Food and Nutrition Research in the Caribbean

FJ Henry

ABSTRACT

Studies at the Caribbean Food and Nutrition Institute (CFNI) were conducted to provide information that would guide the prevention and management of major food and nutrition problems in the region. One of the Institute's mandates is to strengthen the capacity of countries to collect, analyse, interpret and use data to monitor, develop, influence, strengthen or inform policy decisions, interventions and public education programmes. Over the years, numerous studies were done with countries at the individual level, however, as a regional institution, the primary aim was (i) to identify the challenges and opportunities that have application across the region and (ii) to go beyond the descriptive work and elaborate the proximal and distal barriers and interventions that relate to the two major food and nutrition problems in the Caribbean – food insecurity and obesity. Central to all the research was the recognition that unless the studies are grounded in the context of poverty and inequity, the importance of the findings on food security and obesity will be consequently diminished.

Keywords: Caribbean, food insecurity, obesity, risk factors

Investigación de los Alimentos y la Nutrición en el Caribe

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RESUMEN

En el Instituto Caribeño de Nutrición y Alimentos (ICAA) se llevaron a cabo estudios con el propósito de ofrecer información encaminada a servir de guía a la hora de prevenir y tratar los problemas principales de la nutrición en la región. Uno de los mandatos del Instituto es fortalecer la capacidad de los países para recoger, analizar, interpretar y usar datos que permitan monitorear, desarrollar, influir, fortalecer o informar decisiones en cuanto a trazar políticas, realizar intervenciones y organizar programas para la educación del público. A través de los años, se hicieron numerosos estudios en diversos países a nivel individual, Sin embargo, al abordar el problema como institución regional, el objetivo primario fue (i) identificar los desafíos y oportunidades aplicables en toda la región y (ii) ir más allá del trabajo descriptivo y elaborar las barreras distales y proximales así como las intervenciones que guardan relación con los dos problemas principales de los alimentos y la nutrición en el Caribe – la inseguridad de los alimentos y la obesidad. Crucial para toda la investigación ha sido el reconocimiento de que a menos que los estudios tengan por base el contexto de la pobreza y la falta de equidad, la importancia de los hallazgos en relación con la seguridad de los alimentos y la obesidad disminuirá de conformidad con ello.

Palabras claves: Caribe, inseguridad de los alimentos, obesidad, factores de riesgo

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INTRODUCTION

The reduction in Caribbean undernutrition in the last five decades should not lead to complacency and to the dangerously false conclusion that there is no urgency to focus on nutrition in the region. Results from the Caribbean Food and Nutrition Institute (CFNI) surveys show the decline in early childhood undernutrition during the last decade, but it also shows the rapid increase in obesity (Fig. 1). Obesity prevalence in all age groups has increased to the point where it is now the most important underlying cause of death in the Caribbean.

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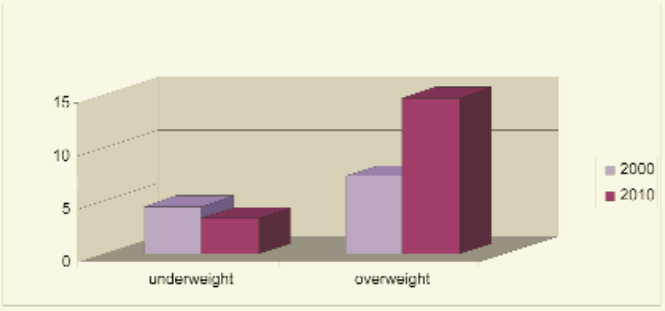

Fig. 1: Changes in childhood (0–5 years) nutritional status from 2000 to 2010.

Anaemia caused by iron deficiency declined but was still highly prevalent in the Caribbean with rates of more than 50% in some population groups. The prevalence of low birthweight (LBW) reduced but remained between 6 and 9%. The falling rates of exclusive breastfeeding coincided with the earlier and earlier introduction of other foods (1).

Over the years, CFNI conducted numerous studies on the status of nutritional deficiencies and excesses; and on various interventions which successfully impacted on food insecurity and obesity (2). For this paper, however, the aim is to identify the generic underlying issues and immediate barriers that affect food insecurity and obesity in the region. Particular attention was given to studies which will continue to have high relevance over the next decade. Space limitation allowed the summaries of only six studies: Part 1 highlights three studies related to food insecurity and undernutrition and Part 2 presents three studies related to obesity and its comorbidities. Because 2012 marks the 50th anniversary of political independence of Jamaica and Trinidad and Tobago, these countries are highlighted in the multi-country studies.

PART 1: FOOD INSECURITY

1 (a) Impact of Economic Policies on Nutrition and Health

In 2010, nine of the CARICOM countries had debt to GDP ratios of over 60%, with three of them well over 100%. By 2012, three CARICOM countries have had to resort to stand-by programmes with the International Monetary Fund (IMF) and others look set to follow (3). Such structural adjustment programmes (SAPs) are likely to impact not only the economic but also the social fabric of countries, particularly health and nutrition.

This section summarizes the health impacts of the SAPs which were implemented in Jamaica in the late 1970s and early 1980s. The summary draws heavily from the findings of a larger study conducted by CFNI to evaluate the impact of the SAPs on poor households in Jamaica and Guyana over the post-1980 period (4). These programmes encompassed significant economic policy changes and reflected fundamental shifts in development thinking away from protected and highly subsidized nationally inward-looking markets, to open, competitive and less subsidized externally-oriented markets. Concurrently, there were drastic government spending cuts in education, health and food subsidies and other state sponsored economic activities.

The prescription on how best to deal with the economic crises in Jamaica was a series of structural adjustment programmes that contained economic policies (5) aimed at, *inter alia*:

(i) Fiscal restraint, *viz*, reduction in government spending on education, health and other social services, wage restraint, elimination of government subsidies on food *etc*;
(ii) Economic liberalization, *ie* greater reliance on market signals to allocate resources, set prices, and reduction/elimination of barriers to trade and investment;
(iii) Privatization of state owned enterprises (SOEs) and other social services; and
(iv) Monetary discipline, *viz*, tight monetary policies, including reduced access to credit, high interest rates, market determined exchange rates *etc*.

