Prevalence and correlates of pre-diabetes and diabetes among a national population based sample of adults in Zambia: Results of the first national STEPS survey in 2017

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Research Article

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Abstract

Background: This investigation aimed to estimate the prevalence and its correlates of pre-diabetes and diabetes among 18-69 year-old persons in Zambia.

Method: Nationally representative cross-sectional data were analysed from 3,608 18-69 year old persons (31 years median age) that participated in the “2017 Zambia STEPS survey,” with complete blood glucose measurement.

Results: Results indicate that 8.8% of 18-69 year-olds had pre-diabetes and 7.2% diabetes. In adjusted multinomial logistic regression analysis, older age, rural residence, central obesity (or overweight or obesity), hypertension, raised total cholesterol and physical inactivity were associated with pre-diabetes and/or diabetes. In addition, in unadjusted analysis, female sex, lower education, alcohol family problem and alcohol dependence were associated with pre-diabetes and/or diabetes. Only 8.4% of the study sample reported that they ever had their blood glucose examined by a health care professional. Having had blood glucose measured was higher among women (9.6%) than men (7.2%) but not significantly (P=0.08). Residents in urban areas (11.8%) had significantly more often ever their blood glucose measured than residents in rural areas (5.4%) (P<0.001). Among study participants with diabetes, 22.3% were aware, 9.4% were currently taking treatment and 17.1% had controlled their diabetes (<7.0 mmol/L).

Conclusion: Almost one in ten participants had pre-diabetes and diabetes and several associated variables were detected which can aid in designing intervention strategies.

Background

Non-communicable diseases are “estimated to account for 29% of all deaths in Zambia in 2016,” 1% is the mortality contribution from diabetes in Zambia.1 The World Health Organization (WHO) “estimates that diabetes was the seventh leading cause of death in 2016.”2 The “global age-standardised diabetes prevalence increased from 4.3% in 1980 to 9.0% in 2014 in men, and from 5.0% to 7.9% in women.”3 The “diabetes prevalence has been rising more rapidly in low- and middle-income countries than in high-income countries.”2 In order to prevent and control diabetes it is important that national population-based surveys are conducted periodically.3 There is lack of national data on the prevalence of pre-diabetes and diabetes and associated factors in Zambia, a lower-middle income country in Southern Africa.

In a large community-based study among adults in 16 communities from 5 of 10 provinces in 2010 in Zambia, “the age-standardised prevalence of diabetes was 3.5%”.4 In the 2008 STEPS survey in Lusaka district, Zambia, among participants 25 years or older “the combined prevalence for impaired glucose level or diabetes was 4.0%,”5 and in an investigation of bank employees (N=121) in Ndola, Zambia, the prevalence of diabetes mellitus was 15%.6 In other African countries, the national prevalence of diabetes was 5.8% in Burkina Faso,7 3.3% in Ethiopia,8 5.7% in Guinea,9 5.6% (pre-diabetes 4.2%) in Malawi10 and 1.4% (pre-diabetes 2.0%) in Uganda.11
In several African countries, a high proportion of undiagnosed diabetes has been shown, e.g., 56% in Guinea, 70.5% in Uganda, 68.0% in Benin, 34.5% in Zambia and 91.7% in Burkina Faso. The proportion of diabetics treated and controlled has been low, e.g. 32.0% treated and 21.7% controlled in Benin, 7.3% treated and 6.9% controlled in Burkina Faso, 27.7% treated and 18.4% controlled in Kenya, and 40.1% treated and 21.4% controlled in South Africa.

Some factors associated with the risk of type 2 diabetes, may include, as reviewed by Vonglokhan et al., sociodemographic factors (older age, male sex, lower education and rural or urban residence), health status (central obesity, overweight, hypertension and hypercholesterolaemia), and health risk behaviour (poor dietary pattern, sedentary behaviour, physical inactivity and substance use. In addition, psychosocial distress, such as depression, suicidal behaviour, stress, and passive smoking may be associated with pre-diabetes and/or diabetes.

The investigation aimed to estimate the prevalence and its correlates of pre-diabetes and diabetes among 18-69 year-old persons in Zambia.

**Methods**

Cross-sectional nationally representative data from the “2017 Zambia STEPS Survey” were analyzed. More details on the survey methodology and the data can be accessed; the response rate was 74.3%. “The study was approved by the University of Zambia (UNZA) Research Ethics Committee (REC), and written informed consent was obtained from participants.”

