) | 736 (14.2) | |
| Education level | | | | | $\chi^2$ = 78.10, P < 0.0001 |
| Primary and below | 684 (84.4) | 318 (92.2) | 144 (91.7) | 4536 (87.5) | |
| Secondary | 80 (9.9) | 23 (6.7) | 9 (5.7) | 577 (11.1) | |
| Tertiary | 46 (5.7) | 4 (1.1) | 4 (2.6) | 74 (1.4) | |
| Social class | | | | | $\chi^2$ = 596.08, P < 0.0001 |
| Lower | 78 (9.6) | 135 (39.0) | 31 (19.7) | 2345 (45.1) | |
| Middle | 111 (13.7) | 80 (23.1) | 27 (17.2) | 1085 (20.8) | |
| Upper | 622 (76.7) | 131 (37.9) | 99 (63.1) | 1773 (34.1) | |
| Area of residence | | | | | $\chi^2$ = 190.29, P < 0.0001 |
| Urban | 373 (46.0) | 106 (30.6) | 63 (40.1) | 1397 (26.8) | |
| Semi-urban | 212 (26.1) | 66 (19.1) | 32 (20.4) | 1091 (21.0) | |
| Rural | 226 (27.9) | 174 (50.3) | 62 (39.5) | 2715 (52.2) | |
| Self-rated health status | | | | | $\chi^2$ = 67.14, P < 0.0001 |
| Poor | 699 (86.2) | 272 (78.6) | 101 (64.3) | 4453 (85.8) | |
| Moderate-to-excellent | 112 (13.8) | 74 (21.4) | 56 (35.7) | 736 (14.2) | |
| Health care utilization | | | | | $\chi^2$ = 30.06, P < 0.0001 |
| Private | 65 (79.3) | 29 (47.5) | 18 (46.2) | 215 (46.8) | |
| Public | 17 (20.7) | 32 (52.5) | 21 (53.8) | 244 (53.2) | |

[Table/Fig 3] presents information on the age cohort of the respondents by diagnosed health conditions. A significant statistical association was found between the two variables $\chi^2$ = 436.8, P < 0.0001.

**(Table/Fig 3) Age cohort by diagnosed illness**

| Age cohort | Diagnosed illness | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|
| | Acute condition | | | Chronic condition | | | Other | |
| | Cold | Diarrhoea | Asthma | Diabetes mellitus | Hypertension | Arthritis | | |
| | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) |
| Children | 97 (65.1) | 13 (48.2) | 51 (53.7) | 3 (2.4) | 0 (0.0) | 0 (0.0) | 54 (23.1) | 218 (24.5) |
| Young adults | 14 (9.4) | 2 (7.4) | 16 (16.8) | 3 (2.4) | 6 (2.9) | 1 (1.8) | 43 (18.4) | 85 (9.6) |
| Other-aged adults | 22 (14.7) | 6 (22.2) | 18 (18.9) | 44 (35.8) | 76 (36.9) | 17 (30.4) | 85 (36.3) | 268 (30.1) |
| Young old | 8 (5.4) | 2 (7.4) | 7 (7.4) | 49 (39.8) | 61 (29.6) | 22 (39.3) | 32 (13.7) | 181 (20.3) |
| Old Elderly | 8 (5.4) | 3 (11.1) | 2 (2.1) | 19 (15.5) | 49 (23.8) | 14 (25.0) | 13 (5.5) | 108 (12.1) |
| Oldest Elderly | 0 (0.0) | 1 (3.7) | 1 (1.1) | 5 (4.1) | 14 (6.8) | 2 (3.6) | 7 (3.0) | 30 (3.4) |
| Total | 149 | 27 | 95 | 123 | 206 | 56 | 234 | 890 |

[Table/Fig 4] examines illnesses by the age of the respondents controlled by the health insurance status. There was a significant statistical relationship between the illness and the age of respondents, but none between the uninsured and the insured, P = 0.410.

