

Intersectionality and Diabetes in a Population of an Ambulatory Clinic, Quito-Ecuador.

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Abstract

Diabetes Mellitus is a noncommunicable chronic disease, caused by the hormonal imbalance of insulin and glucose; it produces premature mortality, morbidity, and disability. A good metabolic control requires changes of personal habits and attitudes that are affected by social environment.

Objective: to identify sociodemographic factors (gender, age, scholarity, civil status and insurance type) that affects metabolic control of type 2 diabetes in a specific population of an ambulatory clinic of Quito-Ecuador.

Material and method: This investigation is a cross sectional study from the data taken of the first semester of the year 2018 of patients with Diabetes (ICD-10 E10-E14) from an ambulatory clinic in Quito.

Results Among the data analyzed there was found association between age, gender, scholarity and insurance type with metabolic control, despite women have worse metabolic control with higher means of triglycerides, total cholesterol, LDL cholesterol, Systolic blood pressure, diastolic blood pressure and body mass index. There was a statistically significant relationship between the control of glycosylated hemoglobin (HbA1c) with age group under 65 and scholarity.

Conclusion DM is a disease that affects the most vulnerable populations: lower socioeconomic status, lower level of education and greater poverty. The prognosis depends on the metabolic control that is influenced by structural and intermediate determinants of health. Traditionally, the vulnerable groups have been exposed to a greater physical and psychosocial risk that increases susceptibility to inadequate metabolic control that are related to intersectionality. Inequalities in disadvantaged population increase the risk factors for complications and premature mortality. The management of this pathology requires an integrative approach.

Introduction

United Nations in 1999 declared gender equity as a worldwide priority, being an inviolable human right and an important indicator of human development and economic growth(1). However, gender inequity continues to impact populations as it is immersed on social relations and cultural behaviors that continuously affect economic country indexes. Women have a higher burden disease of non-communicable diseases (NCD) related to a higher incidence of complications and more premature mortality. Nevertheless, not only gender impacts on health but also the theory of intersectionality, "which posit that a person`s identity is a confluence of multiple social elements simultaneously affecting and affected by one another"(2); where gender, social status, ethnicity, scholarity and most determinants of health affect the overall status of health of individuals and communities as a specific situation that particularly affects the state of illness prevention and management(3).

Diabetes is an up raising NCD affecting population worldwide with a high impact on middle and low-income countries, the world prevalence on adult population is around 8,5% and is the result of the increase on risk factors like obesity. The impact on health system generates enormous economic losses to national budgets, to patients and their families(4, 5).

Ecuador's Human Development Index is 0.758 and is rated as an upper middle-income country. The epidemiological profile shows that of the 10 causes of most death (2019), eight are NCD and Diabetes is the 5th cause of general mortality, differences on mortality by sex were found and the gaps regarding these epidemiological differences by sex and the possible relations to determinants of health as scholarship, age or civil status will be reviewed in this article.

Results

We included 644 participants with type 2 diabetes, 345 (53,6%) were women and 299 (46,4%) were men. The average age of the population was 61,3 years (DE ±11,75). A total of 269 (41,8%) were elderly (>65 years), 412 (64%) participants were married. The insurance type was general insurance of 277 (43%) and scholarship were between primary (n=249, 38,7%) and high-school (n=240, 37,3%).

The median (DE) values of clinical variables were systolic and diastolic pressure 130 mmHg (DE±17) and 75 mmHg (DE±11) with a median blood pressure of 93,68 mmHg (DE± 11,79); BMI 30,26 (DE±5,055), the laboratory variables were: triglycerides 168,5 mg/dL (DE±109,89), total cholesterol 190 mg/dL (DE±37,81), HDL-c 43 mg/dL (DE±12,4), LDL-c 109 mg/dL (DE±32,8). The distribution of the values had a no-normal distribution (Kolmogorov-Smirnov <.001).

