Journal of Student-Run Clinics
Original Study

Characterization of Metabolic Illnesses and Metabolic Syndrome in an Underserved, Predominantly Hispanic/ Latino Population at a Local Student-Run Free Clinic

Luke Chi[1]; Anmol Gill[1]; Kashish Chawla[1]; Christine Vu[1]; Roseanne De Guzman[1]; Tanvi Sondhi[1]; Ketaki Lole[1]; Anny Do[1]; Hera Kim[1]; Aarti Dachepalli[1]; Karina Melgar, MD[2]; Andrea Nicholas, PhD[1]

[1]School of Biological Sciences, University of California, Irvine, California, USA
[2]AltaMed Family Medicine Residency Program, South Gate, California, USA

Corresponding Author: Luke Chi; email: lukechi2002@gmail.com

Published: April 7, 2025

Abstract

Background: Lestonnac Clinics address a disparity in access to United States healthcare, providing free primary care to underserved populations. Student-run free clinics (SRFCs) consistently report high rates of metabolic illnesses, particularly within Latinx communities. However, research is limited on how these conditions co-occur within SRFC settings, leaving a gap in understanding their interplay and priority areas of care. This study aims to assess metabolic illness prevalence and comorbidity patterns in a SRFC with primarily Latinx patients.
Methods: This retrospective study analyzed data from uninsured patients (n=564) seen at a Lestonnac free clinic in Orange County, California, between 2019 and 2021. De-identified electronic health records were collected and included demographics, vitals, body mass index, and diagnoses of diabetes, fatty liver, hyperlipidemia, and hypertension. Statistical analysis using JMP[1] were run including descriptive statistics, prevalence of metabolic illnesses and comorbidities, and Chi-square tests comparing condition proportions between two age groups, <50 years and ≥50 years ($p<0.050$).
Results: Findings revealed differences in diagnosis prevalence between age groups of 564 total patients, with those ages ≥50 showing the higher rates of hyperlipidemia, hypertension, and their co-occurrence, compared to those ages <50. Patients exhibited elevated rates of diabetes (28.7%), and hyperlipidemia (33.2%), surpassing national averages for Hispanic/Latino populations, 11.1%[2] and 10.9%,[3] respectively. However, our clinic demonstrated lower prevalence of fatty liver (15.3%), and hypertension (34.0%) compared to national data, 22.9%[4] and 38.6%,[5] respectively.
Conclusion: Our patients aged ≥50 had significantly higher rates of hyperlipidemia, hypertension, and their co-occurrence, while younger cohorts exhibited a high rate of hyperlipidemia. Diabetes and hyperlipidemia rates at our clinic exceeded national averages, underscoring the need for interventions targeting hyperlipidemia prevention in younger cohorts and hypertension, hyperlipidemia, and diabetes management in the aging population. Future research should aim to identify social determinants of health experienced by these patients to enhance prevention effectiveness.

Introduction

Characterization of metabolic illnesses among uninsured and primarily Latinx populations at student-run free clinics is crucial for targeted interventions. The prevalence of metabolic syndrome among United States adults has been steadily rising, affecting 57% of elderly Latinxs.[5] This increased characterization of metabolic illnesses among uninsured and primarily Latinx populations at student-run free clinics is crucial for targeted interventions. Our clinic is located in an ethnic community enclave where Hispanic/Latinx individuals are the third most prevalent group, with 77.5% of our patient

population identifying as Hispanic/Latinx. The prevalence of metabolic syndrome among United States adults has been steadily rising, affecting 57% of elderly Latinxs.[6] This increased prevalence of metabolic syndrome in underserved Latinx communities is tied to a greater risk of severe complications such as stroke and coronary artery disease.[7] In addition, higher rates of obesity and elevated blood pressure, significant risk factors for metabolic syndrome, are reported for low income, uninsured populations compared to the national average.[8]