**(Table/Fig 4) Illness by age of respondents controlled for health insurance status**

| Characteristic | Age of respondents | |
|---|---|---|
| | Uninsured | Insured |
| | Mean ± SD | Mean ± SD |
| Illness | | |
| Acute condition | | |
| Cold | 18.8 ± 23.5 | 21.0 ± 26.3 |
| Diarrhoea | 28.4 ± 30.3 | 31.8 ± 13.5 |
| Asthma | 21.0 ± 21.7 | 29.4 ± 22.9 |
| Chronic condition | | |
| Diabetes mellitus | 58.7 ± 16.1 | 63.8 ± 15.4 |
| Hypertension | 62.1 ± 17.3 | 63.6 ± 15.7 |
| Arthritis | 64.0 ± 13.3 | 65.0 ± 18.7 |
| Other condition | 38.1 ± 25.0 | 39.2 ± 26.8 |
| F statistic | 73.1, P < 0.0001 | 23.3, P < 0.0001 |

[Table/Fig 5] presents information on the age cohort by diagnosed health conditions and the diagnosed health conditions which are controlled by the health status.

**(Table/Fig 5) Age cohort by diagnosed health condition, and health insurance status**

| Characteristic | Diagnosed health condition | | Diagnosed health condition | | | |
|---|---|---|---|---|---|---|
| | Acute | Chronic | Acute | Chronic | Acute | Chronic |
| | | | Uninsured | | Insured | |
| | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) |
| Age cohort | | | | | | |
| Children | 215 (42.6) | 3 (0.8) | 183 (44.1) | 1 (0.4) | 32 (35.6) | 2 (1.6) |
| Young adults | 75 (14.9) | 10 (2.6) | 58 (14.0) | 6 (2.3) | 17 (18.9) | 4 (3.2) |
| Other aged-adults | 131 (25.9) | 137 (35.5) | 110 (26.5) | 100 (38.6) | 21 (23.3) | 37 (29.3) |
| Young-old | 49 (9.7) | 132 (34.3) | 37 (8.9) | 82 (31.7) | 12 (13.3) | 50 (39.7) |
| Old-old | 26 (5.2) | 82 (21.3) | 20 (4.8) | 55 (21.2) | 6 (6.7) | 27 (21.4) |
| Oldest-old | 9 (1.8) | 21 (5.5) | 7 (1.7) | 15 (5.8) | 2(2.2) | 6 (4.8) |
| Total | 505 | 385 | 415 | 259 | 90 | 126 |
| | $\chi^2$ = 317.5, *P* < 0.0001 | | $\chi^2$ = 234.5, *P* < 0.0001 | | $\chi^2$ = 73.6, *P* < 0.0001 | |

There was a statistical difference between the mean age of the respondents and the typology of self-reported illnesses (F-statistic = 99.9, P < 0.0001). Those with colds were aged 19.2 years (SD = 23.9); diarrhoea -30.3 years (SD = 31.4); asthma- 22.9 years (SD = 22.1); diabetes mellitus- 60.9 years (SD = 16.0); hypertension- 62.5 years (SD = 16.8); arthritis- 64.3 years (SD = 14.5) and other conditions -38.3 years (SD = 25.3).

## Analytic Models

Nine variables see [Table/Fig 6] accounted for 32.8% of the variance in moderate-to-very good self-rated health status of the Jamaicans. The variables were medical expenditure, health insurance status, area of residence, household head, age, crowding index, total food expenditure, health care utilization and illness. Self-reported illnesses accounted for 62.2% of the explained variability of moderate-to-very good health status.