The results of the correlation between age and the variables of control analysis in the non-control population are listed on table 1.

Table 1 Correlation (rho) between age and control variables

Variables	Age
HbA1c	-.184**
Systolic Blood Pressure	.476***
Diastolic Blood Pressure	.367***
Body Mass Index	
* p<.05; **p=.001; ***p<.001	

Source: Prepared by the authors for the present investigation.

HDL-cholesterol, diastolic blood pressure and body mass index showed statistical differences by group age with Kruskal Wallis test (p<.05) (table 2). The Games-Howell multiple comparison of HDL cholesterol revealed median differences between the group age 65-79 and 20-64 (2,62; p=.036), diastolic blood pressure median differences between the group ages: 20-64 and 65-79 (5,287; p<.001) and 20-64 vs 80-99 (8,253; p=.014) and body mass index median differences between the group ages: 20-64 and 65-79 (1,2; p=.008) and 20-64 vs 80-99 (3,52; p<.001).

Table 2 Statistical analysis by age group

From 20 to 64 years (n=375)	From 65 to 79 years (n=244)	From 80 to 99 years (n=25)	
HbA1c	8,03 (5,49)	7,66 (3,51)	8,19 (4,85)
Triglycerids	203,18 (13666,38)	183,6 (9639,63)	185,83 (10284,36)
Total cholesterol	194,39 (1371)	192,41 (1529,52)	191,32 (1428,1)
HDL-c*	43,5 (132,83)	46,12 (179,82)	45,88 (188,95)
LDL-c	111,46 (1047,13)	111,03 (1135,43)	114,15 (1000,34)
SBP	130 (263)	133 (350)	137 (420)
DPB***	77 (108)	72 (124)	69 (177)
BMI**	31,34 (28,81)	30,13 (20,05)	27,82 (14,24)
SBP: systolic blood pressure; DBP: diastolic blood pressure; BMI: body mass index			
* p<.05; **p=.001; ***p<.001			

Source: Prepared by the authors for the present investigation.

Body mass index, systolic blood pressure and HDL-cholesterol showed statistical differences by gender with U-Mann-Whitney test (table 3).

Table 3 Statistical differences by gender

	Female (n=341)	Male (n=298)			
	Mdn (Range)	Mdn (Range)	U	p	Hedges g
HbA1c	7,3 (12,4)	7,2 (14,61)	50164	,782	0,046
Tryglicerids	169,5 (986)	167,5 (753)	49523	,552	0,0182
Total Cholesterol	193 (225)	187,5 (257)	45791	,028	0,1457
HDLc	46 (91)	40 (71)	34115	< 0,001	0,5016
LDLc	110 (184,75)	108 (207,6)	49582,5	,972	0,0609
Systolic blood presure	132 (126)	128 (99)	44511	,003	0,2308
Diastolic blood presure	74 (68)	76 (79)	47567,5	,088	0,1796
BMI	31,47 (36,23)	29,05 (35,99)	36680,5	< 0,001	0,4929

Source: Prepared by the authors for the present investigation.

The systolic blood pressure, diastolic blood pressure and body mass index showed statistical differences by insurance type with Kruskal Wallis test ($p < 0.001$) (table 4). The Games-Howell multiple comparison of systolic blood pressure revealed median differences between the group: retired-general insurance (5.187; $p = 0.013$) and widowed-general insurance (10,736; $p = 0.006$). The multiple comparison with Games-Howell test of diastolic blood pressure showed difference between the group general insurance – retired (3-132; $p = 0.019$) and body mass index had differences between spouse-retired (3,58; $p = 0.029$).