How did these economic policies impact on the nutrition and health status in Jamaica?

Methods

Both quantitative and qualitative methods were used to collect and analyse primary and secondary data and thereby to arrive at an understanding of the health impacts of the SAPs. The qualitative data were obtained from household surveys and focus group discussions in four communities in Jamaica where 485 households were surveyed comprising 1843 family members. The quantitative method used the "before-after approach" (6) to assess the impact of the SAPs. This approach compares the behaviour of key outcome variables – such as macroeconomic indicators, household consumption, consumer prices, exchange rates, poverty, social services and education *etc* – before and during, or after any particular reform period or policy package. The approach assumes that non-programme determinants of economic variables remain constant between non-programme and programme periods.

Results and Discussion

Health Infrastructure and Staffing

Primary health infrastructure expanded rapidly between 1972–82, but was curtailed in the structural adjustment period. Central government recurrent health expenditure as a proportion of total government expenditure declined from 10 per cent in 1971/72 to six per cent in 1980/81. Over the decade 1980–1990, this proportion averaged seven per cent per annum, but declined to 6 per cent in the 1990s. Similarly, capital expenditure for health declined from 10.4 per cent in 1971/72 to 3.7 per cent in 1985/86, but improved to 15 per cent in the following year (7).

During the structural adjustment period, the health sector was severely constrained by the reduction of health professionals who either moved to better paying positions in

the private health sector or migrated. There was a general decline in the ranks of all the professions. In addition to the depletion of health professionals from the sector, there was a decline in the number of beds in the public hospitals, as a result of the closing down or upgrading of several clinics and hospital wards; about 600 community health-workers also lost their jobs. Between 1984 and 1993, 45 health centres were closed because of lack of staff to operate them (8).

Child Health and Nutritional Status

Despite the economic difficulties in Jamaica prior to and during the structural adjustment periods, the health sector was able to maintain a high level of immunization coverage (against polio, diphtheria, pertussis, measles and tuberculosis) for children less than five years of age. However, there were signs of reduced nutritional intakes in the population as a result of poverty induced during the adjustment period. In 1989, the incidence of poverty in Jamaica was 30 per cent and increased to 44.6 per cent in 1991, but declined significantly after 1993 to a low of 15.9 per cent in 1998. However, poverty rates in the rural areas were higher than for other townships. Between 1989 and 1998, the incidence of poverty was highest in rural areas (35 per cent) compared to 16 per cent in the Kingston Metropolitan Area (KMA). Moreover, 78 per cent of those who were poor lived in rural areas, 13 per cent in townships and nine per cent in KMA (4).

With respect to reduced nutritional intake, the most susceptible groups that were directly affected were young children under five, pregnant and lactating mothers and the elderly. Between 1980 and 1987, severe malnutrition (Gomez III) among children attending public health clinics fluctuated between 0.3% (1978) and 0.5% (1981, 1984, 1985). Moderately malnourished (Gomez II) children ranged between 2.9% (1980) and 4.0% (1985) and for those who were mildly malnourished (Gomez I), the incidence ranged between 18.6% (1980) and 23.3% (1981). In 1989, approximately 6.5% of children attending government health clinics were identified as being moderately to severely malnourished (9).

The Jamaica Survey of Living Conditions (10) reported that stunting and wasting declined during the period 1978 and 1989, showed slight increases in 1990 and declined again in 1991 to approximately the 1989 levels. More males than females suffered from low weight-for-height and stunting. However, there was a decrease in the rate in 1992, with the poorest quintile recording more cases of low weight-for-age than any other quintile. On the other hand, stunting increased in all geographic areas while recorded wasting declined in the KMA. The age group with the highest proportion of cases with low weight-for-age, wasting and stunting was the 12 to 23 month group. The incidence of diarrhoea among children in the 0–6 year age group between 1990 and 1995 was generally higher for the poor than for the non-poor, except in 1991 and 1993. The average for the poor during the period was nine per cent and seven per cent for the non-poor (4).

In the era of structural adjustment programmes, the focus was on economic dimensions as a basis for establishing medium to longer-term realignment of the economies to their resource endowment. These economic policy changes in Jamaica came at a time when the economy was facing major instabilities and crises. Living standards and health status were already beginning to erode as purchasing power deteriorated and access to food and healthcare became more difficult. In several instances, this trend continued in the adjustment and post-adjustment periods.

Targeted interventions by the government to soften some impacts of the SAPs were commendable. However, despite the range of these social safety net programmes, the evidence suggests that they were insufficient to significantly neutralize the harsh impacts of the policies.

Conclusion

One major finding from this study is the importance for policy-makers to pay more attention to the effects of policies on poor and marginalized sections of the population. In the case of the SAPs, the economic policies that were embarked upon collided head-on with living standards of the population who hitherto benefitted from subsidized food and social services (health, education, water and sanitation and social welfare). Loss of employment, an overburdened health system and general erosion of purchasing power placed further hardships on the population, especially those who were poor and marginalized. While some of the macro-indicators of the SAPs were impressive, they failed to accurately describe the effects on the poor.

In 2012, the adjustment/realignment process looms large in Jamaica, in an environment where remnants of the old problems still lurk (high external debt servicing, rising energy prices *etc*), and new ones have emerged. In addressing these, it is hoped that policy-makers will design policies with greater concerns for human welfare than were shown in the design and implementation of the structural adjustment programmes in the 1980s.