The Latinx community has one of the highest uninsured rates at 17.7%.[9] Uninsured individuals are more likely to skip regular medical checks, reducing access to early diagnostics, preventive services, and management of chronic conditions.[10,11] In 2009, financial limitations prevented 21.8% of Latinx men from seeking medical attention, which was higher than the national median for men (12.2%).[12] Additionally, Latinxs face significant social and economic disparities that can worsen food insecurity, leading to reliance on inexpensive, nutrient-poor foods.[13]

The demographic of free clinic patients in this study offers a unique opportunity to gain further insight into the prevalence of metabolic syndrome among uninsured and predominantly Latinx individuals. Various, intersecting barriers have previously been identified to limit health care access in this population. Most low-income, uninsured patients live below the poverty line, making routine care and medications financially difficult.[11] Racial discrimination, both structural and interpersonal, can lead to reduced quality of care.[14] Limited health literacy may also hinder patients' understanding of diagnoses and treatment plans, while language barriers complicate communication, especially in clinics with inadequate interpreter services.[15] Additionally, undocumented immigration status often deters individuals from seeking care due to fear of legal repercussions or deportation, even when they are eligible for certain services.[16, 17] These barriers, compounded by lifestyle factors, increase patient risk for metabolic syndrome-associated diseases.

This retrospective study seeks to identify the most prevalent metabolic conditions, their comorbidities, and associations with demographics of age and gender to better inform the development of effective interventions. While previous research has shown that metabolic syndrome is more prevalent among older adults, particularly due to age-related physiological changes and cumulative lifestyle exposures[18], less is known about how these trends manifest specifically within marginalized populations. Additionally, existing literature suggests potential gender differences in the presentation and risk factors of metabolic syndrome, with some studies indicating higher prevalence among men and others noting distinct patterns in women, particularly in relation to hormonal changes and body fat distribution.[19] We aim to identify the most prevalent metabolic conditions and their comorbidities in this clinic population, and to explore how these outcomes potentially correlate with age and gender. By doing so, we hope to address existing gaps in knowledge and contribute to more tailored, demographic-informed interventions for underserved communities.

Methods

This study examined uninsured patients at a Lestonnac satellite clinic in Orange County, California between 2019 and 2021. The inclusion criteria were limited to uninsured patients. Socioeconomic status, age, and gender were collected via self-report surveys. De-identified patient records were extracted from Lestonnac's electronic health record system, Axieum,[20] and securely stored with approval from the University of California, Irvine Institutional Review Board.

Vitals

On-site undergraduate volunteers measured blood pressure using an automated sphygmomanometer. Height and weight were measured using a stadiometer and scale. Body mass index (BMI) was calculated and categorized into specific ranges: Underweight (<18.5 kg/m^2), Normal (18.5-24.9 kg/m^2), Overweight (25.0-29.9 kg/m^2), Obese (30.0-39.9 kg/m^2), and Morbidly Obese (≥40.0 kg/m^2).

Diagnosis

Diabetes, fatty liver, hyperlipidemia, and hypertension were diagnosed by clinic preceptors. Hypertension diagnosis followed the International Society of Hypertension standards: Normal blood