**(Table/Fig 6) Logistic regression: Explanatory variables of self-rated moderate-to-very good health**

| Explanatory variable | Coefficient | Std. error | Odds ratio | 95.0% C.I. | $R^2$ |
|---|---|---|---|---|---|
| Average medical expenditure | 0.000 | 0.000 | 1.00* | 1.00 -1.00 | 0.003 |
| Health insurance coverage (1= insured) | 0.410 | 0.181 | 1.51* | 1.06 - 2.15 | 0.005 |
| Urban | 0.496 | 0.180 | 1.64** | 1.15 - 2.34 | 0.007 |
| Other | 0.462 | 0.197 | 1.59* | 1.08 - 2.34 | 0.006 |
| †Rural | | | 1.00 | | |
| Household head | 0.376 | 0.154 | 1.46* | 1.08 - 1.97 | 0.004 |
| Age | -0.046 | 0.004 | 0.96*** | 0.95 - 0.96 | 0.081 |
| Crowding index | -0.156 | 0.035 | 0.86*** | 0.80 - 0.92 | 0.010 |
| Total food expenditure | 0.000 | 0.000 | 1.00*** | 1.00 - 1.00 | 0.003 |
| Health care seeking (1=yes) | -0.671 | 0.211 | 0.51** | 0.34 - 0.77 | 0.005 |
| Illness | -1.418 | 0.212 | 0.24*** | 0.16 - 0.37 | 0.204 |

**Model fit $\chi^2$ = 574.37, $P < 0.0001$**
**-2LL = 1477.76**
**Nagelkerke $R^2$ = 0.328**
**†Reference group**
*****P < 0.0001, **P < 0.01, *P < 0.05**

[Table/Fig 7] shows information on the explanatory factors of self-reported illnesses. Seven factors accounted for 66.5% of the variability in self-reported illnesses. Ninety-two percent of the variability in self-reported illnesses was accounted for by health care utilization (health care-seeking behaviour).

**(Table/Fig 7) Logistic regression: Explanatory variables of self-reported illness**

| Explanatory variable | Coefficient | Std Error | Odds ratio | 95.0% C.I. | $R^2$ |
|---|---|---|---|---|---|
| Average medical expenditure | 0.000 | 0.000 | 1.00* | 1.00 - 1.00 | 0.001 |
| Male | -0.467 | 0.137 | 0.63** | 0.48 - 0.82 | 0.003 |
| Married | 0.527 | 0.146 | 1.69*** | 1.27 - 2.25 | 0.002 |
| Age | 0.031 | 0.004 | 1.03*** | 1.02 - 1.04 | 0.037 |
| Total food expenditure | 0.000 | 0.000 | 1.00** | 1.00 -1.00 | 0.002 |
| Self-rated moderate-to-excellent health | -1.429 | 0.213 | 0.24*** | 0.16 -0.36 | 0.009 |
| Health care seeking (1=yes) | 5.835 | 0.262 | 342.11*** | 204.71 - 571.72 | 0.611 |

**Model fit $\chi^2$ = 2197.09, $P < 0.0001$**
**-2LL = 1730.41**
**Hosmer and Lemeshow goodness of fit $\chi^2$ = 4.53, $P$ = 0.81**
**Nagelkerke $R^2$ = 0.665**
**†Reference group**
*****P < 0.0001, **P < 0.01, *P < 0.05**

Three variables emerged as statistically significant correlates of health care utilization. They accounted for 71.9% of the variance in health care utilization. Most of the variability can be explained by self-reported illnesses **(71.2%, Table 8)** [Table/Fig 8].

**(Table/Fig 8) Logistic regression: Explanatory variables of health care seeking behaviour**

| Explanatory variable | Coefficient | Std error | Odds ratio | 95.0% C.I. | $R^2$ |
|---|---|---|---|---|---|
| Health insurance coverage (1= insured) | 0.620 | 0.179 | 1.86** | 1.31 - 2.64 | 0.003 |
| Self-reported illness | 5.913 | 0.252 | 369.92*** | 225.74 - 606.17 | 0.712 |
| Self-rated moderate-to-excellent health | -0.680 | 0.198 | 0.51** | 0.34 - 0.75 | 0.004 |

**Model fit $\chi^2$ = 1997.86, $P < 0.0001$**
**-2LL = 1115.93**
**Hosmer and Lemeshow goodness of fit $\chi^2$ = 1.49, $P$ = 0.48**
**Nagelkerke $R^2$ = 0.719**
**†Reference group**
*****P < 0.0001, **P < 0.01, *P < 0.05**

Self-reported diagnosed chronic illnesses can be explained by 5 variables (gender, marital status, health insurance status, age and length of illness) and they accounted for 27.7% of the variance in self-reported diagnosed chronic illness [Table/Fig 9].