**Measures**

**Outcome variable: Pre-diabetes and diabetes**

Fasting (≥10 hours) blood sugar measurements were conducted and the history of diabetes assessed (see Supplementary file 1). “Testing was performed using a portable rapid diagnostic device (Cardiochek™) machine which used test strips for both blood glucose and lipid profile (total Cholesterol and HDL Cholesterol).” Blood sample was collected via a minimally invasive finger prick.” Pre-diabetes was defined as “fasting plasma glucose levels 6.1 to<7 mmol/L and diabetes as fasting plasma glucose levels ≥7.0 mmol/L, and/or currently taking insulin or oral hypoglycemic drugs and/or having been diagnosed with diabetes by a health care professional.”

Sociodemographic information included, sex, age, work status, education, ethnic affiliation, residence status and marital status.

Psychosocial distress variables included alcohol family problem, family member died from suicide, suicidal ideation and passive smoking (details in Supplementary file 1).
**Health status** variables included measured central obesity (Waist Circumference > 88 cm in females and > 102 cm in males); Body Mass Index (measured <18.5 kg/m$^2$ underweight, 18.5-24.4 kg/m$^2$ normal weight, 25-29.9 kg/m$^2$ overweight and ≥ 30 kg/m$^2$ obesity); hypertension based on blood pressure (BP) measurements (average of the last two of three readings) defined as systolic BP ≥ 140 mm Hg and/or diastolic BP ≥ 90 mm Hg or currently on antihypertensive medication; raised total cholesterol (TC) ("fasting TC ≥ 5.0 mmol/L or currently on medication for raised cholesterol").$^{21}$

**Health risk behaviour** variables included daily tobacco use (smoking and/or smokeless tobacco, alcohol dependence (based on items 4-6 of the Alcohol Use Disorder Test=AUDIT; scores 4 or more), inadequate fruit and vegetable intake (<5 servings/day), and based on the “Global Physical Activity Questionnaire” low, moderate or high physical activity and sedentary behaviour (≥ 8 hours/day).$^{21}$

**Data analysis**

Statistical analyses were done with "STATA software version 15.0 (Stata Corporation, College Station, Texas, USA)," taking into account the complex study design. The data were weighted “to make the sample representative of the target population (adults in Zambia aged 18 to 69 years).”$^{21}$ Unadjusted and adjusted multinomial logistic regression was used to assess predictors of pre-diabetes and diabetes (with no pre-diabetes/diabetes as reference category). Missing values were not included in the analysis. P<0.05 was accepted as significant.

**Results**

**Sample and diabetes status characteristics**

The sample comprised of 3,657 18-69 year old persons (31 years median age, 18 years interquartile range) with complete blood glucose measurement. More than half of the participants (61.8%) were female, 48.0% had more than primary education, 41.0% were never married, separated, divorced or widowed, 50.4% were employed, 33.8% were Tonga by ethnicity and 64.0% lived in rural areas. More than one in seven participants (14.7%) reported alcohol family problems, 6.2% had a close family member who died from suicide, 7.8% had past 12-month suicidal ideation and 26.8% were exposed to passive smoking.

Almost one in four participants (22.8%) were overweight or obese, 12.0% had central obesity, 18.8% had hypertension and 7.4% raised total cholesterol. Regarding health risk behaviours, 11.0% used tobacco daily, 7.4% were dependent on alcohol, 91.2% ate insufficient fruit and vegetables, 18.5% were physically inactive and 8.1% engaged in sedentary behaviour. Almost one in ten 18-69 year-olds had pre-diabetes (8.8%) and 7.2% diabetes (see Table 1).

**Associations with pre-diabetes and diabetes**
In adjusted multinomial logistic regression analysis, older age, rural residence, central obesity (or overweight or obesity), hypertension, raised total cholesterol and physical inactivity were associated with pre-diabetes and/or diabetes. In addition, in unadjusted analysis, female sex, lower education, alcohol family problem and alcohol dependence were associated with pre-diabetes and/or diabetes (see Table 2).