Table 1. Descriptive characteristics of the study population by age groups

Characteristics	Age							
	12-75+	**12-24**	**25-34**	**35-44**	**45-54**	**55-64**	**65-74**	**≥75**
	N=564(%)	16(%)	40(%)	125(%)	192(%)	143(%)	40(%)	8(%)
Gender								
Male	222 (39.3)	5 (31.3)	16 (40.0)	40 (32.0)	87 (45.3)	53 (37.1)	16 (40.0)	5 (62.5)
Female	342 (60.6)	11 (68.8)	24 (60.0)	85 (68.0)	105 (54.7)	90 (62.9)	24 (60.0)	3 (37.5)
Ethnicity								
Hispanic/Latino	437 (77.5)	9 (56.3)	23 (57.5)	103 (82.4)	164 (85.4)	110 (76.9)	25 (62.5)	3 (37.5)
Not Hispanic/Latino	96 (17.0)	6 (37.5)	13 (32.5)	9 (7.2)	24 (12.5)	26 (18.2)	13 (32.5)	5 (62.5)
Declined to specify	31 (5.5)	1 (6.3)	4 (10.0)	13 (10.4)	4 (2.1)	7 (4.9)	2 (5.0)	-
Socioeconomic Status								
Unknown	139 (24.6)	6 (37.5)	16 (40.0)	36 (28.8)	43 (22.4)	29 (20.3)	7 (17.5)	2 (25.0)
LT100	235 (41.7)	4 (25.0)	7 (17.5)	55 (44.0)	90 (46.9)	56 (39.2)	19 (47.5)	4 (50.0)
GE – LE	114 (20.2)	2 (12.5)	8 (20.0)	26 (20.8)	38 (19.8)	33 (23.1)	7 (17.5)	-
GT200	76 (13.5)	4 (25.0)	9 (22.5)	8 (6.4)	21 (10.9)	25 (17.5)	7 (17.5)	2 (25.0)
Diagnosis								
Hypertension	192 (34.0)	-	3 (7.5)	22 (17.6)	67 (34.9)	73 (51.1)	21 (52.5)	6 (75.0)
Pre-diabetes	107(17.2)	1 (6.3)	3 (7.5)	23 (18.4)	46 (24.0)	24 (16.8)	9 (22.5)	1 (12.5)
Diabetes	162 (28.7)	1 (6.3)	1 (2.5)	16 (12.8)	57 (29.7)	66 (46.2)	18 (45.0)	3 (37.5)
Controlled	110 (19.5)	1 (6.3)	-	11 (8.8)	36 (18.8)	47 (32.9)	14 (35.0)	1 (12.5)
Uncontrolled	114 (20.2)	-	1 (2.5)	12 (9.6)	41 (21.4)	47 (32.9)	10 (25.0)	3 (37.5)
Hyperlipidemia	187 (33.2)	-	3 (7.5)	31 (24.8)	73 (38.0)	62 (43.4)	16 (40.0)	2 (25.0)
Fatty Liver	86 (15.2)	1 (6.3)	3 (7.5)	18 (14.4)	36 (18.8)	22 (15.4)	6 (15.0)	-
Comorbidities								
Hypertension AND								
Fatty Liver	42 (7.4)	-	1 (2.5)	6 (4.8)	17 (8.8)	14 (9.8)	4 (10)	-
Hyperlipidemia	89 (15.8)	-	-	7 (5.6)	33 (17.1)	36 (25.2)	11 (27.5)	2 (25.0)
Pre-diabetes	43 (7.6)	-	-	5 (4.0)	18 (9.3)	13 (9.1)	5 (12.5)	1 (12.5)
Diabetes	90 (16.0)	-	-	5 (4.0)	28 (14.5)	43 (30.1)	12 (30.0)	2 (25.0)
Controlled	65 (11.5)	-	-	5 (4.0)	17 (8.8)	33 (23.1)	9 (22.5)	1 (12.5)
Uncontrolled	64 (11.3)	-	-	4 (3.2)	21(10.9)	29 (20.3)	8 (20.0)	2 (25.0)
Fatty Liver AND								
Hyperlipidemia	57 (10.1)	-	2 (5)	14 (11.2)	21 (10.9)	16 (11.2)	4 (10.0)	-
Pre-diabetes	36 (6.4)	1 (6.25)	1 (2.5)	7 (5.6)	19 (9.8)	5 (3.5)	3 (7.5)	-
Diabetes	38 (6.7)	-	-	7 (5.6)	14 (7.3)	12 (8.4)	5 (12.5)	-
Controlled	33 (5.9)	-	-	6 (4.8)	11 (5.7)	12 (8.4)	4 (10.0)	-
Uncontrolled	27 (4.8)	-	-	5 (4.0)	10 (5.2)	9 (6.3)	3 (7.5)	-
Hyperlipidemia AND								
Pre-diabetes	54 (9.6)	-	1 (2.5)	10 (8)	20 (10.4)	17 (11.9)	6 (15.0)	-
Diabetes	84 (14.9)	-	-	8 (6.4)	30 (15.5)	34 (23.8)	11 (27.5)	1 (12.5)
Controlled	62 (11.0)	-	-	7 (5.6)	20 (10.4)	26 (18.2)	8 (20.0)	1 (12.5)
Uncontrolled	64 (11.3)	-	-	5 (4.0)	25 (13.0)	26 (18.2)	7 (17.5)	1 (12.5)

