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Diabetes, Hypertension Coexistence, Multimorbidity and Functional Health Among Jamaicans: Evidence from the 2023 Jamaica Survey of Living Conditions

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ABSTRACT

Background: Diabetes is a major non-communicable disease in Jamaica and frequently coexists with hypertension, multimorbidity, and functional limitation. This study examined sociodemographic characteristics, hypertension coexistence, additional chronic conditions, and functional health among Jamaicans reporting diabetes in the 2023 Jamaica Survey of Living Conditions (JSLC).

Methods: A cross-sectional secondary analysis was conducted using JSLC 2023 data made available through the SALISES Documentation and Data Centre, The University of the West Indies, Mona Campus, Kingston, Jamaica. The national JSLC comprised 4,442 individuals from 1,719 households, while the supplied analytical file contained 322 respondents selected by the diabetes filter A24_B≤2. Frequencies, cross-tabulations, Pearson chi-square tests, Fisher's exact tests where appropriate, and Cramer's V were examined.

Results: Women constituted 64.6% of the analytical population, and 65.6% were aged 60 years or older. Hypertension was reported by 70.5%, arthritis by 27.3%, heart disease by 7.8%, kidney disease by 3.4%, and cancer by 4.0%. Overall, 70.5% met the combined hypertension-diabetes indicator, with a significantly higher proportion among women than men (75.0% vs 62.3%; $P=.017$). Functional difficulty affected 53.6%, including 34.6% reporting either much difficulty or inability to perform the relevant function. Functional limitation and hypertension-diabetes coexistence increased markedly with age.

Conclusions: Diabetes in this Jamaican analytical population was embedded within ageing, hypertension, multimorbidity, and substantial functional impairment. Findings support integrated cardiometabolic and functional-health management rather than isolated diabetes care, particularly for older adults and women, and persons experiencing coexisting arthritis or severe functional limitations. Unweighted filtered estimates should not be interpreted as national prevalence for Jamaica.

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Introduction

Diabetes mellitus has become one of the defining non-communicable disease challenges of contemporary population health because its consequences extend beyond abnormal blood glucose to cardiovascular, renal, neurological, ophthalmic and functional outcomes. The World Health Organization reported that the number of people living with diabetes increased from approximately 200 million in 1990 to 830 million in 2022 (i.e., a 730% increase in 33 years, averaging 22.12% per year), while prevalence rose more rapidly in low- and middle-income countries than in high-income countries [1]. Diabetes was present among approximately 14% of adults aged 18 years and older globally in 2022, compared with approximately 7% in 1990, indicating a doubling of adult prevalence over slightly more than three decades [1]. The International Diabetes Federation subsequently estimated

that approximately 589 million adults aged 20–79 years were living with diabetes in 2024 and projected that this number could increase to approximately 853 million by 2050 [2]. These developments have important implications for health systems because increased survival with diabetes also expands the population exposed to cardiovascular disease, kidney disease, neuropathy, functional disability and other long-term complications. Diabetes should increasingly be conceptualised as part of a complex chronic-disease environment rather than as an isolated disturbance of glucose metabolism.

Hypertension is especially important within this chronic-disease environment because it frequently coexists with diabetes and substantially increases cardiovascular and renal risk. The World Health Organization estimated that approximately 1.4 billion adults aged 30–79 years were living with hypertension in 2024, representing approximately one-third of the global population in this age range [3]. Approximately two-thirds of adults with hypertension live in low- and middle-income countries, making

control of the condition particularly important for health systems already confronting multiple competing demands [3]. The relationship between hypertension and type 2 diabetes is especially pronounced, with a systematic review by Colosia et al indicating that hypertension prevalence exceeded 50% in most observational studies of persons with type 2 diabetes and exceeded 75% in many studies [4]. Diabetes and hypertension also share important metabolic, behavioural and demographic pathways, including ageing, excess body weight, dietary exposures and physical inactivity. Consequently, the coexistence of hypertension and diabetes can magnify cardiovascular risk, complicate treatment, increase medication burden and intensify the need for sustained primary and specialist care.

The Jamaican experience is particularly relevant because the country has undergone substantial demographic and epidemiological transitions during which chronic non-communicable diseases have become increasingly important causes of morbidity. Mitchell-Fearon et al examined 2,943 community-dwelling Jamaicans aged 60 years and older in 2012 and reported hypertension among 61.4% and diabetes among 26.3% of participants [5]. Their study also identified important sex differences, with older Jamaican women carrying greater burdens of hypertension and diabetes than men. The findings indicated that diabetes had increased markedly compared with estimates generated from Jamaican older adults in 1989, thereby indicating an important secular expansion of cardiometabolic morbidity [5]. Because the Jamaican population continues to age, the clinical intersection between diabetes, hypertension, functional impairment and other chronic conditions has become increasingly important. Contemporary analysis is required to determine whether the diabetes experience continues to be characterised by the same demographic and multimorbidity patterns documented in earlier Jamaican research.

The broader Jamaican multimorbidity literature provides further evidence that single-disease approaches are unlikely to describe the health experiences of many persons with diabetes. Craig et al analysed nationally representative Jamaica Health and Lifestyle Survey 2007/2008 data from 2,551 participants aged 15–74 years and found that 24.1% experienced multimorbidity, defined as two or more chronic conditions. Multimorbidity was substantially more common among women than men, affecting 31.6% of women compared with 16.1% of men. Hypertension, obesity, hypercholesterolaemia and diabetes were major contributors to the metabolic and vascular patterns identified in that study. The analysis further indicated that morbidity clustered in recognisable patterns rather than occurring as unrelated individual diagnoses, thereby questioning the adequacy of a purely disease-specific framework [6]. These observations are particularly relevant to diabetes because a person living simultaneously with diabetes, hypertension, arthritis and functional limitation may confront fundamentally different clinical and social challenges from someone living with uncomplicated diabetes alone.

Evidence from the wider Caribbean similarly demonstrates that cardiometabolic disease constitutes a regional rather than exclusively Jamaican phenomenon. In Barbados, Howitt et al studied 1,234 adults and reported hypertension prevalence of 40.6%, diabetes prevalence of 18.7% and obesity prevalence of 33.8% after appropriate population standardisation [7]. Their study indicated that diabetes and hypertension were distributed within wider social, behavioural and biological environments rather than being socially neutral conditions [7]. Earlier work from Trinidad and Tobago also indicated the long-standing nature of the Caribbean cardiometabolic transition, with Miller et al

prospectively studying 2,491 adults aged 35–69 years in the St James survey [8]. That study documented incident hypertension and non-insulin-dependent diabetes mellitus and indicated the importance of body mass index, weight change and other metabolic characteristics in subsequent disease development [8]. Taken together, the Barbadian and Trinidadian evidence indicates that the coexistence and development of cardiometabolic disease are longstanding concerns across English-speaking Caribbean populations.

The wider Latin American and Caribbean literature extends the concern from individual cardiometabolic diseases to multimorbidity more generally. Huaquia-Díaz et al conducted a systematic review and meta-analysis and estimated a pooled multimorbidity prevalence of approximately 43% across Latin America and the Caribbean, while the pooled estimate from nationally representative studies was approximately 37%. Estimates increased considerably among older populations, indicating the central role of ageing in the accumulation of chronic diseases. Hypertension and type 2 diabetes were notable because they were included in every multimorbidity definition examined across the eligible reports. The authors also identified a higher multimorbidity burden among women than men, thereby reinforcing sex differences documented in Jamaica and elsewhere in the region [9]. These regional findings support examination of diabetes through a multimorbidity framework that incorporates age, sex and additional chronic conditions instead of regarding glycaemic disease as an independent outcome.