Table 4 Statistical analysis by insurance type

	Spouse (n=28)	Retired (n=218)	Widowed (n=34)	General insurance (n=277)	Voluntary insurance (n=87)
HbA1c	8,13 (3,27)	7,67 (3,64)	7,5 (1,96)	8,13 (6,22)	7,78 (4,14)
Triglycerids	220,33 (13412,06)	184,51 (8546,66)	174,2 (10166,59)	198,48 (12410,15)	210,98 (19753,78)
Total cholesterol	199,11 (1582,77)	188,99 (1572,85)	195,67 (1256,03)	194,77 (1268,77)	198,19 (1577,55)
HDL-c	47,41 (223,56)	43,89 (150,53)	48,03 (144,03)	44,2 (145,06)	45,3 (171,28)
LDL-c	114,22 (1313,99)	109,64 (1161,1)	111,73 (775,53)	112,4 (1039,45)	111,67 (1055,93)
SBP**	137 (313)	133 (381)	139 (264)	128 (243)	131 (257)
DBP*	74 (64)	73 (133)	76 (103)	76 (117)	75 (142)
BMI***	33,37 (34,08)	29,78 (21,3)	32,93 (41,76)	30,93 (23,96)	30,92 (27,49)
SBP: systolic blood pressure; DBP: diastolic blood pressure; BMI: body mass index					
* $p < 0.05$; ** $p = 0.001$; *** $p < 0.001$					

Source: Prepared by the authors for the present investigation.

HbA1c, systolic blood pressure and diastolic blood pressure showed statistical differences by schoolarity with Kruskal Wallis test ($p < 0.05$) (table 5). The Games-Howell multiple comparison in HbA1c had differences between the group basic-university (1,02; $p = 0.05$); systolic blood pressure had differences between high school and university (5,485; $p = 0.028$) and diastolic blood pressure had differences between high school and primary school (3,556; $p = 0.003$).

Table 5 Statistical analysis by schoolarity

	None (n=10)	Basic (n=60)	Primary (n=249)	High school (n=240)	University (n=85)
HbA1c*	7,31 (1,75)	8,57 (5,33)	7,96 (5,2)	7,8 (4,33)	7,55 (4,1)
Triglycerids	155,90 (3248,54)	181,92 (7642,34)	186,16 (10357,68)	209,05 (15788,53)	196,13 (10097,27)
Total cholesterol	187,5 (1187,73)	196,85 (1560,21)	192,12 (1507,05)	195,49 (1337,19)	190,35 (1426,41)
HDL-c	39,84 (63,5)	46,79 (160,75)	44,87 (153,46)	44,18 (162,8)	43,87 (134,62)
LDL-c	113,8 (848,18)	118,06 (1322,22)	111,53 (1089,76)	111,18 (1040,03)	106,58 (978,97)
SBP*	144 (438)	131 (317)	131 (309)	133 (326)	127 (176)
DBP*	71 (229)	72 (134)	73 (123)	77 (119)	75 (105)
BMI	30,89 (8,4)	30,78 (27,25)	30,53 (21,05)	30,9 (27,16)	30,93 (35,87)
SBP: systolic blood pressure; DBP: diastolic blood pressure; BMI: body mass index					
* p<.05; **p=.001; ***p<.001					

Source: Prepared by the authors for the present investigation.

The statistic analysis by civil status showed higher median values of HbA1c on the single group (Mdn 8,24; range 4,36), triglycerids on the common law union group (Mdn 206,02; range 15128,29); total and LDL cholesterol on the married group (Mdn 195,03; range 1470,95; Mdn 112,88 range 1130,65); systolic blood pressure on the divorced group (Mdn 135; range 389); diastolic blood pressure on the single group (Mdn 77; range 127) and body mass index on the widowed group (Mdn 31,84; range 31,85). The lowest median value on HDL-cholesterol was found on the separate group (Mdn 37,5; range 60,5). The analysis showed no statistical differences by civil status with Kruskal Wallis test.

Discussion

Diabetes is a public health problem that particularly affects Hispanic population especially individuals with multiple risk factors and vulnerabilities. The data collected highlights the need to include structural factors and their intersectionality to understand and improve health policies towards the improvement of populations health.