1 (b) Food Security Assessments and Vulnerability Profiling

Vulnerability to harsh conditions comes in many forms. The Caribbean is prone to natural disasters, particularly hurricanes. The region also experiences regular periods of drought and, less frequently, earthquakes. Hurricanes, floods and drought often devastate the crops and the agriculture base of the Caribbean economies. This has a direct effect on domestic food supplies and also foreign exchange earnings which are required to buy food, among other needs. Prolonged crises affect the availability and access to food through the erosion of livelihoods resulting from crop failure, depletion of food stocks, market failure, among others. This

in turn affects how the limited food is allocated within the family. The soaring prices in food commodities around the globe in 2005–2007 presented another type of crisis which can have devastating consequences on attempts to preserve nutritional status, particularly in children. But to truly assess the impact of these crises, these food price increases should be related to the purchasing power of those most vulnerable in society.

To assess this impact, CFNI used the method of a 'nutrient cost analysis' which specifies the minimum cost of obtaining a nutritious basket of commodities for a family of given size. This cost was then compared with the prevailing minimum wages in the country. The basket of commodities reflects foods that are currently available in local markets and with considerations to cultural preferences (2).

Results show that all Caribbean countries showed increased vulnerability during the food price crisis. The percentage of the minimum wage ranged from 11–15% for countries like St Lucia, St Kitts and Nevis and Antigua and Barbuda to a little under 50% in Montserrat. Although the global food price crisis officially ended in 2008, small states such as those in the Caribbean showed vulnerability through 2009 and beyond (11).

Apart from assessing vulnerability, the nutrient cost analysis is unique because it offers an objective biological tool that can be used in poverty analysis to estimate the number of persons below a given poverty threshold. Further, it can be used as a policy tool (*eg* to set wages) by governments, trade unions and the private sector.

The Caribbean Food and Nutrition Institute further utilized another framework (12) to draw attention to – in a dynamic way – *who* are vulnerable, *why* they are vulnerable and *where* they are located, and to the full range of factors that place people at risk of becoming food insecure. The sustainable livelihood approach (SLA) complements the vulnerability analysis by providing a lens for analysing how people combine different assets (natural, human, financial and social capital) to which they have access to maintain a living (13).

Methods

Data collection combined qualitative and quantitative methods. The qualitative methods include national consultations, key informant interviews and community level focus group discussions (including semi-structured interviews with selected households). The quantitative methods include rigorous analyses of secondary data (population census, surveys of living conditions, surveys of agricultural production *etc*) and household surveys using a formal structured survey instrument. The questionnaire collected information on the various data subsets including: demographics, income, employment history, indicators of vulnerability and food insecurity – food availability, food access, disease/health profile – community interventions, government interventions and food intake data.

Results and Discussion

Table 1 identifies these livelihoods, the estimated number of persons in these livelihoods, their proportion in the population and their food security status. These four vulnerable livelihoods comprise 388 211 persons or 14.9 per cent of the Jamaican population.

The question regarding *why* the vulnerable groups are food insecure is analysed. The information from the household survey, focus group discussions and secondary data sources is used to analyse the food security and vulnerability situation for each livelihood.

Table 1: Vulnerable livelihoods in Jamaica

Vulnerable Group	Number of People	Per cent of Population	Food Insecure* (%)	Severely Food Insecure* (%)
Fisher Folk	40 000[1]	1.5	79.8	10.4
Sugar Cane Workers	39 000[1]	1.5	76.9	6.4
Subsistence Farmers	129 211[1]	5.0	61.3	16.0
Inner City Poor	180 000[2]	6.9	57.2	11.7
Total	**388 211**	**14.9**		

Source: [1]Ministry of Agriculture, Fisheries and Lands, Jamaica; [2]Statistical Institute of Jamaica.
* HFIA indicator (16).

Livelihood 1 – Fisher Folk

This livelihood activity supports several categories of fisher folk. These include: persons who operate their own fishing vessels, persons employed as fishermen to work on other persons' vessels, on-shore workers who provide support services such as mooring the boats, mending nets, cleaning, painting and other services, and fish vendors.

Livelihood Outcomes

Health Risk Indicator

The most prevalent disease among fisher folk is non-communicable and upper respiratory tract diseases (21% and

12%, respectively). Just under half of the fisher folk sampled reported not suffering from any diseases.

Constraints and Coping Strategies

The major constraints faced by persons in this livelihood and which prevent them from expanding their livelihood activities include "lack of own capital" (47%), a combination of "lack of market, lack of capital and high risk" (14%) and "lack of credit" (12%). About 10% were not interested in expanding livelihood activities.

The fisher folk represent a very vulnerable group in Jamaica. Given the limited access to all five types of capital, it is not surprising that they do not at all times have physical, social and economic access to safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Food security is linked to economic viability in the fishing villages and that varies in this livelihood as fisher folk revealed that they experienced both bad and good times. The "good times" consisted of relatively well balanced meals including fish, all types of meats, starches and vegetables, while "bad times" consisted of 'anything' available.

Livelihood 2 – Sugar Cane Workers

The sugar cane workers live close to sugar cane factories and in areas where sugar cane is being cultivated. A small number of these workers are seasonal migrants who seek work during cropping season. At the time of this study, there were seven sugar cane factories operating in Jamaica, down from 18 in 1996. These factories are located in several parishes – one each in St Thomas, Trelawny, Westmoreland, St Elizabeth, Clarendon and two in St Catherine. The sugar industry provides a livelihood for about 39 000 sugar-workers (1.5% of Jamaica's population) and their families. Full time employment for sugar-workers is available during the cane harvesting season and some part-time employment is available off-season.

Livelihood Outcomes

Health Risk Indicator

Most persons in this livelihood use public healthcare (60.8%) followed by private care (28.3%) and both (10.1%). The main diseases from which sugar workers suffer include non-communicable and upper respiratory tract diseases (24% and 16%, respectively) and acute and chronic joint pains (10%). Just over 41% reported that they did not suffer from any diseases.

Constraints and Coping Strategies

The main constraints faced by sugar-workers at attempts to expand their livelihood activities include, "lack of own capital" (54%), a combination of "lack of market, capital and risk" (14%), and "lack access to credit" (14%). Seven per cent were not interested in expanding livelihood activities.

In order to cope in difficult times, persons in this livelihood engage in a range of coping strategies including "use up savings" (88%), "borrow from friends/relatives" (55%), "reduce quality of adult meals" (53%) and "sell livestock/ physical assets" (29%).