The notation (%) signifies the percentage out of the respective age group's total population. The socioeconomic section considers the patients' household income and household size in relation to the federal poverty level (FPL). LT100 denotes patients who are less than 100% below the FPL. GE - LE signifies patients within the range of greater than 100% but less than 200% below the FPL, and GT200 designates patients who are greater than 200% below the FPL.

Table 2. Percentage of patients within weight categories in the study population

BMI Group by Gender	Age						
	12-24	**25-34**	**35-44**	**45-54**	**55-64**	**65-74**	**≥75**
Female							
Underweight (n=2)	9.09	-	-	0.952	-	-	-
Normal (n=65)	27.3	33.3	20.0	16.2	16.7	20.8	-
Overweight (n=138)	18.2	29.2	37.7	46.7	38.9	4.17	66.7
Obese (n=115)	27.3	29.2	32.9	32.4	38.9	29.2	33.3
Morbidly Obese (n=22)	18.2	8.33	9.41	3.81	5.7	4.17	-
Male							
Underweight (n=1)	20.0	-	-	-	-	-	-
Normal (n=48)	60.0	37.5	15.0	13.8	26.4	25.0	60.0
Overweight (n=85)	-	50.0	40.0	32.2	43.4	50.0	40.0
Obese (n=80)	20.0	12.5	40.0	49.4	28.3	18.8	-
Morbidly Obese (n=8)	-	-	5.00	4.59	1.89	6.25	-

Body mass index (BMI) values (in kg/m2) were categorized as Underweight (less than 18.5), Normal (18.5 to 24.9), Overweight (25.0 to 29.9), Obese (30.0 to 39.9), or Morbidly Obese (40.0 and above), then stratified by sex and age. For each sex category, proportion was calculated as the number of individuals in their age and weight groups over the total number of individuals in their age group.

pressure (<130/85 mmHg), High-Normal blood pressure (130-139/85-89 mmHg), Grade 1 Hypertension (140-159/90-99 mmHg), and Grade 2 Hypertension (≥160/100 mmHg). Hypertension diagnosis was confirmed over 2-3 visits or immediately if systolic blood pressure/diastolic blood pressure was ≥180/110 mmHg or if cardiovascular indicators were present. Diabetes diagnosis followed American Diabetes Association criteria: fasting plasma glucose ≥126 mg/dL, two-hour plasma glucose during an oral glucose tolerance test ≥200 mg/dL, glycated hemoglobin (A1C) ≥6.50%, or hyperglycemia symptoms with random plasma glucose ≥200 mg/dL. Uncontrolled Diabetes (UDB) and Controlled Diabetes (CDB) are defined as A1C ≥7.00% and A1C <7.00% respectively. Patients transitioning from uncontrolled to controlled diabetes were included in both uncontrolled and controlled categories. Fatty liver disease was diagnosed via ultrasound for hepatic steatosis (>5.00% hepatocyte fat), and hyperlipidemia was determined from lipid profiles: total cholesterol (≥200 mg/dL), low-density lipoprotein (≥130 mg/dL), high-density lipoprotein (<59.0 mg/dL), and triglycerides (≥150 mg/dL).