Functional health is another essential element of this framework because diagnostic burden does not necessarily reveal the extent to which chronic diseases affect everyday life. Diabetes can contribute to neuropathy, visual impairment, cardiovascular complications, renal disease and lower-extremity problems, while hypertension and arthritis can further affect independence and mobility [1]. The World Health Organization defines healthy ageing in terms of developing and maintaining the functional ability that enables well-being in older age and emphasises that functional ability reflects interactions between individual capacity and the surrounding environment [10]. This conceptualisation is highly relevant to persons living with multiple chronic conditions because the ability to move, obtain medications, prepare food, attend clinical appointments and perform self-care may be as consequential as the number of diagnoses recorded. Functional decline may also affect treatment adherence and place increasing demands on household members, caregivers and the health system. Incorporating functional health into an analysis of diabetes can reveal dimensions of disease burden that remain hidden when investigation is restricted to prevalence or diagnostic status.

Despite the accumulated Jamaican and regional literature on diabetes and hypertension, an important research gap remains concerning the contemporary social, cardiometabolic and functional characteristics of Jamaicans reporting diabetes using the 2023 Jamaica Survey of Living Conditions. Earlier Jamaican studies have provided valuable information on diabetes, hypertension, ageing and multimorbidity, but relatively limited recent work has integrated socioeconomic position, education, sex, hypertension coexistence, multiple chronic diseases and functional health in one contemporary JSLC-based analysis. This gap is important because conditions surrounding diabetes management may have changed substantially since the Jamaica Health and Lifestyle Survey 2007/2008 and the 2012 survey of older Jamaicans [5,6]. The JSLC also provides a distinctive advantage because it situates health information within household

and living-condition variables rather than functioning exclusively as a disease surveillance instrument. The present study examined the demographic and socioeconomic profile, chronic-disease coexistence, functional health, sex differences and age patterning among the 322 respondents contained in a diabetes-specific analytical subset of the 2023 JSLC. The study further compared these findings with evidence from Jamaica, the wider Caribbean, Latin America and the Caribbean, and the international literature to determine how the contemporary Jamaican experience corresponds with broader patterns.

Materials and Methods

Research Design

The study employed a quantitative, cross-sectional, secondary-data research design using observations obtained from the 2023 Jamaica Survey of Living Conditions [11]. A cross-sectional design was appropriate because variables describing demographic circumstances, socioeconomic position, reported chronic conditions and functional health were observed within a defined survey period rather than through prospective follow-up. Secondary analysis enabled detailed examination of an established national household-survey resource without undertaking new primary data collection. The analytical approach combined descriptive statistics with bivariate inferential procedures to identify meaningful patterns and associations within the diabetes-specific analytical population. No intervention was implemented, respondents were not randomly allocated to treatment groups, and the available data did not establish temporal ordering between explanatory characteristics and health outcomes. Accordingly, all relationships are interpreted as descriptive or associational rather than causal.

General Overview of the Jamaica Survey of Living Conditions

The Jamaica Survey of Living Conditions is one of the longest-running household living-conditions surveys in the English-speaking Caribbean and has been conducted since 1988 [11,12]. The survey developed from the broader Living Standards Measurement Study tradition but was adapted to Jamaican policy and planning requirements, with particular emphasis on generating information that can support governmental decision-making. The Planning Institute of Jamaica serves as the principal investigator and depositor of the survey series, while the Statistical Institute of Jamaica is identified as the principal data-collection agency [12]. The JSLC gathers household- and individual-level information concerning health, education, consumption, housing, demographic characteristics, social assistance and other dimensions of living conditions [11,12]. This broad structure distinguishes the JSLC from disease-specific health surveys because health outcomes can be interpreted within the social and household environments in which they occur. The survey consequently provides a useful empirical platform for examining diabetes as a condition situated simultaneously within demographic, socioeconomic and health circumstances.

The official overview of the 2023 JSLC reports a realised sample of 4,442 individuals from 1,719 households. Data collection was undertaken through Computer Assisted Personal Interviews over the period July 2023 to March 2024, indicating the use of an electronic fieldwork system for the survey round. The published survey report was organised into six principal substantive chapters addressing demographic characteristics, household consumption and poverty, health, education, housing and social protection [11]. Data were analysed at both household and individual levels and, where applicable, disaggregated according to

region, socioeconomic quintile, age group and sex [11]. These characteristics demonstrate that the 2023 JSLC was designed as a multidimensional survey of Jamaican living conditions rather than exclusively as a health survey. The national parent sample of 4,442 individuals must nevertheless be distinguished carefully from the 322-person disease-specific analytical subset used in the present investigation.

Sampling Frame and Sampling Structure

The established JSLC sampling architecture is based on a stratified random household-survey framework linked historically to the Statistical Institute of Jamaica's Labour Force Survey infrastructure [12,13]. SALISES describes the JSLC as drawing household and individual information from a subset of the population covered by the Labour Force Survey and identifies the general sampling procedure as a stratified random sample [12]. Detailed documentation from earlier JSLC rounds describes a two-stage design in which geographic areas or enumeration districts are selected at the first stage, and dwellings are selected within those geographic units at the second stage. Enumeration districts have historically been grouped within strata or sampling regions, with selected dwellings derived from dwelling lists that form part of the national household sampling frame. This general architecture facilitates geographic coverage across Jamaica and links household selection to a formal national statistical sampling infrastructure rather than to convenience recruitment [13]. Because the publicly available 2023 overview reports the realised sample but does not reproduce every technical parameter of the 2023 master-sample design, the present study does not assume that every historical selection fraction or procedural detail remained identical in 2023.

The sampling frame should be understood at two related but analytically distinct levels. At the parent-survey level, the JSLC belongs to Jamaica's national household-survey system and is intended to provide information about persons and households selected through a probability-based statistical framework [11-13]. At the secondary-analysis level, the present study did not analyse every person in the parent survey but instead used a disease-specific filtered subset extracted from the available individual-level dataset. Consequently, the original national probability design does not by itself make every unweighted percentage calculated from the filtered subset a national prevalence estimate. Appropriate population inference normally requires consideration of selection probabilities, survey weights, non-response adjustments and, where relevant, stratification and clustering. None of these survey-design adjustments was applied in the supplied SPSS output used for the present analysis. The distinction between national survey origin and unweighted disease-specific secondary analysis is maintained throughout the interpretation.

Survey Structure and Health Information

The JSLC contains core modules that collect information on general health among household members in addition to education, household expenditures, housing conditions, social assistance and other living-condition indicators [12]. The health component allows respondents to report illnesses, healthcare utilisation and selected chronic conditions, thereby providing opportunities to examine disease beyond short-term episodes of illness. Because health information is collected alongside demographic and socioeconomic data, the survey facilitates examination of social patterning that may be unavailable within routine clinical records. This structure is especially useful for studying diabetes because the ability to manage a chronic condition can be affected by age, economic resources, household organisation and functional

capacity. The present study utilised variables from the health and sociodemographic components rather than attempting to analyse every module contained within the JSLC. The resulting design is consequently a focused secondary analysis nested within a much broader national survey infrastructure.