Livelihood 3 – Subsistence Farmers

Jamaican agriculture has been characterized as a long standing structural dichotomy. On one hand there is a large-scale sector which produces crops such as sugarcane, banana and coffee for the export market. Then there is a small-scale farming sector which accounts for the greater proportion of farm labour and produces a wide range of crops, mainly for the domestic market. This group of farmers represents over 80 per cent of all farmers in Jamaica and only between 50–60 per cent of the land they cultivate is owned.

Within the small-scale farm sector there is a group that is considered subsistence farmers. These farmers engage in a mode of agriculture in which a plot of land is used to produce food for home consumption and for income generation. However, the amount produced depends on climate, soil conditions, agricultural practices and the crops grown. Subsistence farming, by definition, produces only enough food to sustain the farmers and their families through their normal daily activities. Because of low production capacity (due to small plot sizes, poor soils *etc*), subsistence farming does not allow for growth, the accumulation of capital or even for much specialization of labour. This group of subsistence farmers (129 211) constitutes 60 per cent of all farmers in Jamaica and five per cent of the Jamaican population.

Livelihood Outcomes

Health Risk Indicator

Among subsistence farmers, 53.2% had no major illness in the past 12 months. However, 20.3% suffer from non-communicable diseases such as hypertension, diabetes, heart diseases *etc*, 13.2% suffer from upper respiratory tract diseases and 4.8% suffer from acute and chronic pain of the joints.

Constraints and Coping Strategies

The main constraints to expanding subsistence farmers' livelihood activities include "lack of own capital" (37%), followed by a combination of "lack of market, own capital and excessive risk" (20%). Lack of markets (9%) and too much risk (8%) were other reasons. Seven per cent were not interested in expanding their livelihood activities. Subsistence farmers engage in a wide range of coping mechanisms when faced with difficult situations.

Given these unsustainable livelihood characteristics, the subsistence farmers' livelihood outcomes are precarious. Low levels of income are linked to high levels of food insecurity. All focus group members spoke of the risks to income generation. For the farmers, it was praedial larceny,

natural disasters and bad crops. The issue of limited market opportunities for produce and livestock is directly linked to food shortages within participants' households. Most of the cash crops are harvested at the same time and therefore prices fall as supply outstrips demand. Food access for persons in this livelihood is seasonal. There are times when food is plentiful to the point of wastage. There are diverse types of fruits, vegetables and coconuts in abundance and during the glut vendors offer low prices for the produce, which gravely affect their returns and ability to save for emergencies. However, the consensus was that although food is scarce, they always manage to find something to feed the family such as tinned mackerel, sardines, cornmeal *etc*. The group reported that there is a preference for name brand chickens, therefore the home grown ones are not in demand.

Livelihood 4 – Inner City Poor

The inner city poor are located in cities, towns and other densely populated areas in Jamaica. The largest percentage of this vulnerable group is in Kingston. Other areas in which these groups are located include St Catherine, Clarendon and St James. These are an essentially urban marginal population, consisting of youths (males and females) without complete schooling, adults who are unemployed and persons who live from day to day working as traders, casual workers in local urban areas and any other activity from which they would derive some income. The core defining characteristic of the inner city poor is that they are circumscribed by a range of factors that combine to keep them in poverty and vulnerable to food insecurity. They face serious problems and difficulties in education, housing, healthcare and employment. One main source of their population increase is the migrant from the rural areas.

The locations of this livelihood system are variously described as "ghettos", "inner cities" and more politically-oriented "tribalized communities" and "garrison communities". The Kerr Report (14) described these garrison communities as exhibiting an element of autonomy, *ie* "a state within a state" and linked to a political culture extending beyond the communities which are under tight control of politicians and the local enforcers – the "Dons". While the political influence exists, the criminal elements have become more independent of the politicians.

Livelihood Outcomes

Health Risk Indicator

The main diseases reported by persons in the inner city livelihood include non-communicable and upper respiratory tract diseases (24% and 14%, respectively). More than half (56%) reported that they did not suffer from any diseases.

Constraints and Coping Strategies

The main constraints faced by the inner city poor to expand their livelihood activities include "lack of own capital" (21%), lack of access to capital (16%), and a combination of "lack of market and capital, and risk" (15%). Just over 35% were not interested in expanding their livelihood activities.

As coping strategies used by persons in this livelihood in times of difficulties, most persons resort to using past savings (61.3%), followed by borrowing from friends/relatives (60.3%), assistance from relatives abroad (29.8%), reducing the quality of adult meals (20.8%), fewer meals eaten by adults (11.3%), and begging (7.2%). The coping strategies of the inner city poor included among others, crime, "hustling" and deprivation of self. Methods of coping were varied and pegged to both informal and formal networks. Self-employment was a main coping strategy of single mothers, but overall 'hustling' was the order of the day. This meant doing odd jobs, receiving help from relatives, borrowing, crediting, begging and some indication of prostitution. Women in the inner city always ensure that their children eat even if it meant that they would do without food. Overall, the coping strategies used included skipping lunch or making adjustments like varying meals day by day.

Conclusions

Sustained access to all five types of capital is necessary for sustainable livelihoods. The types of capital examined in this study were human, natural, physical, financial and social. An important finding is that access to natural and physical capital is not enough to ensure food security. Given the island's vulnerability to natural disasters, the farmers and the fishermen are frequently exposed to natural disasters that can immediately destroy their livelihood activities. Financial and social capitals are also of paramount importance. The farmers have access to physical and natural capital but no credit and in some cases, no land title to access the credit. Social capital among relatives, neighbours and friends was stronger than the support received from government, employers and non-state agencies.

Youth unemployment is high in Jamaica and poor families are usually female-headed with an average household size of five. This highlights the importance of targeting the youth and single mothers so as to break the cycle of poverty that faces their children for generations to come.