**(Table/Fig 9) Logistic regression: Explanatory variables of self-reported diagnosed chronic illness**

| Explanatory variable | Coefficient | Std error | Odds ratio | 95.0% C.I. | $R^2$ |
|---|---|---|---|---|---|
| Male | -1.037 | 0.205 | 0.36*** | 0.24 - 0.53 | 0.048 |
| Married | 0.425 | 0.199 | 1.53* | 1.04 - 2.26 | 0.012 |
| †Never married | | | 1.00 | | |
| Health insurance coverage (1= insured) | 0.454 | 0.220 | 1.58* | 1.02 - 2.42 | 0.008 |
| Age | 0.047 | 0.005 | 1.05*** | 1.04 - 1.06 | 0.201 |
| Logged Length of illness | 0.125 | 0.059 | 1.13* | 1.01 - 1.27 | 0.008 |

**Model fit $\chi^2$ = 136.32, *P* < 0.0001**
**-2LL = 673.09**
**Hosmer and Lemeshow goodness of fit $\chi^2$ = 15.96, *P* = 0.04**
**Nagelkerke $R^2$ = 0.277**
**†Reference group**
*****P < 0.0001, **P < 0.01, *P < 0.05**

Sixty-two percent of the variability in income can be explained by crowding index, social class, household head, health insurance status, self-rated health status, health care utilization, area of residence and marital status. Most of the variability in income can be explained by social class [Table/Fig 10].

**(Table/Fig 10) Multiple regression: Explanatory variables of income**

| Explanatory variable | Unstandardized Coefficients | | | | $R^2$ |
|---|---|---|---|---|---|
| | B | Std. Error | β | 95% CI | |
| Constant | 11.630 | 0.061 | | 11.511 - 11.750 | |
| Crowding index | 0.206 | 0.008 | 0.625*** | 0.190 - 0.221 | 0.195 |
| Upper class | 1.265 | 0.052 | 0.649*** | 1.162 - 1.368 | 0.320 |
| Middle Class | 0.692 | 0.047 | 0.347*** | 0.599 - 0.784 | 0.133 |
| †Lower class | | | | | |
| Household head | -0.181 | 0.038 | -0.108*** | -0.256 - -0.106 | 0.012 |
| Health insurance coverage (1= insured) | 0.137 | 0.042 | 0.075** | 0.054 - 0.220 | 0.007 |
| Self-rated good health status | 0.165 | 0.040 | 0.094*** | 0.088 - 0.243 | 0.006 |
| Health care seeking (1=yes) | 0.109 | 0.039 | 0.063** | 0.033 - 0.185 | 0.003 |
| Urban | 0.145 | 0.046 | 0.079** | 0.055 - 0.235 | 0.002 |
| Other town | 0.130 | 0.049 | 0.063** | 0.033 - 0.226 | 0.003 |
| †Rural area | | | | | |
| Married | 0.075 | 0.038 | 0.044* | 0.000 - 0.150 | 0.001 |
| †Never married | | | | | |

**F = 144.15, P < 0.0001**
**$R^2$ = 0.682**
**†Reference group**
*****P < 0.0001, **P < 0.01, *P < 0.05**

[Table/Fig 10] Table 11 presents information on the explanatory variables which account for health insurance coverage. Six variables emerged as significant determinants of health insurance coverage (age, income, chronic illness, health care utilization, marital status and upper socio-economic class). The explanatory variables accounted for 19.4% of the variability in health insurance coverage. Income was the most significant determinant of health insurance coverage (accounting for 43% of the explained variance, 19.4%).