Data Access and SALISES Documentation and Data Centre

The JSLC 2023 dataset used in the present secondary analysis was made available through the SALISES Documentation and Data Centre, Sir Arthur Lewis Institute of Social and Economic Studies, The University of the West Indies, Mona Campus, Kingston, Jamaica, West Indies. The SALISES databank identifies the Derek Gordon Databank at UWI Mona as one of the local archives where JSLC studies are stored and lists survey rounds extending from 1988 through 2023 [12]. The repository identifies the Planning Institute of Jamaica as depositor and principal investigator and the Statistical Institute of Jamaica as data collector [12]. SALISES performs an important documentation and research-access role while the underlying national survey remains institutionally associated with PIOJ and STATIN [12]. Use of an established academic data archive improves transparency because the analytical dataset is located within a documented national survey series rather than being treated as an independently assembled convenience database. The present study acknowledges both the national institutions responsible for the JSLC and SALISES as the route through which the dataset was made available for scholarly secondary analysis.

Study Population and Analytical Sample

The analytical population consisted of respondents selected from the available JSLC 2023 dataset using the supplied SPSS filtering for diabetes. The working file contained 322 cases, and no weighting variable was applied in the statistical outputs provided for the study. The disease-specific analytical subset comprised 114 males and 208 females, representing 35.4% and 64.6% of respondents, respectively. Age information was available for all 322 respondents, educational information for 319 respondents and union-status information for 320 respondents. The analytical population was strongly concentrated at older ages, with 129 participants aged 60–74 years and 82 aged 75 years or older. These 322 observations constitute the denominator for most descriptive analyses and must not be confused with the 4,442 individuals included in the national JSLC 2023 parent survey.

Variables and Operationalisation

Demographic characteristics included sex, age cohort, parish and union status, while socioeconomic characteristics included educational level, socioeconomic group and the supplied head-of-household indicator. Age was classified into 0–14 years, 15–24 years, 25–44 years, 45–59 years, 60–74 years and 75 years or older. Socioeconomic position was grouped as poor for quintiles 1 and 2, middle for quintile 3 and wealthy for quintiles 4 and 5. Educational attainment was classified into primary education and below, secondary education and post-secondary education. Union status was represented by married, common-law, visiting and single categories. Because the supplied output did not independently establish the substantive labels corresponding to the numerical codes of the head-of-household variable, those codes were not assigned additional meaning without supporting documentation.

The health variables included reported hypertension, asthma, arthritis, chronic obstructive pulmonary disease, heart disease, sickle-cell disease, depression, dementia, other mental disorders, cancer, epilepsy and kidney disease. For many chronic conditions,

the questionnaire differentiated reports occurring within the preceding 12 months from reports extending beyond 12 months, while also recording absence of the disease and, where relevant, uncertainty. For descriptive purposes, affirmative disease histories were combined to facilitate interpretation of the overall reported burden, while the original categories were retained where required for crosstabulation. A supplied derived variable, Hypertension and Diabetes, identified respondents meeting the combined hypertension-diabetes criterion within the analytical dataset. Functional health was classified as no difficulty, some difficulty, a lot of difficulty and inability to perform the relevant activity at all. Taken together, these variables made it possible to examine diabetes within a wider cardiometabolic, multimorbidity, demographic and functional-health framework.

Statistical Analysis

Statistical analysis was based on the frequencies and crosstabulation procedures contained within the supplied SPSS outputs. Descriptive statistics were reported primarily as frequencies, percentages and valid percentages, with valid percentages used when small amounts of item non-response were present. Sex-specific and age-specific crosstabulations were used to examine heterogeneity in socioeconomic position, chronic morbidity, hypertension-diabetes coexistence and functional health. Pearson's chi-square test was used to evaluate associations between categorical variables, with statistical significance defined as $p\text{-value} < .05$. Phi and Cramer's V were used to assess the magnitude of association, particularly where statistically significant differences were identified. Fisher's exact test was considered when conventional chi-square assumptions were weakened in small 2×2 tables.

Assumptions underlying inferential tests were considered explicitly because several uncommon chronic conditions generated sparse contingency tables. Standard Pearson chi-square approximations become less reliable when substantial numbers of expected cell frequencies fall below five, especially when minimum expected counts are extremely small. Consequently, statistically significant results from sparse tables were not regarded as automatically definitive and were interpreted alongside cell frequencies, effect sizes and substantive plausibility. Analyses involving common outcomes such as socioeconomic group and arthritis generally produced more stable tables than analyses involving COPD, dementia, epilepsy and some cancer categories. No multivariable regression model was included in the supplied statistical output, and the present study does not describe bivariate associations as independent predictors or determinants. Similarly, because the supplied analysis applied no survey weights or complex-survey adjustments, reported percentages describe the 322-person analytical subset rather than weighted national prevalence.

Ethical Considerations

This investigation involved secondary analysis of an existing national household-survey dataset and did not involve new recruitment, clinical intervention or direct contact with participants. Data were examined for scholarly purposes without attempting to identify individual respondents, households or exact residential addresses. Responsibility for original survey field procedures, consent processes and primary data governance resided with the institutions responsible for the JSLC. Access to the secondary dataset was facilitated through the SALISES Documentation and Data Centre at The University of the West Indies, Mona Campus. The present analysis reports findings at the aggregate level and focuses on variables relevant to the stated research questions. This approach supports scientific use of the data while limiting

unnecessary disclosure of individual-level information.

Results

Demographic and Socioeconomic Characteristics

The analytical population was predominantly female, with women representing 64.6% of the 322 participants compared with 35.4% for men. Age was strongly concentrated in the older categories, as 40.1% were aged 60–74 years and 25.5% were aged 75 years or older. Taken together, 65.6% of respondents were aged 60 years or older, indicating that diabetes in the analytical subset was principally concentrated among older adults. Socioeconomically, 46.6% belonged to the wealthiest two quintiles, 31.7% belonged to the poorest two quintiles, and 21.7% belonged to the middle quintile. Among respondents with valid educational information, 54.9% had post-secondary education, compared with 35.7% with secondary education and 9.4% with primary education or below. Among respondents with valid union-status information, 53.8% were single, 30.6% were married, 8.1% were in visiting relationships, and 7.5% were in common-law unions.

Table 1: Demographic and Socioeconomic Characteristics of the Diabetes Analytical Population, JSLC 2023

Characteristic	n	%
Sex		
Male	114	35.4
Female	208	64.6
Age cohort		
0–14 years	2	0.6
15–24 years	2	0.6
25–44 years	28	8.7
45–59 years	79	24.5
60–74 years	129	40.1
≥75 years	82	25.5
Socioeconomic group		
Poor: quintiles 1–2	102	31.7
Middle: quintile 3	70	21.7
Wealthy: quintiles 4–5	150	46.6
Educational level*		
Primary and below	30	9.4
Secondary	114	35.7
Post-secondary	175	54.9
Union status†		
Married	98	30.6
Common-law	24	7.5
Visiting	26	8.1
Single	172	53.8

Education valid n=319. †Union status valid n=320. Valid percentages are reported for variables containing missing values

Social Characteristics by Sex

Sex was significantly associated with socioeconomic position within the diabetes analytical population ($\chi^2=12.115$, $df=2$, $P=.002$; Cramer's $V=.194$). Among males, 59.6% belonged to the wealthy socioeconomic group compared with 39.4% of females, while 36.1% of women belonged to the poor category compared with 23.7% of men. Educational attainment did not differ significantly by sex ($\chi^2=2.419$, $df=2$, $P=.298$), and post-secondary education accounted for 54.9% of both men and women with valid educational information. Union status displayed a smaller but statistically significant association with sex ($\chi^2=7.930$, $df=3$, $P=.047$; Cramer's $V=.157$), with women more commonly classified as single. The supplied head-of-household variable was also significantly associated with sex ($\chi^2=8.116$, $df=1$, $P=.004$; Cramer's $V=.159$), although its numerical coding prevents confident substantive interpretation without the relevant codebook labels. These findings indicate that social differentiation within the analytical population was clearer for socioeconomic circumstances and household characteristics than for educational attainment.