The common characteristics among the livelihoods were poverty, little support from the State and limited access to state-provided social programmes. The urban poor are the most vulnerable with the fisher folk being more vulnerable than their other rural counterparts. Households with children were the most vulnerable. Cultural barriers were evident as children do not want to consume that which is prepared at school. The Programme for Advancement through Health and Education (PATH) – Jamaica's flagship social protection programmes – was under-utilized as the programme was perceived by the majority of participants as targeting mostly the elderly and destitute.

The findings highlight the need for social protection programmes for the poor. Although, poverty in Jamaica has reduced significantly through the years, analysis at the micro-

level revealed that there are groups in the society that are chronically deprived. These groups have little or no access to human, natural, financial or physical capital. Unless social risk management is adopted, it is unlikely that they will move above the poverty line.

The subsistence farmers, the sugar cane workers and, to a lesser extent, the fisher folk, form an important part of the agricultural base of the Jamaican society. They should be encouraged to produce enough to feed the nation. The findings reveal that development remains skewed towards the urban areas and rural development is not a priority. Specific policy requirements for these groups would include: increased access to credit for the farmers and the fisher folk. The sugar-workers need more decent wages and better working conditions. Increased access to health insurance, national insurance scheme and pension benefits are essentials for these workers. The urban poor have several policy necessities including increased access to the labour market, education and health. The consensus among the urban poor was that work and some form of training or schooling would be highly beneficial for improving their earnings.

Only an integrated development plan will secure more inclusiveness in the policy process. Reduction of crime and violence remains important parameters to secure improvement in physical and social infrastructure. Unless these policy adjustments are made, the livelihoods of the members of these vulnerable groups will continue to be unsustainable.

1 (c) Economic Analysis of Food Expenditure Behaviour

This comprehensive study shows how households in Jamaica change their purchases of various foods as their income changes. It further shows exactly how much households, in different locations in Jamaica and over time, will spend on aggregate food commodity groups (*eg* poultry, meat and fish, dairy products, oils/fats, starchy roots and tubers *etc*), or on specific foods (*eg* beef, bread, milk, meals away from home *etc*), as their incomes change.

Methods

The study utilized sophisticated econometric techniques and advanced micro-economic modelling of consumer expenditure and demand behaviour. The study used 17 years of data (1992–2008) from the Economic and Social Survey of Jamaica (9) data set and provided estimates of the responsiveness of household expenditures on food with respect to changes in total expenditures. These estimates are called expenditure elasticities or income elasticities and several sets are reported in the study:

(i) For food, meals away from home and 10 food commodity groupings
(ii) By areas (Kingston, towns and rural areas)
(iii) By quintiles (five income groups)
(iv) By area over time
(v) By quintiles over time
(vi) For 55 commodity items, by quintiles and by area

Results and Discussion

The study is able to show exactly how much income households, in different locations in Jamaica, and over time, will spend on specific food items (*eg* beef, bread, milk, meals away from home *etc*) as their income changes. Some of the specific findings of the study include:

Households in rural areas tend to spend more on food when their income increases compared to households in other towns and the Kingston metropolitan areas.

Over time, however, households tend to spend smaller proportions of any increases in income on food.

Generally, poorer households tend to spend a larger proportion of their incomes on food compared to higher income groups.

Conclusion

The findings of the study would assist policy-makers in Jamaica in planning for future production of, and demand for food, and to guide policies on health and nutrition especially as Jamaica is facing increasing prevalence of obesity and nutrition-related diseases such as diabetes, hypertension and heart diseases.

The policy implications include:

Any policies that affect income levels, whether positively or negatively, will have a much greater effect on the demand for foods among poorer house-holds than among richer ones. The results also indi-cate that policies that affect income levels will, on average, have differing affects on the demand for foods in terms of the three areas studied, Kingston metropolitan area, other towns, and rural areas. Rural households are more sensitive to income changes in terms of the demand for foods than are other towns and the Kingston metropolitan area. Policies that affect income levels should take this into account but should also be cognizant of the fact that, although the Kingston metropolitan area on average is more affluent that rural areas and other towns, there are still many households in the Kingston metropolitan area that are in the poorest quintile. As such, both area and income level effects should be considered when targeting food programmes that affect income.

The income elasticities generated in this study may also assist the Jamaican government in planning for future demand for foods. As income grows, the quantity demanded for foods will increase fastest in the rural areas on a *per capita* basis than in other towns and the Kingston metropolitan area. How-ever, immigration from rural areas to other towns and the Kingston metropolitan area will most likely continue in the coming years.

The income elasticities of demand for foods generated in this study may also be used for studies on nutrition and food-related health issues such as obesity. Results indicate that households of differ-ent affluence levels have different income-change sensitivities in terms of demand for foods, but also, even within the same area and within the same quin-tiles, the demand for different food groups and food items differ, sometimes significantly, to income changes.

PART 2: OBESITY AND CO-MORBIDITIES

Figure 2 shows the staggering increase in obesity prevalence in the last four decades.

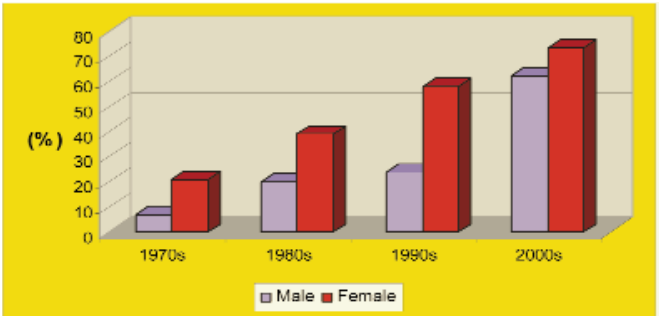

Fig. 2: The prevalence of Caribbean adult overweight/obesity.

2 (a) Cost of Obesity

The cost of obesity should be estimated based on its effects on its numerous consequences; however, the estimates of cost for this paper use only two co-morbidities – diabetes and hypertension.