Statistical Analysis

The proportions of patients with pre-diabetes (PDB), controlled diabetes, uncontrolled diabetes, fatty liver, hyperlipidemia, and hypertension across different variables and Pearson chi-square tests for individuals aged <50 years and ≥ 50 years were calculated using the statistical software, JMP. The proportions of patients with pre-diabetes (PDB), controlled diabetes, uncontrolled diabetes, fatty liver, hyperlipidemia, and hypertension across different variables and Pearson Chi-square tests for individuals aged <50 years and ≥ 50 years were calculated using the statistical software, JMP. The threshold for statistical significance was $p<0.050$. Age 50 was chosen as the age threshold for data stratification as it has commonly been used and recognized in previous studies to be associated with a significantly higher risk for many age-related chronic conditions.[22]

Results

Our clinic population exhibited lower hypertension rates compared to the national average, where 38.6% of the Latinx population met the criteria for hypertension, while our clinic population showed 34.0%[5] (Table 1). Furthermore, fatty liver prevalence in our clinic (15.2%) was lower than the

Table 3. Comorbidity proportion by age groups <50 or ≥50 years old

Characteristics	Overall (N=564)	Age <50 Years (n=274, 48.6%)	Age ≥50 Years (n=290, 51.4%)	P-value
Diagnosis				
Hypertension	192 (34.0)	54 (19.7)	138 (47.6)	<0.001†
Pre-diabetes	107 (19.0)	48 (17.5)	59 (20.3)	0.3922
Diabetes	162 (28.7)	39 (14.2)	123 (42.4)	<0.001†
Controlled	110 (19.5)	25 (9.12)	85 (29.3)	<0.001†
Uncontrolled	114 (20.2)	28 (10.2)	86 (29.7)	<0.001†
Hyperlipidemia	187 (33.2)	61 (22.3)	126 (43.4)	<0.001†
Fatty Liver	86 (15.2)	40 (14.6)	46 (15.9)	0.677
Comorbidities				
Hypertension AND				
Fatty Liver	42 (7.45)	18 (6.57)	24 (8.28)	0.440
Hyperlipidemia	89 (15.8)	16(5.84)	73 (25.2)	<0.001†
Pre-diabetes	43 (7.61)	14(5.11)	29 (10.0)	0.0287*
Diabetes	90 (16.0)	17(6.20)	73 (25.2)	<0.001†
Controlled	65 (11.5)	13 (4.74)	52 (17.9)	<0.001†
Uncontrolled	64 (11.3)	12 (4.38)	52 (17.9)	<0.001†
Fatty Liver AND				
Hyperlipidemia	57 (10.1)	24 (8.76)	33(11.4)	0.302
Pre-diabetes	36 (6.38)	18 (6.57)	18 (6.1)	0.860
Diabetes	38 (6.74)	14 (5.11)	24 (8.28)	0.134
Controlled	33 (5.85)	11 (4.01)	22 (7.59)	0.0709
Uncontrolled	27 (4.79)	10(3.65)	17 (5.86)	0.219
Hyperlipidemia AND				
Pre-diabetes	54 (9.57)	19 (6.93)	35 (12.1)	0.0383*
Diabetes	84 (14.9)	18 (6.57)	66 (22.8)	<0.001†
Controlled	62 (11.0)	15 (5.47)	47 (16.2)	<0.001†
Uncontrolled	64 (11.3)	13 (4.74)	51 (17.6)	<0.001†

*This table displays proportion of the top four most common diagnoses and up to two comorbidity combinations, both overall and stratified by age group. The proportion (%) represents the prevalence of a diagnosis or comorbidity as a percentage of the respective age group, either <50 or ≥50 years old. To assess whether there are significant differences in the prevalence of diagnoses and comorbidities between the two age groups, a Pearson Chi-squared test was conducted. *p < 0.050; †p < 0.001*

national average of 22.9%.[4] However, diabetes (28.7%) and hyperlipidemia (33.2%) rates in our clinic were higher than the national figures for the Latinx population, 11.1%[2] and 10.9%[3], respectively. Stratifying the data by age showed that hyperlipidemia was notably more prevalent among the younger cohort, 24.8% in the 35-44 age group, than the other recorded diagnoses. Fatty liver and hyperlipidemia co-occurred most frequently in the younger group, 35-44 years (11.2%). For all single diagnoses and comorbidity, there was a notable increase in prevalence among patients in the 45-55 age group.