Table 2: Social Characteristics by Sex Among the Diabetes Analytical Population, JSLC 2023

Characteristic	Male, n (%)	Female, n (%)	Total, n (%)	χ^2	df	P value	Cramer's V
Socioeconomic group				12.115	2	0.002	.194
Poor, quintiles 1–2	27 (23.7)	75 (36.1)	102 (31.7)				
Middle, quintile 3	19 (16.7)	51 (24.5)	70 (21.7)				
Wealthy, quintiles 4–5	68 (59.6)	82 (39.4)	150 (46.6)				
Educational level				2.419	2	0.298	.087
Primary and below	7 (6.2)	23 (11.2)	30 (9.4)				
Secondary	44 (38.9)	70 (34.0)	114 (35.7)				
Post-secondary	62 (54.9)	113 (54.9)	175 (54.9)				
Head-of-household indicator				8.116	1	0.004	.159
Code .00	29 (25.4)	86 (41.3)	115 (35.7)				
Code 1.00	85 (74.6)	122 (58.7)	207 (64.3)				
Union status				7.930	3	0.047	.157
Married	43 (38.1)	55 (26.6)	98 (30.6)				
Common-law	11 (9.7)	13 (6.3)	24 (7.5)				
Visiting	10 (8.8)	16 (7.7)	26 (8.1)				
Single	49 (43.4)	123 (59.4)	172 (53.8)				

Chronic Morbidity

Hypertension represented the dominant additional chronic condition among participants in the diabetes analytical population. Approximately 11.2% reported hypertension within the preceding 12 months and 59.3% reported hypertension extending beyond 12 months, producing a combined reported history of approximately 70.5%. Arthritis was the second most frequently reported condition, affecting approximately 27.3%, including 5.6% within the preceding year and 21.7% extending beyond 12 months. Heart disease was reported by approximately 7.8%, asthma by 5.2%, cancer by 4.0%, kidney disease by 3.4% and sickle-cell disease by 3.1%. Depression, other mental disorders, dementia, epilepsy and COPD occurred considerably less frequently within the analytical population. The overall pattern demonstrates that diabetes frequently coexisted with cardiovascular and musculoskeletal morbidity rather than representing an isolated chronic condition.

Table 3: Selected Coexisting Chronic Conditions in the Diabetes Analytical Population

Condition	Within preceding 12 months, %	>12 months, %	Combined reported history, %
Hypertension	11.2	59.3	70.5
Arthritis	5.6	21.7	27.3
Heart disease	1.2	6.5	7.8
Asthma	0.9	4.3	5.2
Cancer	0.6	3.4	4.0
Kidney disease	0.6	2.8	3.4
Sickle-cell disease	0.3	2.8	3.1
Depression	0.9	1.2	2.1
Other mental disorder	0.0	1.2	1.2
Dementia	0.0	0.9	0.9
Epilepsy	0.0	0.9	0.9
COPD	0.0	0.6	0.6

Combined percentages may differ slightly from sums of displayed percentages because of rounding.

Chronic Morbidity by Sex

Arthritis indicated one of the strongest sex differences among the chronic diseases examined, with approximately 35.6% of women reporting arthritis compared with 12.2% of men. The association between sex and arthritis status was statistically significant ($\chi^2=20.129$, $df=2$, $P<.001$; Cramer's $V=.250$), indicating substantially greater articular morbidity among women in the diabetes subset. Cancer was reported by approximately 8.8% of men compared with 1.4% of women, and the sex association was statistically significant according to the Pearson test ($\chi^2=10.762$, $df=2$, $P=.005$; Cramer's $V=.183$). That cancer result requires caution, however, because half of the expected cell frequencies were below five and the distribution of cancer types was extremely sparse. Hypertension showed a greater descriptive burden among women but did not reach the conventional threshold for statistical significance across its original

response categories ($\chi^2=6.643$, $df=3$, $P=.084$). Most of the rarer chronic conditions similarly produced non-significant sex differences, with interpretation limited by low frequencies and sparse contingency cells.

Table 4: Chronic Morbidity by Sex Among the Diabetes Analytical Population, JSLC 2023

Chronic condition	Male, n (%)	Female, n (%)	Total, n (%)	χ^2	df	P value	Cramer's V
Hypertension				6.643	3	0.084	.144
Reported history*	71 (62.3)	156 (75.0)	227 (70.5)				
Arthritis				20.129	2	<0.001	.250
Reported history*	14 (12.3)	74 (35.6)	88 (27.3)				
Asthma				4.600	3	0.204	.120
Reported history*	9 (7.9)	8 (3.8)	17 (5.3)				
COPD				0.187	1	0.665	.024
Reported history*	1 (0.9)	1 (0.5)	2 (0.6)				
Heart disease				4.546	3	0.208	.119
Reported history*	8 (7.0)	17 (8.2)	25 (7.8)				
Sickle-cell disease				1.265	2	0.531	.063
Reported history*	2 (1.8)	8 (3.8)	10 (3.1)				
Depression				3.922	2	0.141	.110
Reported history*	0 (0.0)	7 (3.4)	7 (2.2)				
Dementia				1.294	1	0.255	.063
Reported history*	2 (1.8)	1 (0.5)	3 (0.9)				
Other mental disorder				2.220	1	0.136	.083
Reported history*	0 (0.0)	4 (1.9)	4 (1.2)				
Cancer				10.762	2	0.005	.183
Reported history*	10 (8.8)	3 (1.4)	13 (4.0)				
Epilepsy				1.660	1	0.198	.072
Reported history*	0 (0.0)	3 (1.4)	3 (0.9)				
Kidney disease				0.525	2	0.769	.040
Reported history*	5 (4.4)	6 (2.9)	11 (3.4)				

Functional Health

Functional impairment represented an important component of morbidity within the diabetes analytical population because only 46.4% of participants with valid functional-health information reported no difficulty. Some difficulty was reported by 19.0%, a lot of difficulty by 15.0% and complete inability by 19.6%. Combining the three limitation categories indicates that 53.6% experienced at least some functional difficulty, while 34.6% experienced either a lot of difficulty or an inability to perform the relevant activity. Men were somewhat more likely than women to report no difficulty, at 50.4% compared with 44.2%, whereas complete inability was more common among women at 23.1% compared with 13.3% among men. Nevertheless, functional health status did not differ significantly overall by sex ($\chi^2=4.653$, $df=3$, $P=.199$; Cramer's $V=.120$). The findings demonstrate a substantial functional burden among persons with diabetes even though the overall distribution was not statistically distinguishable between men and women.

Table 5: Functional Health Status by Sex

Functional health status	Male, n (%)	Female, n (%)	Total, n (%)
No difficulty	57 (50.4)	92 (44.2)	149 (46.4)
Some difficulty	24 (21.2)	37 (17.8)	61 (19.0)
A lot of difficulty	17 (15.0)	31 (14.9)	48 (15.0)
Cannot do at all	15 (13.3)	48 (23.1)	63 (19.6)
Total	113 (100.0)	208 (100.0)	321 (100.0)

Pearson $\chi^2=4.653$, $df=3$, $P=.199$; Cramer's $V=.120$

Age and Functional Health

Age indicated a considerably stronger relationship with functional health than sex, with limitations becoming progressively more pronounced across older age groups. Among respondents aged 25–44 years, 82.1% reported no functional difficulty, compared with 65.8% among persons aged 45–59 years, 45.7% among those aged 60–74 years and only 14.6% among those aged 75 years or older.