**Diabetes awareness, treatment and control**

Only 8.4% of the study sample reported that ever they had their blood glucose measured by a health care professional. Having had blood glucose measured was higher among women (9.6%) than men (7.2%) but not significantly (P=0.08). Residents in urban areas (11.8%) had significantly more often ever their blood glucose measured than residents in rural areas (5.4%) (P<0.001). Among study participants with diabetes, 22.3% were aware, 9.4% were currently taking treatment and 17.1% had controlled their diabetes (<7.0 mmol/L). Awareness, treatment and control status of diabetes did not significantly differ by sex. Urban dwellers with diabetes were significantly more often aware, treated and controlled their diabetes than rural dwellers. Awareness, treatment and control of diabetes increased with age, but this was only significant for treatment of diabetes (see Table 3).

**Discussion**

The investigation aimed to estimate the prevalence and correlates of pre-diabetes and diabetes in a national population-based survey among 18-69 year-old persons in Zambia. The prevalence of diabetes (overall 7.2%, 7.5% in women and 6.9% in men) and pre-diabetes (8.8%) was similar among women globally (7.9%) and lower among men globally (9.0%), and was higher than in local studies in Zambia (3.5% diabetes and “impaired glucose level or diabetes” 4.0%) and in Malawi (5.6% diabetes and pre-diabetes 4.2%), in Uganda (1.4% diabetes and 2.0% pre-diabetes 2.0%), Burkina Faso (5.8%), Ethiopia (3.3% diabetes) and in Guinea (5.7%). The increased rate of diabetes found in Zambia (lower-middle income country) may be explained by a greater change of lifestyle, older age structure and greater urbanization than in low-income other African countries (Burkina Faso, Ethiopia, Guinea and Malawi) and older studies in Zambia.

The investigation showed a high prevalence of undiagnosed diabetes (77.3%), which seems to be higher than in Guinea (56%), in Uganda (70.5%), in Benin (68.0%), in Zambia (34.5%) and lower than in Burkina Faso (91.7%). The prevalence of treated diabetics in this study (9.4%) was lower than in most other African countries, e.g. Benin (32.0%), Kenya (27.7%) and South Africa (40.1%), except for Burkina Faso (7.3%). The prevalence of controlled diabetes among diabetics (17.1%) in this study was lower than in Benin (21.7%) and South Africa (21.4%), similar to Kenya (18.4%) and higher than in Burkina Faso (6.9%). The study found that urban dwellers had greater awareness, treatment and control of their diabetes than rural dwellers, while there were no sex differences. The lack of awareness, treatment and control among rural dwellers may be attributed to poorer health services access. "Most primary care
facilities in Zambia do not routinely screen for cholesterol or diabetes.” By enhancing primary facilities to conduct blood glucose tests, especially in rural Zambia, diabetes awareness, treatment and control may improve.

Consistent with former research, this investigation showed pre-diabetes and diabetes increased with age. In unadjusted analysis, the study showed that female sex was associated with pre-diabetes, but no significant sex differences were found in the adjusted analysis for pre-diabetes and diabetes. In a systematic review on sex differences of the prevalence of diabetes in Africa, in most countries no sex differences were identified. Rural residence and in unadjusted analysis lower education increased the odds for pre-diabetes. Some previous studies confirm the association between rural residence, lower education in high-income and not low- or middle-income countries and diabetes, while some other studies found a higher prevalence in urban areas. A diabetes-screening programme may be introduced, particularly targeting the older age high-risk groups.

Some studies found an association between psychosocial distress, such as suicidal behaviour, stress and passive smoking, increased the likelihood of diabetes, while in this study only in unadjusted analysis alcohol family problem was associated with diabetes, while the stress of family member die from suicide, suicidal ideation and passive smoking were not significantly with pre-diabetes and/or diabetes.

This survey found an association between hypertension, central obesity and in unadjusted analysis raised total cholesterol and pre-diabetes and diabetes. These findings are consistent with previous investigations showing major “modifiable cardio-metabolic risk factors”. This “combination of cardiometabolic risk factors calls for a multiple rather than single risk intervention approach in this population.”

Several health risk behaviours, such as unhealthy diet, sedentary behaviour, physical inactivity, tobacco use and alcohol misuse have been found to increase the risk for diabetes, while in this study only physical inactivity and in unadjusted analysis alcohol dependence were associated with pre-diabetes, and in unadjusted analysis physical inactivity was associated with diabetes, and no significant association between sedentary behaviour, daily tobacco use and inadequate fruit and vegetable intake and pre-diabetes and/or diabetes was found.