Table 2 illustrates the distribution of patients categorized as underweight, normal weight, overweight, obese, and morbidly obese, stratified by sex and age. Of the population, 0.532% were classified as underweight, 20.0% as normal weight, 39.5% as overweight, 34.6% as obese, and 5.32% were classified as morbidly obese. Our obesity prevalence of 40.0% was slightly lower than the national average of 41.9%.[21]

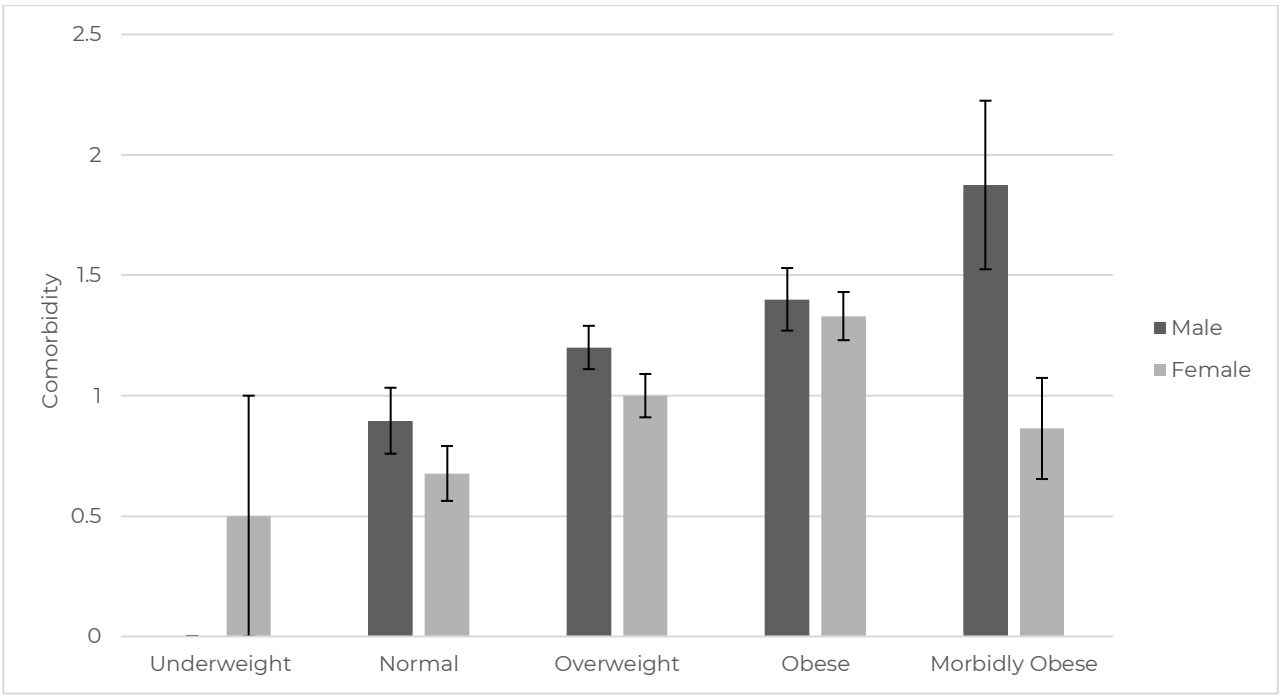
Hypertension, hyperlipidemia, and diabetes (controlled and uncontrolled) were significantly higher ($p<0.001$) in patients over 50 years, while fatty liver and prediabetes were not. Uncontrolled diabetes with either hypertension ($p<0.041$) or hyperlipidemia ($p<0.010$) also increased after age 50 (Table 3). In general, any diabetes diagnosis was a significant indicator for hyperlipidemia or hypertension ($p<0.001$). A strong age-dependent risk for comorbidity of hyperlipidemia with hypertension ($p<0.001$) was also observed. However, no significant differences were found between patients under and over 50 for fatty liver and diabetes (UDB, CDB, and PDB) comorbidities. Additionally, comorbidities of hypertension and fatty liver were not significantly different at these age ranges. The lack of statistical significance indicates a greater prevalence of comorbidity combinations in the younger age group of <50. The age groups are stratified by <50 and ≥50 as research has indicated a greater prevalence of metabolic syndrome in individuals ≥50 years.[22]