**(Table/Fig 11) Logistic regression: Explanatory variables of health insurance status (1= insured)**

| Explanatory variable | Coefficient | Std. error | Odds ratio | 95.0% C.I. | $R^2$ |
|---|---|---|---|---|---|
| Age | 0.014 | 0.006 | 1.01* | 1.00 - 1.03 | 0.040 |
| Income | 0.000 | 0.000 | 1.00*** | 1.00 - 1.00 | 0.082 |
| Chronic condition | 0.563 | 0.210 | 1.7** | 1.16 - 2.65 | 0.013 |
| Health care seeking (1=yes) | 0.463 | 0.211 | 1.59* | 1.05 - 2.40 | 0.010 |
| Married | 0.647 | 0.192 | 1.91** | 1.31 - 2.79 | 0.024 |
| †Never married | | | | | |
| Upper class | 0.841 | 0.227 | 3.46*** | 1.49 - 3.62 | 0.025 |
| †Lower class | | | | | |

**Model fit $\chi^2$ = 95.7, *P* < 0.0001**
**-2LL = 686.09**
**Hosmer and Lemeshow goodness of fit $\chi^2$ = 5.08, *P* =0.75**
**Nagelkerke $R^2$ = 0.194**
**†Reference group**
*****P < 0.0001, **P < 0.01, *P < 0.05**

## Discussion

The current study revealed that 15 out of every 100 Jamaicans reported having an illness in the last 4 weeks and 57% of those with an illness had chronic conditions. Sixty-one out of every 100 of those with chronic illnesses were 60+ years; 67% of the chronically ill sought medical care as compared to 66% of the population. Most of the chronically ill respondents were uninsured (67%). The chronically ill mostly had primary level education and there was no statistical association between the typology of illness and the social class. Almost 2 in every 100 chronically ill Jamaicans were children (less than 19 years) and most of them were uninsured. Nine percent of the chronically ill who were in

the other aged adult cohort did not have health insurance coverage. Insured respondents were 1.5 times more likely to rate their health as moderate-to-very good as compared to the uninsured and they were 1.9 times more likely to seek more medical care, 1.6 times more likely to report having chronic illnesses and more likely to have greater income than the uninsured. Illness is a strong predictor of why Jamaicans seek medical care ($R^2$ = 71.2% of 71.9%) and health insurance coverage accounted for less than half a percent of the variance in health care utilization. However, health care utilization is a strong predictor of self-reported illness, but it was weaker than illness in explaining health care utilization (61.1% of 66.5%). Public health insurance was most common among those with chronic illnesses (76%) as compared to 44% with private health coverage, whereas 38% had no coverage at all. The income of those in the upper income strata was significantly more than those in the middle and the lower socio-economic group, but chronic illnesses were statistically the same among the social classes.

Health disparities in a nation are explained by socio-economic determinants as well as the health insurance status. Previous research showed that health care utilization and health disparities are enveloped in unequal access to insurance coverage and social differences [2], [4], [17],[18],[19]. The present paper revealed that health insurance coverage is mostly acquired by those in the upper class, with less than 20 in every 100 insured being in the lower socio-economic class. Although this study found that those in the lower class did not report more chronic illnesses than those in the wealthy class, it found that 86 out of every 100 uninsured respondents indicated poor health status.

Health insurance coverage provided valuable economic relief for chronically ill respondents, as this allowed them to access needed health care. Like Hafner-Eaton's research [2], this paper found that health insurance status was the third most powerful predictor of health care utilization. Forty-nine to every 100 chronically ill persons used the public health care facilities. The uninsured ill were therefore less likely to demand health care and this economic burden of health care was going to be the responsibility of either the state, the individual or the family. The difficulty here was that the uninsured were more likely to be in the lower-to-middle class, of working age or children and experiencing more acute illness. 38 out of every 100 chronically ill individuals were in the lower class and these provided a comprehensive understanding of the insured and the uninsured that would allow for explanations in the health disparities between the socio-economic strata and sexes. With 43 out of every 100 people in the lower socio-economic strata self-reporting being diagnosed with chronic illness, health insurance coverage, public health systems and other policy interventions aided their health and health care utilization.