Intersectionality embodies elements where intersections between determinants of health have a direct influence on wellbeing outcomes and access to health services(7). Despite the progress done on treatments, social influences and variables as age; gender, scholarity, insurance type and marital status need to be recognized and integrated to essential management of chronic diseases as an effort to diminish health inequalities and improve life quality of people with chronic diseases.

Although intersectionality is a socio-legal theory developed to refer to specific situation of black women, factors like gender, race and class were defined as central vector across which inequalities changed(8). These factors regarding intersectionality are not the addition of different factors of inequality but the specific integration of the unique relation that create social inequity, being the methods and social experiences the ones that affect directly social situations generated by the interrelation that includes the dominant powers and induce hierarchical structures with social complexity(9).

The gender roles are social, cultural and economical mediators of the individual experiences in society(10). Inequities in health related to women with diabetes had been focused through accessibility to healthy food, safe environment, work stability, opportunities of personal development and social support that allow an adequate metabolic control and the decrease of difference regarding the morbidity and mortality caused by Diabetes requires the identification of factor related to the population(11)

Prevention and management of diabetes is known because of the need to have multidisciplinary health professionals working to maintain life quality, but the most cost-effective interventions are not related to the health system intervention alone, it is mandatory for governments to notice the determinants of health that impact the most on the natural history of any disease. Especially when those factors causes an intersectionality relation that increases the risk of certain populations and whose needs differ from vertical policies that won't improve individual health.

Individuals with multiple disadvantages related to intersected social identities intertwine to health opportunities, and theoretically have less metabolic control and require a different appreciation of multiple social factors and the recognition of social contexts for applicability of public health interventions.

The multilevel intersecting factors increases the disadvantages towards the availability to diminish risk factors related to NCD and for that increasing health inequalities and worst outcomes of chronic diseases like diabetes. The importance of differing between additive or compound intersectional factors can be distinguished and understand where the influence of these factors affects in a specific way the overall health of an individual with multiple inequality factors(12).

The intersectionality highlights missed opportunities related the health interventions approaches towards prevention and management of Diabetes in Ecuador, it's mandatory to understand how intersectionality can diminish or increase social differences and inequities through the results of natural history of this disease and the consequences on life quality.

The relations in between groups and the existence of a social dominance reproduce social division and the hierarchy related to age, gender and social status. There are different groups coexisting as an integrate unit with assignments of power from one group toward another group and also with specific roles. Hegemonic groups are socially better recognized with higher accessibility to resources; patterns that are reproduced in NCD as diabetes.

Ethnic, social status and gender are axes of subordination that overlap in a person, persons under this axes experiences a unique and qualitative grade of inequality that can not be answered by the addition of the different categories(13). Disadvantages interact with existing vulnerabilities creating a new dimension of

empowerment lost in each vulnerable group(14); axes that fall on the metabolic control through personal elections that worsen or improve the health status of women with diabetes These NCD it's affected by the social role and the power axes that affect directly this specific population. This study integrates the sociodemographic factors like age, scholarity, gender, insurance type and civil status as collaborative or disruptive factors for metabolic control.

Self-care factors in diabetes are resumed in three objectives: diet, exercise and weight control (15–17); factors that respond with a social pattern of accomplishment different between men and women. Social status and gender determine access to different quantity of resources that ameliorate metabolic control and health status(18); being a constitutive part of a person that also defines their decisions, attitudes and experiences regarding selfcare as a decisive way towards metabolic control.

There are behaviors that depend on their closest social support in order to achieve metabolic control objectives. Intersectionality explores the way different social subdivisions are related with the production of social relations and by that, with the life of people; it evolves the relations between social status, gender and other social differences: (1) consequences related to inequalities on individual life, (2) the different representations of how multiple institutions and multiple process built social powers and privileges(19). In other words, the theory builds the interrelation between the generation and multiplication of social inequalities. The role designated as family provider it's regularly given to men and also the responsibility of food acquisition, that is the basic source of health food in order to modify diet as required in patients with diabetes.