Figure 1 illustrates the average comorbidity by gender and BMI. Among females, the mean comorbidity for underweight individuals was 0.500±0.500 (mean±standard error). For females classified as normal weight, the mean comorbidity increased to 0.677±0.114, 1.00±0.093 for overweight individuals, 1.33±0.117 for obese individuals, and 0.864±0.211 for morbidly obese individuals. Normal weight males exhibited a higher average comorbidity to their female counterparts, with a mean of 0.896±0.137. The trend of increasing comorbidity with higher BMI levels persisted among males in which is seen by overweight males with a mean comorbidity of 1.20±0.093, obese males with a mean of 1.40±0.128, and morbidly obese males with the highest mean comorbidity of 1.88±0.350.

Discussion

Past retrospective studies on metabolic syndrome lack specialization in underserved communities. This study addresses that gap by assessing the prevalence of specific metabolic

Figure 1. Average comorbidity of patients within each body mass index (BMI) level by gender



Average comorbidity is defined as the average prevalence of comorbidities within the above four most common diagnoses. Stratified by male (M) and female (F) gender. Vertical error bars are presented for each set of data. Sample sizes (N) for each BMI category are as follows: Underweight (F=2, M=1), Normal (F=65, M=48), Overweight (F=138, M=85), Obese (F=115, M=80), Morbidly Obese (F=22, M=8).

diagnoses and comorbidity patterns within an uninsured majority Latinx patient population at a student-run Lestonnac Free Clinic from 2019 to 2021. Due to our patient population's particular susceptibility to barriers of health inequity, e.g. lower socioeconomic status, and language barriers, it was observed that clinical proportions of diabetes and hyperlipidemia exceeded those seen nationally in the United States for Latinxs.

Within similar underserved, uninsured populations, risk factors of minimal family support, limited transportation, lack of education, and financial constraints have been shown to hinder care, resulting in the accumulation of multiple diseases and possibly contributing to the higher proportion of patients with diabetes and hyperlipidemia in comparison to national averages seen in our population.[10,11,17] Older adults may lack reliable family support to aid them in maintaining a healthy diet, active lifestyle, and medication adherence, resulting in the worsening and/or presence of medical conditions.

Our results showed a higher prevalence of diabetes in our clinic population compared to the national average. Our patient population is more likely to have uncontrolled diabetes. This may be due to risk factors related to socioeconomic and insurance status. These include difficulties in medication adherence relating to costs and missed follow-up appointments if they interfere with work and/or family responsibilities. There are complications with uncontrolled diabetes such as eye and nerve damage and increased risk of heart and kidney disease that can then disproportionately affect our patient population.[23]

Our findings show that among the four selected metabolic diseases, hypertension is most closely associated with other comorbid diagnoses. Patients with DB, FL or HLD showed a statistically significant prevalence of hypertension in older age groups. A similar study of a cancer population found that hypertension was the most common comorbidity, with prevalence increasing with age.[24] Hence, specialized interventions should aim to educate patients at all ages about the risk factors of hypertension. An example of a successful intervention at East Harlem Health Outreach Program's free clinic demonstrated significant reduction of high blood pressure in their hypertensive patients.[25] This highlights the effectiveness of student-run free clinics as well as programs such as patient education in controlling hypertension, particularly in vulnerable populations.