If everyone with diabetes and hypertension were to be treated, then the direct cost attributed to obesity for treating these two diseases alone was US$336 million per year (Table 2). This represents 31.9 per cent of the countries' total public health expenditure. Note that in Guyana and Jamaica the obesity cost is 108% and 89% of public health expenditure, respectively – an unsustainable scenario. The countries with the highest estimated obesity costs were Jamaica (US$146.5M), Trinidad and Tobago (US$48.4M), Guyana (US$38.0M), Bahamas (US$22.4M), Barbados (US$20.0M) and Suriname (US$18.2M). These direct costs are for hospitalization, medications and physician bills and do not include the indirect costs such as pre-mature deaths, lost productivity, healthcare provided by family members *etc* which are estimated as twice the direct cost.

2 (b) Diet and Physical Activity Behaviour

The obesity tsunami (Fig. 2) and its cost (Table 2) must compel the most reluctant decision-maker to find and implement appropriate and effective programmes to prevent and control obesity. Two significant factors contributing to the

Table 2: Direct cost of diabetes and hypertension attributable to obesity

Caribbean Countries	*Cost of Diabetes (Average) due to Obesity (US$ M)*	*Cost of Hypertension (Average) due to Obesity (US$ M)*	*Total Cost (DM and HTA) due to Obesity (US$ M)*	**Total Cost (DM and HTA) due to Obesity (% PHEx)**
Guyana	5.7	32.3	38.0	107.8
Jamaica	50.5	96.0	146.5	88.9
Suriname	4.0	14.1	18.2	52.4
St Vincent/Grenadines	1.4	4.8	6.3	42.7
Dominica	1.0	2.9	3.9	33.6
St Lucia	1.4	6.2	7.6	29.5
St Kitts and Nevis	0.7	2.2	2.8	27.9
Belize	2.0	8.9	10.9	26.7
Antigua and Barbuda	1.1	4.2	5.2	17.4
Barbados	6.4	13.6	20.0	16.6
Grenada	0.7	3.1	3.8	15.9
Trinidad and Tobago	9.0	39.4	48.4	15.1
Anguilla	0.2	0.6	0.8	14.9
Bahamas	5.1	17.4	22.4	11.3
Montserrat	0.1	0.3	0.4	10.6
British Virgin Islands	0.2	0.9	1.1	7.9
Total/Aver Caribbean	**89**	**247**	**336**	**31.9**
% GDP	**0.27**	**0.74**	**1.01**	

Source: (17).

high prevalence of obesity and chronic diseases are sedentary lifestyle and the low consumption of fruits and vegetables coupled with increasing intakes of high fat and high sugar foods. But first, there needs to be an understanding of the drivers of the obesity epidemic and more importantly, the actions which are likely to change habitual behaviours.

Methods

The Caribbean Food and Nutrition Institute has used the trans-theoretical model of behaviour change (15) to foster a better understanding of a person's willingness to change dietary and physical activity behaviours. Stages of change (SOC) is the core construct of the model, and involves progress over time through five stages of change: pre-contemplation, contemplation, preparation, action and maintenance. Psychosocial factors are considered a part of this model and include the constructs of decisional balance and self-efficacy, and the processes of change individuals employ to move through the stages.

This study was conducted to determine the stage of readiness for males and females, according to their levels of obesity, for increasing the consumption of fruits and vegetables and for adopting regular physical exercise and to examine the relationship between stage of change and psychosocial factors. The study was conducted in four Caribbean countries: Jamaica, Trinidad and Tobago, St Kitts and Nevis, and Belize. Both qualitative and quantitative research methods were employed in fulfilling the objectives.

Results and Discussion

Stages of Change and Fruits and Vegetable Consumption

In this study, a large proportion (39%) of the sample was classified in the action/maintenance stage of change for fruits and vegetables. Overall, about 32% were in the preparation and 28% in the pre-contemplation/contemplation stages. However, there were significant differences by country, showing Jamaica and Trinidad and Tobago with over 40% in the action/maintenance stages while St Kitts and Nevis and Belize were much lower with 33% and 25%, respectively. In fact, the majority of Belizeans (48%) were in the pre-contemplation and contemplation stages. Focus group discussions revealed that fruit and vegetable consumption was not high among most respondents. The combined proportion of persons who are not consuming fruits and vegetables should therefore be a concern for policy-makers in light of the health benefits that are known to derive from adequate consumption of these foods.

The choice of fruits used was mainly the traditional fruits grown in the Caribbean but apples and grapes were found in the top ten fruits consumed throughout. This may be due to the influence of cable television advertising as well as the availability of these fruits to accommodate the palate of the tourism industry. Belize and St Kitts and Nevis showed the lowest intake of the recommended amounts of fruits and vegetables, which may be due to seasonal availability or cost which was listed as a major limiting factor in the focus group discussions.

Obesity was not found to be a predictor of consuming more fruits and vegetables for either males or females in this study. Gender differences were seen for the fruit and vegetable stage of change in Belize and Trinidad and Tobago, but the differences were found in the early stages where more males were in the pre-contemplation and contemplation stages than females. Women on the other hand, were more likely to be in the preparation stages. Finding a fruit tree as part of one's property is a regular sight in the Caribbean and may account for the lack of differences among the obese and non-obese or a more clear-cut difference between males and females. Caribbean people tend to eat fruits and vegetables regularly, though they may not consume adequate amounts or it may not be seen as a meal as noted in the qualitative study. Location emerged as a significant predictor of consuming five or more servings of fruits and vegetables on a daily basis. Urban residents especially in Jamaica, Belize and Trinidad and Tobago were less likely to be consuming the required amount of fruits and vegetables and also less likely to be in the action/maintenance SOC. They were more likely to be in the preparation and early stages. Again, this may be related to both availability and high cost in the urban areas.

Overall, education was not an important predictor of consuming the required amount of fruits and vegetables. However, on a country level basis, Jamaica showed significant differences in consumption and placement in the stages by education where respondents who had pre-secondary level education were more likely to be in action/maintenance SOC. This could also be related to area, since more persons from the rural areas (> 60%) in Jamaica reported being in action/maintenance SOC for fruits and vegetables.