Complete inability increased from 7.1% among participants aged 25–44 years to 15.5% among those aged 60–74 years and 45.1% among those aged 75 years or older. The association between age and functional health was statistically significant for the total analytical population ($\chi^2=82.429$, $df=15$, $P<.001$; Cramer's $V=.293$). Significant age-related functional patterning was also observed separately among males and females, although some age-by-function cells contained small expected frequencies. The magnitude and consistency of the descriptive gradient nevertheless demonstrate that advanced age constituted a major marker of functional-health burden among persons in the diabetes analytical subset.

Table 6: Functional Health Status by Age Group Among the Diabetes Analytical Population, JSLC 2023

Age group, years	No difficulty, n (%)	Some difficulty, n (%)	A lot of difficulty, n (%)	Cannot do at all, n (%)	Total, n
0–14	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	2
15–24	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	2
25–44	23 (82.1)	2 (7.1)	1 (3.6)	2 (7.1)	28
45–59	52 (65.8)	12 (15.2)	8 (10.1)	7 (8.9)	79
60–74	59 (45.7)	30 (23.3)	20 (15.5)	20 (15.5)	129
≥75	12 (14.6)	17 (20.7)	19 (23.2)	37 (45.1)	82*
Total	149 (46.4)	61 (19.0)	48 (15.0)	63 (19.6)	321

Statistical Test: Pearson $\chi^2=82.429$, $df=15$, $P<.001$; Cramer's $V=.293$

Hypertension-Diabetes Coexistence by Sex

The combined hypertension-diabetes indicator was positive for 227 of the 322 participants, corresponding to 70.5% of the diabetes analytical population. Among women, 75.0% met the combined indicator compared with 62.3% of men. This sex difference was statistically significant ($\chi^2=5.728$, $df=1$, $P=.017$), while Cramer's $V=.133$ indicated a relatively modest association. The female excess is nevertheless important because women represented almost two-thirds of the diabetes subset and simultaneously carried a substantially greater burden of arthritis. The coexistence of these conditions implies that many women may have been managing multiple chronic problems rather than diabetes alone. The findings support interpretation of female diabetes morbidity within a multimorbidity framework while avoiding the conclusion that sex independently caused the observed differences.

Table 7: Hypertension-Diabetes Coexistence by Sex Among the Diabetes Analytical Population, JSLC 2023

Combined hypertension-diabetes status	Male, n (%)	Female, n (%)	Total, n (%)
No combined hypertension-diabetes coexistence	43 (37.7)	52 (25.0)	95 (29.5)
Combined hypertension-diabetes coexistence	71 (62.3)	156 (75.0)	227 (70.5)
Total	114 (100.0)	208 (100.0)	322 (100.0)

Statistical Test: Pearson $\chi^2=5.728$, $df=1$, $P=.017$; Cramer's $V=.133$

Age and Hypertension-Diabetes Coexistence

The relationship between age and combined hypertension-diabetes status was substantially stronger than the association observed for sex. Combined hypertension and diabetes increased from 28.6% among participants aged 25–44 years to 65.8% among those aged 45–59 years, 75.2% among those aged 60–74 years and 85.4% among persons aged 75 years or older. The overall association was statistically significant ($\chi^2=44.136$, $df=5$, $P<.001$), with Cramer's $V=.370$ indicating a moderately strong relationship relative to the other bivariate associations examined. Among women, coexistence increased from 28.6% at ages 25–44 years to 73.9% at ages 45–59, 78.8% at ages 60–74 and 90.7% at age 75 years or older. Among men, the corresponding proportions were 28.6%, 54.5%, 68.2% and 75.0%, although the male-specific Pearson test did not reach conventional statistical significance. Sparse observations among the youngest age groups require caution, but the substantive progression from middle adulthood into older age remains pronounced.

Table 8: Combined Hypertension and Diabetes by Age Group and Sex

Age group	Male, %	Female, %	Total, %
25–44 years	28.6	28.6	28.6
45–59 years	54.5	73.9	65.8
60–74 years	68.2	78.8	75.2
≥75 years	75.0	90.7	85.4
All ages	62.3	75.0	70.5

Overall age association: Pearson $\chi^2=44.136$, $df=5$, $P<.001$; Cramer's $V=.370$. The 0–14-year and 15–24-year groups each contained only two respondents and are omitted from substantive percentage comparison

Discussion

Principal Findings: Current

The principal finding of the present study is that diabetes in the selected JSLC 2023 analytical population was embedded within an extensive cardiometabolic, multimorbidity and functional-health burden. Approximately seven in every ten participants met the combined hypertension-diabetes indicator, more than one-quarter reported arthritis, and more than one-half experienced some degree of functional limitation. The population was also highly concentrated at older ages, with 65.6% aged 60 years or older. Advancing age was accompanied by pronounced increases in both hypertension-diabetes coexistence and functional impairment, thereby indicating an important convergence between cardiometabolic accumulation and declining functional capacity. Women experienced a greater combined hypertension-diabetes burden than men and were substantially more likely to report arthritis, although not every sex difference was statistically significant. These results demonstrate that understanding diabetes among contemporary Jamaicans requires substantially more than measuring the presence of elevated blood glucose or a diabetes diagnosis.

Comparison with Earlier Jamaican Research

The findings are broadly consistent with earlier Jamaican research indicating substantial coexistence between diabetes, hypertension, ageing and female morbidity. Mitchell-Fearon et al reported hypertension among 61.4% and diabetes among 26.3% of 2,943 Jamaicans aged 60 years or older in 2012.[5] Their population differed fundamentally from the present analytical group because they studied an older community population rather than restricting analysis to persons selected through a diabetes filter.[5] The present finding that approximately 70.5% of the diabetes analytical subset also reported hypertension should not be interpreted as directly comparable with a population hypertension prevalence of 61.4%. Instead, it demonstrates that once analysis is concentrated among persons reporting diabetes, hypertension constitutes an exceptionally common coexisting condition. The strong age pattern identified in the present study further reinforces Mitchell-Fearon et al's conclusion that Jamaica's demographic transition is closely connected to its chronic-disease burden.[5]

The findings also correspond closely with the Jamaican multimorbidity patterns identified by Craig et al.[6] Their analysis found that 24.1% of Jamaicans aged 15–74 years were multimorbid and documented a substantially greater burden among women than men.[6] Hypertension, diabetes, obesity and hypercholesterolaemia were important contributors to metabolic and vascular disease classes, while cardiovascular, articular and mental conditions formed another clinically meaningful pattern.[6] The present study similarly demonstrates that diabetes frequently coexists with hypertension and arthritis, particularly among women, thereby reinforcing the view that chronic diseases cluster within individual patients. Importantly, the current analysis extends the earlier Jamaican literature by integrating functional-health information and indicating that more than one-half of the diabetes subset experienced functional difficulty. It adds a functional dimension to earlier evidence showing that the single-disease paradigm is inadequate for understanding Jamaican chronic morbidity.

Comparison with the Wider Caribbean

The Jamaican results are consistent with the substantial cardiometabolic burden documented in neighbouring Caribbean populations. Howitt et al reported adult hypertension prevalence of 40.6% and diabetes prevalence of 18.7% in Barbados, alongside obesity prevalence of 33.8%.[7] Those estimates describe a

population-based sample rather than a diabetes-specific subset and should not be compared numerically with the 70.5% hypertension history observed in the present analytical population. Nevertheless, both studies demonstrate that hypertension and diabetes occupy overlapping epidemiological spaces within English-speaking Caribbean populations. The Barbadian study additionally indicated social and demographic patterning in risk factors, strengthening the argument that cardiometabolic disease cannot be separated from socioeconomic conditions.[7] The present Jamaican findings extend this regional evidence by showing that functional limitation and musculoskeletal morbidity also form important components of disease burden among persons with diabetes.