Our data showed that hyperlipidemia diagnosis emerged in earlier age groups than hypertension and diabetes. Hyperlipidemia is one of the main causes of diabetes and atherogenic hyperlipidemia can lead to hypertension.[26,27] It was also shown that for patients over 50, hyperlipidemia diagnosis was significantly associated with both diabetes and hypertension. Therefore, it is vital to ensure proper targeted prevention measures in early age groups, such as education about risk factors for hyperlipidemia, to help prevent the early onset of hyperlipidemia and increased prevalence of hypertension and diabetes with age. A study examined the adherence to triple therapy, consisting of antidiabetics, renin-angiotensin system antagonists, and statins, among older patients with hyperlipidemia, hypertension, and diabetes. They found that adherence to triple therapy was 68.05%, suggesting that this approach holds promise for future clinical use.[28]

A comorbidity of any diabetes condition paired with fatty liver was not significantly different when comparing age groups of 50 years and older to those below 50 years. Fatty liver with either hypertension or hyperlipidemia were also not significantly different at these age ranges. These results indicate a higher prevalence of these combinations of illnesses at earlier age ranges, and thus, the need for preventative strategies to be implemented at an earlier stage.

Among both genders in younger age groups, similar trends of increasing obesity with age were observed. However, the 45-54 and 55-64 age groups showed deviations from these patterns. In males, obesity prevalence decreased while normal weight and overweight prevalence increased. However, the prevalence of obesity in women of both these age ranges was high. Hence, it is crucial to address barriers to losing weight. Targeted interventions like free diet programs tailored for budget-friendly healthy foods and convenient at-home exercise programs should aim to reduce obesity prevalence

for both genders, with a particular focus on middle-aged women. It is also important to implement prevention measures before the age of 45.

Further research with our patient population could help explain the factors contributing to metabolic syndrome and identify the most beneficial interventions. Promoting culturally tailored physical activities can effectively address obesity within the Latinx community.[29] For example, Project Dulce, a nurse-led multidisciplinary team that included registered dietitians and bilingual/bicultural peer educators, was found to have a 1.5% A1C reduction by month ten of participation in a program developed for diabetic patients.[30] The program consisted of weekly, culturally competent classes about healthy diet, exercise, blood glucose monitors, and medications. Furthermore, a free clinic study analyzed the effectiveness of the University of Washington Madison Community Resource Navigator program in addressing social determinants of health.[31] The resource navigator is a group of undergraduate volunteers who have completed a semester-long service-learning course that provides appropriate social services to patients according to their needs and then follows up until the patient concludes their case. There is no delegated team at Lestonnac Free Clinics that follows up and continuously helps patients with their social service needs. Therefore, the implementation of a resource navigator would address the social disparities of poverty, housing, food insecurity, and transportation that patients at our clinic may experience.

Conclusion

This study presents data on the prevalence of metabolic disease comorbidity relationships in an underserved, uninsured, and primarily Latinx population, taking into consideration age and gender. We found that patients had significantly higher risks of hyperlipidemia, hypertension, and their comorbidities at and above age 50, while patients under 50 showed a higher risk of hyperlipidemia. Such investigations are pivotal for comprehending the co-occurrence patterns of various chronic conditions and identifying shared risk factors or common pathways for diseases in this vulnerable population. Findings here may be used in other free clinics to optimize early treatment strategies, guide targeted preventative exercise and diet programs, and monitor patients at risk for multiple chronic metabolic conditions, improving their health outcomes, quality of life, and quality of care.

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