**Study limitations**

This investigation was limited because of its cross-sectional design as well as the self-report of the interview data. The variable on household income had many missing values and could therefore not be included in the analysis.

**Conclusion**
The study found among a nationally representative population of 18 to 69 years in Zambia that almost one in ten participants had pre-diabetes and diabetes. Less than one in five Zambians were aware, treated and controlled their diabetes. Several risk factors for pre-diabetes and/or diabetes were identified, including older age, rural residence, central obesity (or overweight or obesity), hypertension, raised total cholesterol and physical inactivity, and in unadjusted analysis female sex, lower education, alcohol family problem and alcohol dependence, which can assist in guiding interventions to prevent pre-diabetes and diabetes in the Zambian population.

**Declarations**

**Availability of data and materials**

“The data for the current study are publicly available at the World Health Organization NCD Microdata Repository (URL: https://extranet.who.int/ncds microdata/index.php/catalog).”

**Competing interests**

The authors declare that they have no competing interests.

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Not applicable.

**Authors’ contributions**

“All authors fulfil the criteria for authorship. SP and KP conceived and designed the research, performed statistical analysis, drafted the manuscript and made critical revision of the manuscript for key intellectual content. All authors read and approved the final version of the manuscript and have agreed to authorship and order of authorship for this manuscript.”

**Acknowledgement**

“The data source, the World Health Organization NCD Microdata Repository (URL: https://extranet.who.int/ncds microdata/index.php/catalog), is hereby acknowledged.”

**Abbreviations**

STEPS: **STEPwise** approach to surveillance; STATA: Statistics and data

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**Tables**

Table 1: Sample and diabetes status characteristics among 18-69 year-old persons in Zambia
| Variable                          | Sample | Pre-diabetes | Diabetes |
|----------------------------------|--------|--------------|----------|
|                                  | N (%)  | % (95% CI)   | % (95% CI) |
| **Socio-demographics**           |        |              |          |
| **All**                          | 3608   | 8.8 (7.7, 10.1) | 7.2 (6.2, 9.4) |
| **Age (years)**                  |        |              |          |
| 18-34                            | 1810   | 7.8 (6.5, 9.3) | 4.4 (3.3, 5.8) |
| 35-49                            | 1085   | 9.9 (8.0, 12.1) | 8.9 (6.7, 11.7) |
| 50-69                            | 713    | 11.5 (9.0, 14.7) | 16.8 (13.6, 20.5) |
| **Gender**                       |        |              |          |
| Male                             | 1379   | 7.5 (6.0, 9.3) | 6.9 (5.4, 8.9) |
| Female                           | 2229   | 10.2 (8.8, 11.7) | 7.5 (6.2, 9.0) |
| **Education**                    |        |              |          |
| <Primary                         | 1324   | 11.5 (9.6, 13.7) | 8.0 (6.4, 10.0) |
| Primary                          | 859    | 10.4 (8.0, 13.4) | 7.9 (5.7, 10.9) |
| >Primary                         | 1424   | 6.5 (5.1, 8.2) | 6.3 (4.8, 8.3) |
| **Marital status**               |        |              |          |
| Married/cohabiting               | 2203   | 9.6 (8.1, 11.2) | 7.9 (6.5, 9.5) |
| Nev. married/separated/divorced/widowed | 1398   | 7.8 (6.3, 9.6) | 6.1 (4.7, 7.9) |
| **Employment status**            |        |              |          |
| Employed                         | 1792   | 8.4 (7.0, 10.1) | 7.7 (6.3, 9.5) |
| Nonpaid                          | 677    | 7.2 (5.3, 9.9) | 5.1 (3.6, 7.5) |
| Unemployed                       | 1134   | 10.6 (8.7, 13.0) | 7.6 (5.9, 9.8) |
| **Residence**                    |        |              |          |
| Urban                            | 1300   | 5.9 (4.7, 7.5) | 7.1 (5.4, 9.3) |
| Rural                            | 1140   | 11.4 (9.7, 13.3) | 7.3 (6.1, 8.6) |
| Ethnic group   | Count | Mean (95% CI) |
|---------------|-------|---------------|
| Bemba         | 1048  | 7.1 (5.5, 9.2) |
| Tonga         | 1033  | 9.3 (7.5, 11.5) |
| Other         | 1238  | 9.3 (7.5, 11.6) |