Among the material deprivations of the poor, is uninsurance. Those in the wealthy socio-economic groups in Jamaica were 3.5 times more likely to be holders of health insurance coverage than those in the lower socio-economic strata. Gertler and Sturm [3] identified that health insurance causes a switching from the public health to the private health system, which indicates that a reduction in public health expenditure and health insurance will significantly influence the health of the poor. This research showed that only 19% of those with health insurance were in the lower class. Therefore, the issue of uninsurance creates future challenges for the poor with regards to their health and health care utilization. At the onset of illness, those in the lower income strata without health insurance must first think about their illness and weigh this against the cost of losing their current income, in order to provide for their families; parents of ill children must also do the same. The public health care system will relieve the burden of the poor and while those with health insurance are more likely to utilize health care, this is a future product in enhancing a decision to utilize health care. But outside of those issues, their choices (or lack of choices), the cost of public health care, national insurance schemes and general price indices in the society, all further lower their quality of life. Although the poor may be dissatisfied with the public health care system (waiting time, crowding, discriminatory practices by medical practitioners), better health for them without

health coverage is through this very system. It can be extrapolated therefore, from the present data that there are unmet health needs among some people in the lower socio-economic strata, as those who do not have health insurance want to avoid the public health care system, owing to dissatisfaction or lack of means and will only seek health care when their symptoms are severe; sometimes the complications from the delay make it difficult for their complaints to be addressed on their visits. Among the unmet health needs of the poor, will be medication. Even if they attend the public health care system and are treated, the system does not have all the medications, which is an indication that they are expected to buy some themselves. The challenge of the poor is to forego purchasing medication for food and this means their conditions would not have been rectified by the health care visitation.

By their very nature, the socio-economic realities of the poor, such as less access to education, proper nutrition, good physical milieu, poor sanitation and lower health coverage, cripple their future health status and this hinders health care utilization while also accounting for high premature mortality. It is this lower health care utilization which accounts for their increased risk of mortality, as the other deprivations such as proper sanitation and nutrition expose them to disease-causing pathogens, which means that their inability to afford health insurance increases their reliance on the public health care system. The present findings showed that the uninsured are mostly poor and within the context of Lasser et al.'s work [20], they receive worse access to care and are less satisfied than the insured in the US with the care and medical services that they receive. This is an indication of further reluctance on the part of the poor to willingly demand health care, as this intensifies their dissatisfaction and humiliation. Despite the dissatisfaction and humiliation, their choices are substantially the public health care system, abstinence from care, risk of death and the burden of private health care. Some of the reasons why those in the lower socio-economic strata have less health coverage than those in the wealthy income group are **(1)** inafffordability and **(2)** type of employment (mostly part-time, seasonal, low paid and uninsured positions), which makes it too difficult for them to be holders of health insurance, and this retards the switch from public-to-private health care utilization. Recently, a study conducted by Bourne and Eldemire-Shearer [21] found that 74% of those in the poorest income quintile utilized public hospitals as compared to 58% of those in the second poor quintile and 31% of those in the wealthiest 20%. Then, if public health is privatized and becomes increasingly more expensive for recipients, the socio-economically disadvantaged population (poor, elderly, children and other vulnerable groups) will become increasingly exposed to more agents that are likely to result in their deaths, with an increased utilization of home remedies as well as the broadening of the health outcome inequalities among the socio-economic strata.

Illness and particularly chronic conditions can easily result in poverty before mortality sets in. With the World Health Organization (WHO) opining that 80% of the chronic illnesses were in the low and middle income countries and that 60% of global mortality is caused by chronic illness [7], levelling insurance coverage can reduce the burden of care for those in the lower socio-economic strata. The importance of health insurance to health care utilization, health status, productivity, production, socio-economic development, life expectancy, poverty reduction strategies and health intervention must include increased health insurance coverage of the citizenry within a nation. The economic cost of uninsured people in a society can be measured by the loss of production, payment of sick leave, mortality, lowered life expectancy and cost of care for children, orphanages and the elderly who become the responsibility of the state. Therefore, the opportunity cost of a reduced public health care budget is the economic cost of the aforementioned issues and goes to the explanation of premature mortality in a society.