Historical evidence from Trinidad and Tobago similarly supports the interpretation of cardiometabolic disease as a longstanding Caribbean transition rather than a newly emerging phenomenon. Miller et al prospectively followed 2,491 men and women aged 35–69 years in the St James survey and examined incident hypertension and non-insulin-dependent diabetes mellitus over five years.[8] Their study indicated relationships between body weight, weight gain and subsequent cardiometabolic disease, thereby providing evidence of shared risk pathways.[8] The present JSLC analysis cannot evaluate incident disease because its design is cross-sectional and does not include equivalent longitudinal physiological measurements. Nevertheless, the very high coexistence of hypertension among participants with diabetes is compatible with the shared metabolic pathways identified in Trinidad.[8] Taken together, the Jamaican, Barbadian and Trinidadian evidence indicates that Caribbean NCD policy must address interconnected cardiometabolic risks rather than treating national disease experiences as isolated epidemiological events.

Comparison with Latin America and the Caribbean

The results also correspond with the broader multimorbidity landscape described across Latin America and the Caribbean. Huaquía-Díaz et al reported pooled multimorbidity prevalence of approximately 43% across eligible regional studies and approximately 37% when analyses were restricted to nationally representative studies.[9] Their review further indicated increasing multimorbidity at older ages, with considerably greater burdens among studies involving populations aged 50 or 60 years and older. [9] Hypertension and type 2 diabetes were the only two conditions appearing in every multimorbidity definition included in the review, indicating their central position within regional chronic-disease clustering.[9] The present finding that 70.5% of persons in the diabetes subset met the combined hypertension-diabetes indicator corresponds conceptually with the dominant role of these two conditions in regional multimorbidity research. The strong rise in coexistence across older age groups additionally mirrors the regional finding that multimorbidity becomes increasingly concentrated in later life.

Sex differences identified in the present study also correspond with the broader Latin American and Caribbean literature, although the underlying mechanisms remain complex. Huaquía-Díaz et al found that pooled multimorbidity prevalence was higher among women than men, a pattern that accords with the female excess reported previously in Jamaica and observed for several outcomes in the current analysis. [6,9] Women in the present diabetes subset were significantly more likely than men to meet the combined hypertension-diabetes indicator and had an especially large arthritis burden. However, women were also differently distributed across socioeconomic groups and union statuses, indicating that biological sex and social circumstances may operate simultaneously. Differences in longevity, health-service utilisation,

diagnosis, body composition, caregiving responsibilities and economic resources may all contribute to apparent sex inequalities in chronic disease. Multivariable analyses are required before the observed female excess can be attributed to any independent causal mechanism.

Comparison with the Rest of the World

The 70.5% hypertension history identified among persons within the diabetes analytical subset is compatible with international evidence indicating that hypertension is among the most frequent comorbidities of type 2 diabetes. Colosia et al reviewed observational studies from multiple global regions and found that hypertension prevalence exceeded 50% in most studies of persons with type 2 diabetes, while many studies reported prevalence above 75%.[4] The present Jamaican proportion falls within the broad international range, although differences in case definitions, measurement approaches, age distributions and sampling strategies prevent simple direct comparison. The international literature also demonstrates that diabetes and hypertension frequently share relationships with obesity, ageing and cardiovascular risk. [4] The age gradient observed in Jamaica is epidemiologically plausible within the wider global literature. What the present study adds is evidence concerning how that internationally recognised cardiometabolic overlap is expressed within a contemporary Caribbean living-conditions dataset alongside social characteristics and functional health.

The growing global diabetes burden makes these findings particularly consequential for future health-system planning. WHO identifies kidney failure, cardiovascular disease, visual impairment, neuropathy and lower-extremity complications among the important consequences associated with diabetes.[1] The presence of heart disease, kidney disease and substantial functional limitation in the present analytical population is clinically consistent with the broader complication environment, although the cross-sectional data do not establish that diabetes caused these conditions. WHO's healthy-ageing framework similarly emphasises that health in later life should be evaluated through functional ability and not merely through the presence or absence of disease.[10] The striking reduction in functional independence among the oldest participants connects Jamaican diabetes management to a wider international agenda concerning healthy ageing. As survival with chronic illness increases globally, preserving independence and functional capacity becomes increasingly important alongside conventional biomedical disease control.

Ageing and the Hypertension-Diabetes Nexus

Age emerged as one of the strongest organising characteristics of cardiometabolic morbidity in the present study. Combined hypertension and diabetes increased from 28.6% among persons aged 25–44 years to 65.8% at ages 45–59, 75.2% at ages 60–74 and 85.4% among those aged 75 years or older. The relationship was particularly pronounced among women, reaching 90.7% in the oldest female age group. These differences illustrate how diabetes increasingly becomes part of a broader cardiovascular-risk environment as individuals advance through later adulthood. Older patients may require simultaneous management of blood pressure, glycaemia, renal risk, arthritis, functional limitations and complex medication regimens. The findings consequently support stronger integration between Jamaica's NCD management programmes and services concerned with ageing and long-term functional independence.

The age distribution also explains why overall percentages from this analytical subset must be interpreted carefully. Approximately

two-thirds of participants were aged 60 years or older, meaning that the observed burden of hypertension, arthritis and functional difficulty is strongly influenced by an older age structure. The high coexistence percentages should not be interpreted as independent of the composition of the analytical population. At the same time, the predominance of older participants is itself epidemiologically meaningful because it identifies the population in which diabetes-related healthcare is likely to become increasingly complex. Jamaica's ageing transition may increase demands not only for diabetes medication but also for cardiovascular monitoring, rehabilitation, caregiver support and long-term care. Effective policy responses must consequently address the intersection between chronic-disease management and healthy ageing rather than treating them as separate health-system agendas.[10]

Functional Health and Multimorbidity

The functional-health findings constitute an important contribution because they reveal consequences that cannot be captured solely through diagnostic counts. More than one-half of the analytical population experienced at least some functional difficulty, and approximately one-third reported either a lot of difficulty or complete inability. Among participants aged 75 years or older, 45.1% were classified as unable to perform the relevant function at all, illustrating a substantial degree of dependency in the oldest group. These limitations may affect the ability to travel to clinics, prepare meals, obtain medication, monitor glucose, participate in physical activity and comply independently with complex treatment regimens. Functional impairment can modify the practical meaning of otherwise standard diabetes-management recommendations. The current findings support incorporating functional capacity into routine assessment rather than assuming that people with diabetes possess equivalent ability to undertake self-management.

The coexistence of arthritis adds further importance to this functional interpretation. Arthritis affected approximately 27.3% of the analytical population and was particularly concentrated among women, among whom more than one-third reported the condition. Physical-activity recommendations commonly form part of diabetes and hypertension management, yet arthritis, pain or mobility impairment may limit the feasibility of conventional exercise advice. Clinicians consequently need to distinguish unwillingness to exercise from physical inability or activity-related pain. Adapted exercise, physiotherapy, rehabilitation and caregiver support may be more appropriate for some patients than generic advice concerning increased activity. The combination of diabetes, hypertension, arthritis and functional impairment illustrates why person-centred care must respond to the total burden experienced by the patient rather than to individual diagnoses in isolation.