| Psychosocial distress                  | Count | Mean (95% CI) |
|---------------------------------------|-------|---------------|
| Alcohol family problem                | 442   | 8.8 (6.1, 12.5) |
| Family member died from suicide       | 217   | 11.1 (6.4, 18.3) |
| Suicidal ideation                     | 286   | 10.5 (7.0, 15.4) |
| Passive smoking                       | 880   | 8.2 (6.2, 10.6) |

| Health status                          | Count | Mean (95% CI) |
|---------------------------------------|-------|---------------|
| Central obesity                       | 501   | 11.3 (8.2, 15.3) |
| Hypertension                          | 739   | 11.1 (8.8, 13.8) |
| Raised total cholesterol              | 333   | 14.6 (10.7, 19.8) |

| Health risk behaviour                  | Count | Mean (95% CI) |
|---------------------------------------|-------|---------------|
| Daily tobacco use                      | 389   | 8.2 (5.4, 12.3) |
| Alcohol dependence                    | 197   | 6.2 (3.4, 10.9) |
| Fruit and vegetable intake (<5 servings/day) | 3045  | 8.7 (7.6, 10.0) |
| Physical activity                      |       |               |
| Low                                   | 706   | 12.4 (9.5, 16.0) |
| Moderate                               | 370   | 8.1 (5.4, 12.0) |
|                |       |          |          |
|----------------|-------|----------|----------|
|                | 2178  | 8.1 (6.8, 9.6) | 6.7 (5.4, 8.1) |
| Sedentary behaviour | 312 (8.1) | 11.5 (7.7, 16.9) | 9.2 (5.9, 14.2) |

Table 2: Associations with pre-diabetes and diabetes
| Variable                  | Pre-diabetes | Diabetes | Pre-diabetes | Diabetes |
|---------------------------|--------------|----------|--------------|----------|
|                           | Unadjusted RRR % (95% CI) | Adjusted RRR % (95% CI) | Unadjusted RRR % (95% CI) | Adjusted RRR % (95% CI) |
| Socio-demographics        |              |          |              |          |
| Age (years)               |              |          |              |          |
| 18-34                     | 1 (Reference) | 1 (Reference) | 1 (Reference) | 1 (Reference) |
| 35-49                     | 1.37 (1.03, 1.83)* | 2.17 (1.39, 3.40)*** | 1.21 (0.87, 1.67) | 1.64 (1.06, 2.54)*** |
| 50-69                     | 1.81 (1.29, 2.55)*** | 4.66 (3.19, 6.81)*** | 1.23 (0.84, 1.80) | 3.03 (2.03, 4.52)*** |
| Gender                    |              |          |              |          |
| Male                      | 1 (Reference) | 1 (Reference) | 1 (Reference) | 1 (Reference) |
| Female                    | 1.40 (1.07, 1.85) | 1.12 (0.79, 1.58) | 1.33 (0.97, 1.83) | 0.86 (0.54, 1.37) |
| Education                 |              |          |              |          |
| <Primary                  | 1 (Reference) | 1 (Reference) | 1 (Reference) | 1 (Reference) |
| Primary                   | 0.88 (0.62, 1.26) | 0.97 (0.64, 1.48) | 0.97 (0.65, 1.45) | 0.93 (0.59, 1.45) |
| >Primary                  | 0.52 (0.38, 0.71)*** | 0.73 (0.50, 1.05) | 0.74 (0.51, 1.10) | 0.93 (0.63, 1.37) |
| Marital status            |              |          |              |          |
| Married/cohabiting        | 1 (Reference) | 1 (Reference) | — | — |
| Never married/separated/  | 0.78 (0.59, 1.02) | 0.74 (0.53, 1.04) | — | — |
| divorced/widowed          |              |          |              |          |
| Employment status         |              |          |              |          |
| Employed                  | 1 (Reference) | 1 (Reference) | — | — |
| Nonpaid                   | 0.82 (0.57, 1.19) | 0.64 (0.41, 1.01) | — | — |
| Unemployed                | 1.29 (0.96, 1.74) | 1.01 (0.72, 1.43) | — | — |
| Residence | Urban | Rural | 1 (Reference) | 1 (Reference) | 1 (Reference) | 1 (Reference) |
|-----------|-------|-------|---------------|---------------|---------------|---------------|
|           |       |       | 2.05 (1.50, 2.82)** | 1.09 (0.77, 1.56) | 2.01 (1.40, 2.89)** | 1.19 (0.80, 1.78) |