Marital status and employment were associated with stages of change. In addition, analysis of focus group discussions showed that spouses were identified as one of the triggers for change and family support as an important factor in maintenance. The cost of fruit and vegetables on the other hand, was identified as a barrier in the qualitative analyses. This would then confirm results showing that employed persons were more apt to be in the action/maintenance stages of change for fruits and vegetables.

Persons who gave positive and health-related reasons for consuming fruits and vegetables were more likely to be in the action and maintenance stages compared to those persons who gave negative and emotive reasons. The latter were more likely to be in the pre-action stages. Intervention strategies focussing on persons in the pre-action stages to encourage them to move upwards should include information on benefits of consumption of more fruits and vegetables and possibly the risks associated with low intakes.

Stages of Change and Exercise

The SOC for fruits and vegetable consumption was dissimilar to the SOC for planned exercise. About a third of

the population was in action or maintenance while the majority (46%) was in the pre-preparation stages for exercise. This was in line with the results seen from the qualitative study where almost everyone agreed on the importance of exercise but considered it very hard work and almost "punishment" with very few seeming to enjoy it.

With SOC for planned exercise, there was a gender difference. Males more than females were likely to be at the action and maintenance stages for exercise in all the countries, nearly twice as much in some. Qualitative results showed a series of factors that prevented change in females, such as: time constraints, being tired due to work and security issues. Again, there are sizeable differences with respect to countries: Belize, and Jamaica had the lowest proportions in maintenance stage compared to Trinidad and Tobago and St Kitts and Nevis, and Belize like the SOC for fruits and vegetables, had nearly 50% of persons at the pre-contemplation stage for exercise, much higher than any of the other countries.

Although no significant differences existed for levels of obesity across the stages for fruits and vegetables among males and females, there were some differences for SOC for exercise. Higher proportions of obese males were in the maintenance SOC for exercise compared to proportions for females. This though could be due to higher muscular composition among the males. This should be further investigated. Otherwise, high proportions of both obese males and females were in the pre-action stages of change for exercise and this was confirmed in the qualitative studies where most persons exercising for weight loss reported that it was especially difficult since results were not immediately evident.

In this regard, health promotion strategies for encouraging higher intakes of fruits and vegetables and increased exercise participation must be country specific. Since the larger proportion of the population in Belize is in the pre-preparation stages for both behaviours, the first set of interventions could be focussed in that area while for the other countries, focussing on interventions geared at moving persons from the preparation to action and maintenance for fruits and vegetables could be the focus. Exercise interventions should also target females specifically to move from the pre-action stages upwards.

Psychosocial Factors and Behaviour Change

A positive association between the psychosocial factors and fruit and vegetable intake was found in this study. The self-efficacy construct represents the level of confidence which individuals have in partaking in the behaviour. Although the scores were generally high, mean scores gradually increased across the stages from pre-contemplation to action/maintenance.

For the exercise behaviour, similar significant increases from pre-contemplation to maintenance were also seen. However, there was a wider range in the increases in the self-efficacy scores from pre-contemplation to maintenance. Self-efficacy may be more important in exercise behaviour change from pre-contemplation to preparation and on to maintenance.

Decisional balance assesses the relative importance of the benefits (pros) and the barriers (cons) the individual places on making changes. Not only were the benefit scores high for both fruit and vegetable behaviour and for exercise, but like the self-efficacy scores, increased gradually from pre-contemplation to maintenance stages. Alternatively, the barrier scores were generally lower and increased significantly from the action and maintenance stages to the pre-contemplation stages. Barriers or disadvantages of making behaviour changes are higher among the pre-contemplators of SOC for exercise compared to pre-contemplators of fruits and vegetables. In fact, more negative reasons (for example, lack of time, lack of discipline and physical and social barriers) were given for exercise participation compared to those given for consuming fruits and vegetables. These were also more likely to be given by persons in the pre-action stages of change. Barriers to changing exercise behaviour, therefore, must be a part of the focus of education interventions in all the countries.

Social support from family and friends was positively associated with SOC for both behaviours under study. The lowest scores were found among respondents classified in the pre-contemplation and contemplation stages. Also the mean scores for respondents at the pre-contemplation SOC for exercise were much lower than the scores for respondents at the same stage for fruit and vegetables. Obtaining support from family and friends especially for exercise will have to be an important element in the intervention programmes. This may not pose much difficulty since friends and family were found to be important influences, both in the quantiative and qualitative, for information and support for exercise and dietary habits. These programmes must, however, be innovative and desirable for the target groups and should be sustainable for significant changes to be made.

Focus group discussions showed that most respondents had gained information about weight from the media. The media itself should play a critical role in influencing the populace on weight changes. Since media coverage on weight issues disproportionately focus on young females rather than the older population, targeting is vital.

Conclusion

The conclusions drawn from the quantitative results in the four countries confirm the conclusions from the qualitative results from focus groups. The hypothesis that significant differences exist between males and females with regards to SOC can be accepted for exercise behaviour but there is uncertainty for fruit and vegetable consumption since only two countries showed any difference. The proportion at the different stages of change for exercise and fruit and vegetables are different. Since a higher proportion of persons are in the pre-contemplation and contemplation stages for

exercise compared to fruit and vegetables, the intervention strategies must be different. This study has further exposed the fact that if health promotion initiatives are to be successful in producing positive behavioural change, they must be focussed on topic, target audience and means of conveyance of the message.

2 (c) Gender Inequities in Obesity, NCDs and HIV

In the Caribbean, chronic non-communicable diseases (NCDs) such as heart disease, stroke, hypertension, diabetes and cancer as well as HIV/AIDS are the main causes of death. What is striking is that each one has a higher increasing prevalence in women than in men. The aim of this study was therefore to determine the relative importance of gender, and gender-based interactions/relationships at household and social levels, on the onset and experiences of AIDS and NCDs: including identifying key interrelationships between gender, household and community relationships, food intake practices and sexual interactions.