Sex and Socioeconomic Context

The present findings demonstrate that sex differences in diabetes-related morbidity were important but not uniform. Women were significantly more likely than men to meet the combined hypertension-diabetes indicator, which is consistent with the literature [8,15–19], and substantially more likely to report arthritis, whereas overall functional-health categories did not differ significantly by sex. Men were more highly represented within the wealthy socioeconomic category, while women were more frequently represented within the poor category. Union status also differed modestly by sex, with a greater proportion of women classified as single. These findings indicate that sex operates within a wider social environment characterised by differences in economic resources, household arrangements and potentially social support. Interpretation of female cardiometabolic

disadvantage should consequently incorporate socioeconomic and household characteristics rather than relying on biological explanations alone.

The apparently large proportion of respondents in the wealthy category also requires careful interpretation. Approximately 46.6% of the diabetes analytical subset belonged to quintiles 4 and 5 (wealthy class), compared with 31.7% classified within the poorest two quintiles. This pattern does not indicate that wealthy Jamaicans have a higher national prevalence of diabetes because the analysis begins with a diabetes-specific filtered subset rather than comparing diabetes occurrence across the unrestricted socioeconomic distribution of Jamaica. It instead demonstrates that persons represented within the diabetes analytical group came from all socioeconomic strata and that substantial socioeconomic heterogeneity existed within the group. Proper investigation of socioeconomic gradients in national diabetes prevalence would require the unrestricted JSLC denominator, appropriate weighting and direct comparison of persons with and without diabetes. Consequently, no causal or prevalence conclusion concerning wealth and diabetes should be inferred from the within-subset socioeconomic distribution.

Policy and Clinical Implications

The findings provide a strong rationale for integrating diabetes and hypertension management within Jamaican primary healthcare. When approximately seven in ten persons within a diabetes analytical population also meet a hypertension-diabetes indicator, disease-specific pathways may lead to duplication of clinical visits, investigations and health education. Integrated encounters could combine blood-pressure monitoring, glycaemic assessment, cardiovascular-risk evaluation, renal surveillance, medication review and lifestyle counselling. Such coordination may be particularly important for older persons with limited mobility or dependence on relatives for transportation and medication management. Systematic review evidence from low- and middle-income countries indicates considerable interest in integrated models of care for diabetes, hypertension and multimorbidity, although the certainty of evidence concerning some health outcomes remains limited.[14] Jamaican service integration should be implemented alongside careful evaluation of effectiveness, feasibility, equity and patient experience.

Functional-health screening should constitute an additional component of integrated chronic-disease care because more than one-half of the analytical population reported some functional limitation. Brief assessment of mobility, self-care, medication access, meal preparation and ability to participate in prescribed activity may identify barriers that routine laboratory measures cannot detect. Older adults reporting severe difficulty may require physiotherapy, rehabilitation, social support, caregiver involvement or modifications to conventional self-management recommendations. Persons living simultaneously with diabetes and arthritis may particularly benefit from exercise strategies adapted to pain and reduced mobility. This approach is consistent with the healthy-ageing emphasis on preserving the functional ability required for people to do what they value in everyday life [10]. Diabetes care should incorporate both disease control and preservation of independence.

The findings also support strengthened national surveillance of multimorbidity rather than routine reporting of each NCD exclusively in isolation. Repeated analysis of JSLC and dedicated health-survey data could reveal whether hypertension-diabetes coexistence, functional limitations and multimorbidity are

changing as Jamaica's population ages. Future analyses intended to produce national estimates should employ survey weights and account for the survey's probability structure where appropriate. Combining self-reported information with objective clinical measurements would additionally help identify undiagnosed hypertension or diabetes that household respondents may not report. Longitudinal research would be particularly valuable for determining whether functional decline follows diabetes-related complications, precedes them or develops through multiple pathways. Continued preservation and research access through resources such as the SALISES Documentation and Data Centre can facilitate this longer-term Jamaican evidence base [12].

Strengths of the Study

The study has several important strengths, beginning with its use of contemporary data originating from one of Jamaica's most established household-survey programmes. The JSLC provides a multidimensional context in which health can be examined alongside age, sex, education, socioeconomic position, union status and other living-condition indicators [11,12]. The study also moves beyond simple identification of diabetes by examining hypertension coexistence, other chronic diseases and functional-health status. Its age-specific analyses reveal particularly strong gradients that could be obscured by reporting only overall disease percentages. The incorporation of functional health represents an additional strength because it demonstrates that morbidity involves restrictions on everyday capacity as well as diagnostic accumulation. Finally, use of a dataset made available through an established UWI research archive enhances transparency and creates opportunities for subsequent Jamaican research using related JSLC resources.

Limitations

Several limitations must be considered when interpreting the results. First, the analysis concerns a filtered 322-person diabetes-specific subset rather than the complete 4,442-person JSLC 2023 parent sample, and the supplied SPSS output applied no survey weights. Percentages such as the 70.5% combined hypertension-diabetes proportion describe the filtered analytical population and must not be reported as national prevalence among all Jamaicans. Second, many chronic conditions were based on respondent reports, creating potential recall error, diagnostic-access bias and underestimation of undiagnosed disease. Third, the cross-sectional study design cannot establish whether diabetes preceded hypertension, functional limitation, arthritis or other associated outcomes. Fourth, the bivariate analytical strategy cannot determine whether observed age, sex or socioeconomic associations persist after simultaneous adjustment for confounding characteristics. Fifth, the findings should consequently be regarded as descriptive and associational rather than causal.

Sparse contingency tables constitute another important limitation. Several uncommon outcomes, including COPD, dementia, epilepsy, mental disorders and individual cancer categories, produced expected frequencies below five in substantial proportions of cells. Under such circumstances, asymptotic Pearson chi-square probabilities may be unstable and should not be interpreted without considering exact tests, category consolidation or the descriptive distribution. The cancer-by-sex association is a notable example because the nominal Pearson result was significant but half of the expected cells contained fewer than five observations. Age-stratified analyses of uncommon diseases were similarly affected because the youngest diabetes age groups contained very few respondents. Larger samples or pooled survey rounds would improve the statistical stability of analyses involving these relatively uncommon conditions.

A further limitation concerns the available documentation of the specific 2023 sampling implementation. The official 2023 overview clearly reports the realised sample of 4,442 individuals from 1,719 households and the period and mode of data collection [11]. SALISES documents the JSLC as a stratified random survey connected to the population covered by the Labour Force Survey, while historical JSLC documentation provides detailed information concerning the use of enumeration districts and dwelling selection [12,13]. However, the publicly accessible 2023 overview does not reproduce every historical sampling parameter in sufficient detail to establish that all earlier master-sample procedures were unchanged in 2023. The methodology section distinguishes the established JSLC sampling architecture from confirmed 2023 realised-sample information rather than silently assuming complete procedural continuity. This conservative approach strengthens methodological transparency but means that users seeking highly technical 2023 design parameters should consult the corresponding STATIN/PIOJ technical documentation where available.