| Ethnic group | Bemba | Tonga | Other | 1 (Reference) | 1 (Reference) | 1 (Reference) |
|--------------|-------|-------|-------|---------------|---------------|---------------|
| Bemba        | 1 (Reference) | 1.37 (0.94, 2.01) | 1.37 (0.96, 1.96) | 1.37 (0.94, 2.01) | 1.37 (0.96, 1.96) | 1.37 (0.96, 1.96) |
| Tonga        | 1.34 (0.79, 2.28) | 1.34 (0.86, 2.10) |       | 1.34 (0.79, 2.28) | 1.34 (0.86, 2.10) |       |
| Other        | 1.34 (0.79, 2.28) | 1.34 (0.86, 2.10) |       | 1.34 (0.79, 2.28) | 1.34 (0.86, 2.10) |       |

**Psychosocial distress**

| Alcohol family problem | 1.04 (0.66, 1.62) | 1.66 (1.04, 2.64)* | 1.21 (0.75, 1.95) | 1.42 (0.84, 2.39) |
|-----------------------|-------------------|-------------------|-------------------|-------------------|
| Family member died from suicide | 1.30 (0.72, 2.35) | 0.87 (0.49, 1.55) |       |       |
| Suicidal ideation     | 1.19 (0.75, 1.88) | 0.62 (0.36, 1.06) |       |       |
| Passive smoking       | 0.88 (0.63, 1.22) | 0.82 (0.56, 1.20) |       |       |

**Health status**

| Central obesity | 1.52 (1.01, 2.27)* | 2.78 (1.75, 4.43)*** | 1.26 (0.79, 2.02) | 1.90 (1.20, 3.03)** |
|-----------------|-------------------|-------------------|-----------------|-------------------|

**Body mass index**

| Normal | 1 (Reference) | 1 (Reference) | Not included because of overlap with central obesity |
|--------|---------------|---------------|------------------------------------------------------|
| Underweight | 1.16 (0.67, 2.00) | 0.99 (0.57, 1.70) |                                        |
| Overweight  | 1.25 (0.87, 1.78) | 2.03 (1.29, 3.21)** |                                        |
| Obesity     | 1.72 (1.04, 2.82)* | 2.92 (1.72, 4.98)*** |                                        |

| Hypertension | 1.53 (1.14, 2.06)** | 2.72 (1.99, 3.73)*** | 1.38 (0.97, 1.95) | 2.24 (1.61, 3.13)*** |
|--------------|---------------------|---------------------|-----------------|---------------------|
| Raised total cholesterol | 2.10 (1.39, 3.16)*** | 2.61 (1.80, 3.77)*** | 1.78 (1.08, 2.94)* | 1.40 (0.89, 2.20)*** |

**Health risk behaviour**
| Variable                          | Of diabetics aware | Of diabetics treated | Of diabetics controlled (<7.0 mmol/l) |
|----------------------------------|--------------------|----------------------|--------------------------------------|
| Total                            | 55 (22.3)          | 28 (9.4)             | 42 (17.1)                            |
| Sex                              |                    |                      |                                      |
| Male                             | 23 (23.4)          | 11 (9.3)             | 16 (17.2)                            |
| Female                           | 32 (21.3)          | 17 (9.5)             | 26 (17.0)                            |
| P-value                          | 0.816              | 0.955                | 0.991                                |
| Residence                        |                    |                      |                                      |
| Rural                            | 22 (11.0)          | 10 (4.7)             | 17 (9.3)                             |
| Urban                            | 33 (35.7)          | 18 (14.9)            | 25 (26.3)                            |
| P-value                          | <0.001             | <0.004               | <0.002                               |
| Age group                        |                    |                      |                                      |
| 18-34                            | 11 (18.8)          | 3 (2.5)              | 9 (14.4)                             |
| 35-49                            | 11 (18.3)          | 7 (9.1)              | 12 (18.5)                            |
| 50-69                            | 33 (31.5)          | 18 (18.4)            | 21 (18.9)                            |
| P-value                          | 0.125              | 0.005                | 0.613                                |