The chronically ill, in particular, benefit from health insurance coverage, not because of the reduced cost of health care, but the increased health care utilization that results from health coverage. From the findings of Hafner-Eaton's

work [2], the chronically ill in the United States were 1.5 times more likely to seek medical care and while this is about the same for Jamaicans, health insurance is responsible for their health care utilization and not the condition or illness. According to Andrulis [22], "Any truly successful, long-term solution to the health problems of the nation will require attention at many points, especially for low-income populations who have suffered from chronic underservice, if not outright neglect". Embedded in Andrulis's work is the linkage between poverty, poor health care service delivery, differences in health outcomes among the various socio-economic groups, higher mortality among particular social classes, deep-seated barriers in health care delivery and the perpetuation of such barriers and how they can increase health differences among the socio-economic strata. The relationship between poverty and illness is well established in the literature [7], [8], [23], as poverty means being deprived of elements such as proper nutrition and safe drinking water and these issues contribute to lower health, production, productivity and more illness in the future. Free public health care or lower public health care cost does not mean equal opportunity to access health care, nor do they eliminate the barriers to such access, neither does it increase health and wellness for the poor or remove lower health disparities among the socio-economic groups. However, lower income, increased price indices, removal of government subsidies from public health care, increased uninsurance and lower health care utilization, increased poverty and premature mortality lower the life expectancy of the population.

Increases in diseases (acute and chronic) largely owe to the lifestyle practices of people. Lifestyle practices are voluntary lifestyle choices and practices [24]. The poor are less educated, more likely to be unemployed, undernourished, deprived of financial resources and their voluntary actions will be directly related to survival and not diet, nutrition, exercise or other healthy lifestyle choices. Lifestyle choices such as diet, proper nutrition and sanitation and safe drinking water are costly and they are choices which often because of poverty, some people cannot afford to make. It follows therefore that those in the lower socio-economic strata will voluntarily make unhealthy choices because they are cheaper. Poverty therefore handicaps people and predetermines unhealthy lifestyle choices, which further accounts for greater mortality, lower life expectancy and less health insurance coverage and private health care utilization.

## Conclusion

Poverty is among the social determinants of health, health care utilization and health insurance coverage in a society. While the current study does not support the literature, that chronic illnesses were greater among those in the lower socio-economic strata, they were less likely to have health insurance coverage as compared to the upper class. Poverty denotes the socio-economic deprivation of resources which are available in a society and goes to the crux of health disparities among the socio-economic groups and sexes. Health care utilization is associated with health insurance coverage as well as government assistance and this embodies the challenges of those in the vulnerable groups.

Within the current global realities, many governments are seeking to reduce their public financing of health care, which would further shift the burden of health care to the individual, and this would further increase premature mortality among those in the lower socio-economic strata. Governments in developing nations continue to invest in improving public health measures (such as safe drinking water, sanitation and mass immunization) and the training of medical personnel, along with the construction of clinics and hospitals and there is a definite need to include health insurance coverage in their public health measures, as this will increase access to health care utilization. Any increase in health care utilization will be able to improve health outcomes, reduce health disparities between the socio-economic groups and the sexes and bring about improvements in the quality of the life of the poor.

In summary, with the health status of the insured being 1.5 times more than the uninsured, their health care utilization being 1.9 times more than the uninsured and illness being a strong

predictor of health care-seeking behaviour, any reduction in the health care budget in developing nations denotes that vulnerable groups (such as children, the elderly and the poor) will seek less care and this will further increase mortality among those cohorts.

## Conflict Of Interest

The author has no conflict of interest to report.

## Disclaimer

The researcher would like to note that while this study used secondary data from the Jamaica Survey of Living Conditions, none of the errors in this paper should be ascribed to the Planning Institute of Jamaica or the Statistical Institute of Jamaica, but to the researcher.

## Acknowledgement

The author thanks the Data Bank in Sir Arthur Lewis Institute of Social and Economic Studies, the University of the West Indies, Mona, Jamaica for making the dataset (Jamaica Survey of Living Conditions) available for use in this study. In addition the aforementioned, the author would also like to extend sincere appreciation to Samuel McDaniel, Ph.D (Harvard), Biostatistician, Department of Mathematics, the University of the West Indies, who checked the statistical accurateness in this manuscript, and made suggestions for its improvements.

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