Answering the Research Gap

The present study addresses the identified research gap by integrating diabetes, hypertension coexistence, multimorbidity, social characteristics and functional health within a contemporary Jamaican household-survey analysis. Earlier Jamaican work established important burdens of diabetes, hypertension and multimorbidity, but the current investigation demonstrates how these dimensions converge within a 2023 diabetes-specific JSLC analytical subset [5,6]. Hypertension coexistence affected 70.5%, functional difficulty affected 53.6%, and arthritis affected more than one-quarter of participants, while both cardiometabolic coexistence and functional limitation increased sharply with age. Women experienced a greater hypertension-diabetes burden and substantially more arthritis, while socioeconomic position also differed according to sex. These findings demonstrate that the experience of diabetes cannot be characterised adequately using one diagnostic label or one biological measure. The research gap is answered by showing that contemporary diabetes morbidity within this Jamaican analytical population is an age-related, cardiometabolic, multimorbidity, socioeconomic and functional-health phenomenon rather than merely an isolated metabolic disease.

The study also demonstrates the value of the JSLC for developing a broader Jamaican social epidemiology of chronic disease. Dedicated health surveys may offer more extensive objective clinical measurements, but the JSLC provides an unusually broad connection between health and household living conditions [11,12]. Future weighted analyses could compare persons with and without diabetes and determine whether socioeconomic group, education, parish, household characteristics and functional health remain associated after adjustment for age and sex. Multivariable logistic regression or other appropriate survey-based modelling could distinguish independent associations from patterns created largely by population composition. Repeated JSLC rounds could additionally determine whether the demographic and functional profile of diabetes is changing over time. The present analysis consequently serves not only as a description of one diabetes subset but also as a foundation for a wider programme of contemporary Jamaican cardiometabolic research.

Conclusion

The 2023 JSLC diabetes analytical population revealed a substantial convergence of diabetes, hypertension, additional chronic morbidity, ageing and functional impairment. Women constituted almost two-thirds of the subset; approximately two-

thirds of participants were aged 60 years or older and 70.5% met the combined hypertension-diabetes indicator. More than one-half experienced some degree of functional difficulty, while approximately one-third experienced either a lot of difficulty or complete inability. Age indicated particularly strong associations, with combined hypertension and diabetes reaching 85.4% and complete functional inability reaching 45.1% among persons aged 75 years or older. Arthritis constituted another major source of morbidity and was particularly concentrated among women. Collectively, these findings indicate that effective diabetes management in Jamaica increasingly requires attention to multimorbidity, ageing and functional capacity.

The findings support a transition from exclusively glucose-centred management towards person-centred cardiometabolic and functional health care. Blood-pressure control, cardiovascular-risk reduction, renal monitoring, medication review, arthritis-sensitive activity recommendations and functional assessment should be considered interconnected rather than unrelated clinical responsibilities. Such integration is increasingly important as Jamaican adults survive longer with multiple chronic diseases and experience varying levels of independence. National surveillance should similarly assess combinations of disease and functional outcomes instead of viewing each NCD as an entirely separate epidemiological category. Continued scholarly use of JSLC data made available through the SALISES Documentation and Data Centre can help clarify how chronic morbidity intersects with the social and economic circumstances of Jamaicans [12]. Ultimately, reducing the burden associated with diabetes requires not merely prolonging survival but protecting cardiovascular health, functional independence and quality of life across the ageing Jamaican population [14-19].

References

1. (2024) World Health Organization. Diabetes. WHO <https://www.who.int/news-room/fact-sheets/detail/diabetes>.
2. (2025) International Diabetes Federation. IDF Diabetes Atlas. 11th ed. International Diabetes Federation <https://diabetesatlas.org/resources/idf-diabetes-atlas-2025/>.
3. (2025) World Health Organization. Hypertension. WHO <https://www.who.int/news-room/fact-sheets/detail/hypertension>.
4. Colosia AD, Palencia R, Khan S (2013) Prevalence of hypertension and obesity in patients with type 2 diabetes mellitus in observational studies: a systematic literature review. *Diabetes Metab Syndr Obes* 6: 327-338.
5. Mitchell-Fearon K, Waldron N, James K, Laws H, Holder-Nevins D, et al. (2014) Hypertension and diabetes prevalence in older persons in Jamaica, 2012. *West Indian Med J*. 63: 416-423.
6. Craig LS, Hotchkiss DR, Theall KP, Cunningham-Myrie C, Hernandez JH, et al. (2020) Prevalence and patterns of multimorbidity in the Jamaican population: a comparative analysis of latent variable models. *PLoS One* 15: e0236034.
7. Howitt C, Hambleton IR, Rose AMC (2015) Social distribution of diabetes, hypertension and related risk factors in Barbados: a cross-sectional study. *BMJ Open* 5: e008869.
8. Miller GJ, Maude GH, Beckles GL (1996) Incidence of hypertension and non-insulin-dependent diabetes mellitus and associated risk factors in a rapidly developing Caribbean community: the St James survey, Trinidad. *J Epidemiol Community Health* 50: 497-504.
9. Huaquia-Díaz AM, Chalán-Dávila TS, Carrillo-Larco RM, Bernabe-Ortiz A (2021) Multimorbidity in Latin America and the Caribbean: a systematic review and meta-analysis.

- BMJ Open 11: e050409.
10. (2020) World Health Organization. Healthy ageing and functional ability. Published Accessed <https://www.who.int/news-room/questions-and-answers/item/healthy-ageing-and-functional-ability>.
11. (2023) Planning Institute of Jamaica. Jamaica Survey of Living Conditions Overview. Planning Institute of Jamaica <https://www.pioj.gov.jm/product/jamaica-survey-of-living-conditions-2023-overview/>.
12. (2026) Sir Arthur Lewis Institute of Social and Economic Studies. Jamaica Survey of Living Conditions. The University of the West Indies, Mona Campus. Accessed <https://www.uwi.edu/salises-mona/databank/JSJC>.
13. (2009) Planning Institute of Jamaica, Statistical Institute of Jamaica. Jamaica Survey of Living Conditions Study Description and Sampling Procedure. International Household Survey Network <https://catalog.ihsn.org/index.php/catalog/4071>.
14. Rohwer A, Uwimana Nicol J, Toews I, Young T, Bavuma CM, et al. (2021) Effects of integrated models of care for diabetes and hypertension in low-income and middle-income countries: a systematic review and meta-analysis. *BMJ Open* 11: e043705.
15. Bourne PA, Francis C, Sharpe-Pryce C, Davis AH, Solan I (2014) Diabetes, hypertension, arthritis and other chronic non-communicable diseases in an English-speaking Caribbean nation: a health perspective. *J Endocrinol Diabetes* 1: 12.
16. Bourne PA (2026) Socioeconomic and lifestyle factors influencing non-communicable disease prevalence among rural Jamaican adults: a population-based study. *Rural Remote Health* 26: 10380.
17. Wilks R, Younger N, Tulloch-Reid M, McFarlane S, Francis D (2008) Jamaica Health and Lifestyle Survey 2007-8: Technical Report. Tropical Medicine Research Institute, The University of the West Indies https://www.moh.gov.jm/wp-content/uploads/2015/05/Jamaica-Health-and-Lifestyle-Survey-2007-8.pdf?utm_source=chatgpt.com.
18. (2022) The Jamaica Health and Lifestyle Survey Writing Team. The Jamaica Health and Lifestyle Survey III (2016-2017): Technical Report. Ministry of Health and Wellness, Jamaica; Caribbean Institute for Health Research, The University of the West Indies; 2022 <https://www.moh.gov.jm/wp-content/uploads/2024/03/Jamaica-Health-and-Lifestyle-Survey-2016-17-JHLSIII-Electronic.pdf>.
19. Ferguson TS, Francis DK, Tulloch-Reid MK, Younger NOM, McFarlane SR, et al. (2011) An update on the burden of cardiovascular disease risk factors in Jamaica: findings from the Jamaica Health and Lifestyle Survey 2007-2008. *West Indian Med J* 60: 422-428.

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