Methods

The study was conducted in Jamaica and the methods, as described in previous studies in this paper, included qualitative participatory studies, quantitative household survey, medical and psychological assessments.

Results and Discussion

On the risk for HIV/AIDS, several relevant elements emerged:

a. The multiple(s) or numbers of partners to which men admit
b. The apparent lack of consistency and/or fit in reporting of multiple partners amongst females
c. The inconsistent condom use by both males and females, within both spousal/residential and other-partner relationships
d. Women's much greater willingness to remain in relationships within which their partner was known/felt to be unfaithful
e. Males' lesser willingness to accept female partners' infidelities
f. Men's and women's absence of knowledge and/or willingness to commit to knowledge regarding their partners' other-partnering status
g. The lack of transparency in respect of "relating" within relationships
h. The lack and/or fluidity of, definitions for attitudinal and behavioural relationship constructs
i. The retained importance of money: (i) to unions and relationships in general, (ii) recognized *via* the increased income-generating potential that males have over females; and (iii) supporting (potential for) actual/perceived imbalance within partnerships
j. The retained spatial distance wherein many men lived on their own and apart from partners; and yet in the context of
k. A retained desire for increased (and sustained) emotional benefits to relationships more than what tends to be acknowledged and/or enunciated. The focus instead being on (i) sexual relations, (ii) financial roles and responsibilities; (iii) household roles and responsibilities; (iv) the actual/perceived interrelationships between these three-mentioned factors with each other, and (v) their respective fulfilments

For men, this has further translated into more tightly wound social networks limiting their support options in such events as needed, increasing both alienation and vulnerability *via* the types and contexts of relationships. The psychological assessments were quite stark in their iteration of this separateness even to the points of depression and/or loneliness. For women, their social strengths have become (even) more important, and they have negotiating skills that allow them access to resources less attainable *via* a traditional workforce and their involvement therein. It also seems to have increasingly engaged their interest in and/or search for the type of utopia commonly described *via* the televised non-reality based viewing to which they ascribe, increasing the perceptual gap between their own lives and the fictionalized versions upheld by many as the ideal.

All these factors would then be added to women's increased physiological vulnerability *via* a make-up that makes them more likely to contract sexually transmitted infections (STIs) inclusive of HIV, *via* unprotected sex; that greater risk of acquiring an STI resides because of their anatomical and physiological attributes. Additionally, the lack of consistent use of barrier protection increases this risk.

On the risks for chronic diseases, the key elements especially amongst women were:

a. Intractable burdens (and resultant stressors) of household and familial responsibilities, but especially as they relate to childcare in its multiple variants.
b. Limiting self-earned income coupled with infrequent/undependable other-earned income that ultimately restricts meal items (availability), access and selection, often further resulting in increased purchase costs per unit.
c. Increased and more regular access to food in general, *via* greater involvement in meals' preparation and more specifically preparation of meals for their children.
d. Restrictions on regular access to vegetables and fruit due to their higher relative costs, but also due to (at familial level) perceived value for money.
e. The engendered nature to care for child first, then self.

f. A seemingly greater liking for snack foods/snacking/sweet food items/fruit.
g. Apparent tendency to elevate "housework" to exercise status, the former, however, also found positively correlated with BMI scores, and time spent both "sitting" and "sleeping". The women doing medical assessments for example were found to exercise less regularly (than men) and those who did apparently did not do so effectively. The cardiovascular benefit and calorie expenditure necessary to make the exercise effective was therefore probably lacking.

Of importance was the relatively lower-than-expected "influence" that one's sexual partner could/did have on behaviour. One of the main reasons for this seems to be a societal failure to adequately describe the nature of "relationships" – even if with multiple definitions. This external perception seems mirrored in fact, within several partnerships. The existence and nature of such relationships also existed at the heart of some of the study's basic assumptions. Although seeming to be an archaic statement, the differentials between males and females' perspectives on and actions within their lives proved quite remarkable. That such differences are manifested *via* at least the respective approaches to foods (but *via* the relationship constructs) is instructive, for it represents an important entrée into decision-making and behaviours that likely impact several other areas of individual and joint relational functioning, not only those assessed here.

In summary, the primary factors identified as critical in onset and/or morbidity *via* chronic diseases and HIV were: (i) females' limiting finances, (ii) females' obesity, (iii) males' and females' disaffect within relationships, and (iv) contrasts between expectations *vs* realities of gendered roles. All these seemed inextricably linked, resulting in webs of uncertainty, discontent and unmet needs.

Conclusions

Findings from the study indicate that, while there were limitations, sufficient data exist to initially direct interventions aimed at addressing a number of the health inequities as observed severally and jointly.

The study reinforced previously determined household vulnerabilities due to reduced income, lack of employment and concomitant financial needs: all associated with some state of poverty. Females were more likely to be impacted due to the sole burden of care for offspring: lower educational levels often limiting the extent of economic opportunities of which they could avail themselves. At the same time, males were less often members of such household that comprised children, instead being in their own sole residential situations, or arrangements with different family members. Yet, more males than females were income earners, due to increased opportunities inclusive of their own time.

Such differentials more often placed women in the role of dependent recipient for finances required for successful operation of their households. Within this equation, males had a much wider range of options for allocating earned resources; these extended to their consumption patterns: for sexual activities as well as for food intake. Females' consumption patterns on the other hand, seemed more closely linked with their actual duties and responsibilities, located around their children – focal points of their lives, and around their households in general.

Within this scenario, males seemed to have a more regimented style of life; one that was (i) more under their own control, (ii) less constrained by other demands, and (iii) less intruded upon by human or any other interventions not of their own desires. Sexual partnering represented one of the main areas in which they exercised such increased personal options for resource-allocation and decision-making: hence they were found to have more sexual partners and have sexual relations more often than females, regardless of relationship definitions, than did females – even while using the same relational and/or union descriptors.

Clearly, recommendations to improve diet, physical activity and safe sex must include policy actions that address the underlying economic, structural and cultural forces which militate against these healthy behaviours.

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