Social elements have different meanings determined by time and space with a specific context regarding the social, culture and historical period(20). The understanding of intersectionality may be used to develop better law and politics that embody other dimensions.

Public health has to face multiple factors regarding health determinants that may become multiple barriers to empower individuals to achieve health, these factors as their age, gender, scholarity, civil status and assurance type can affect the morbidity and mortality burden(12).

Intersectionality theory can analyze inequities that are interdependent, ligated to a historical context, micro and macro social exclusion between one-dimensional reductions(21). Analyze the exclusion through visibility of multiple position and power relations explaining the interconnection between the several forms of subordination(22).

Krause et al. in Argentina found that women had a worst health status compared with men, without homogenic distribution in social groups, which shows that there is a relation between social hierarchy(9), similar results as seen on this research where role designated to specific groups show difference sin between groups for metabolic control.

There is a socialization of gender and the role as health care, women recognize sign and symptoms of disease earlier than men, whom perceive illness as a sign of weakness (9). Differences between social status and age exist more evidence between men and women, factors that increases the differences in women group.

Methods

Study design

This investigation is a cross sectional study done between April-March 2019. We aimed to identify sociodemographic factors (gender, age, scholarship, civil status and insurance type) that affects metabolic control of type 2 diabetes in a specific population of an ambulatory clinic of Quito-Ecuador.

For the metabolic control we defined clinical targets; for systolic blood pressure we used for individuals older than 65 years 140 mmHg and for younger individuals 130 mm Hg or more, for diastolic blood pressure we used for individuals older than 65 years 90 mmHg and for younger individuals 80 mm Hg or more, for BMI we used 25 or more for metabolic uncontrol and laboratory targets; for the HbA1c we used HbA1c of 7,5% or more; for Total cholesterol we used CT of 170mg/dL or more, for HDL-cholesterol we used less than 40 mg/dl for women and less than 50 mg/dL for men; for LDL-cholesterol we used 70 mg/dl or more and for triglycerides we used 150 mg/dL or more for metabolic uncontrol(6).

Data sources

The population of study were patients with diagnosis of Diabetes (ICD-10 E10-E14) attended during the first semester of 2018 at Eloy Alfaro Clinic, Quito-Ecuador. Variables: Dependent variables: clinical variables: body mass index (BMI), systolic and diastolic blood pressure; laboratory variables: glycated hemoglobin A1c (HbA1c), Total cholesterol, LDL- cholesterol, HDL-cholesterol and triglycerides. Independent variables: sociodemographic: age, sex, civil status, insurance type and scholarship. Inclusion criteria were patients with diagnosis of type 2 diabetes, above 18 years older, that accepted to participate on the study.

Statistical analysis

The database was exported to statistical program SPSS version 22 to obtain association values and significance to evaluate the hypothesis. Descriptive analysis: univariate analysis involves distribution of variables, central tendency and dispersion of the data set. Bivariate analysis with cross-tabulation and contingency tables, and quantitative measures of dependence.

Conclusions

It is necessary to refocus health determinants to avoid trivialization of factors towards wellbeing and the need to avoid identity politics (23).

There might exist a new manifestation of disadvantage at intersections of social factors with consequences on health status.

The multidimensionality of chronic diseases requires the development of a integrated concept of equality towards health which has a new approach towards the enforcement of integral management.

Declarations

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Author contributions

KMFS: main idea, statistical analysis, introduction, and discussion

GSDL: discussion

FGMPH: discussion and conclusion

Additional information

The authors declare no competing interests

Additional statements

The authors confirm that all methods were carried out in accordance with relevant guidelines and regulations.

The authors confirm that all experimental protocols were approved by a named institutional and/or licensing committee. It was approved by the Ethics Committee of University San Francisco of Quito. Approbation code: 2019-037PG.

The authors confirm that informed consent was obtained from all subjects.

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