Cardiovascular Disease Behavioural Risk Factors in Rural Interventions: Cross-Sectional Study.

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Abstract

Aims:

This study aims to 1) assess the prevalence of cardiovascular disease (CVD) behavioural risk factors in patients who have undergone percutaneous coronary intervention (PCI) 2) identify target risk factor(s) for behaviour modification intervention, and 3) develop an analytical model to define cluster(s) of risk factors which could help make any generic intervention more targeted to the local patient population.

Subject and Methods:

Study patients with at least one CVD behavioural risk factors living in a rural region. The study used STROBE methodology for cross-sectional studies. Demographic and clinical data of patients (n=2025) were collected at the point of admission for PCI between 04.01.2016 to 31.12.2019. Collected data distributions were analysed by CVD behavioural risk factors for prevalence, associations, and direction of associations. Cluster definition was measured by assignment of a unit score each for overall level of prevalence and significance of associations, and general logistics modelling for direction and significance of risk.

Results:

The mean (SD) age was 69.47(±10.93) years [95% CI (68.99 - 69.94)]. The key risk factors were hyperlipidaemia, hypertension, and elevated body mass index (BMI). Approximately 40% of the population have multiple risk factor counts of two. Analytical measures revealed a population risk factor cluster with elevated BMI [77.5% (1570/2025)] that is mostly either hyperlipidaemic [9.43%, co-eff. (17), *P*=.007] or hypertensive [22.72%, co-eff. (17), *P*=.99] as key risk factor clusters.

Conclusion:

Carefully modelled analyses revealed clustered behavioural risk associated with elevated BMI. This information would support a strategy for applying targeted clusters in novel interventions to improve implementation efficiency.

Conclusion:

Risk factors, cardiovascular disease, obesity, and percutaneous coronary intervention.

Introduction

Background

The global burden of cardiovascular diseases (CVD) remains high.[1] In the UK, 7.4 million people live with CVD and an approximate 460 deaths are recorded per day.[2] This burden accounts for a total annual healthcare cost of £800million in Scotland.[2] The main therapeutic procedure for obstructive coronary

artery disease is percutaneous coronary intervention (PCI) with over 500 procedures performed annually in the Scottish Highlands.[3] Despite the increase in annual counts of procedures and repeated sessions, there continues to be significant challenges to access especially in rural regions.[4]

Cigarette smoking, diabetes, obesity, and hypertension are independent risk factors for CVDs accounting for about 50% of its pathogenesis.[1,2] Treatment of these risk factors has been proven to reduce the risk of future cardiac events.[5] It has been predicted that mortality from CVD in the UK could be halved by small changes in cardiovascular disease risk factors – reducing smoking prevalence by 1% could lead to 2000 fewer CVD deaths per year, and a one percent reduction in population diastolic blood pressure could prevent around 1,500 CVD deaths each year.[2] High-risk reduction strategies i.e. multiple risk factor treatment have also been suggested to have a substantial impact in CVD reduction.[6]

Following a cardiac event such as myocardial infarction or PCI for stable angina, cardiac rehabilitation programmes provide comprehensive cardiac rehabilitation (rehab) in the form of education, exercise sessions, and psychological support. However, the impact of cardiac rehab remains suboptimal due to (1) accessibility, (2) cardio-rehab class uptake and adherence, and (3) patient understanding of CVD.[7] Recent studies have also indicated low rehab support acceptability and lack of completion of classes as major characteristics in patients with lower health literacy.[8,9] A one-size-fits-all approach further weakens the efficacy of interventions due to the exclusion of patient experience in their design.[10] Digital technologies (such as software applications, the internet, and wearable sensors) in CVD risk factor modification have been embraced by some individuals as beneficial. They help overcome some of these challenges by delivering an alternative channel of educating, coaching and training out-patients.[11] However, digital technologies appear to be weak in reducing unhealthy behaviours linked with CVD risk factor modification when compared to cardiac rehab programmes.[12]

A number of different approaches have been used to help modify health behaviour among people with CVD risk factors. Common examples include, health training and coaching sessions, health promotion and campaigns, and community-based participatory research.[13] Storytelling, which is also referred to as a narrative, has historically been used as a means of influencing public opinion and regulating human behaviour. More recently on a digital platform, it has been used for marketing and politics.[14] Lately, in the health sector, digital storytelling has been used for the modification of health behaviour in clinical trials and interventions especially in ‘remote rural’ and ‘deprived’ populations. Due to the ability to integrate patient experience in its design, digital storytelling has now been indexed as a major approach to different CVD-related risk factor modification.

The current generalised approach used in the development of behavioural interventions is not fit for the purpose because it is not cost-efficient in the long term.[15] Therefore, novel (as well as existing) interventions such as digital storytelling in behavioural risk factor modification could use a methodological assessment or model of risk factors of interest in a specific population to identify which risk factor(s) to target. Such a model could inform a risk factor cluster target, which is geo-localized in its

strategic pattern towards a patient-focused approach. This would create an effective targeted behavioural intervention in a more efficient and sustainable manner.[15,16] This study presents an analytical approach, which could be replicated in future intervention designs for different disease populations.

Objectives

This study aims to 1) assess the prevalence of CVD risk factors in patients who have undergone PCI 2) identify target CVD risk factor(s) for behaviour modification intervention, and 3) develop an analytical model to define cluster(s) of risk factors which could help make any generic intervention more targeted to the local patient population.

Methods

Study design

This study was designed in line with Strengthening the Reporting of Observational studies in Epidemiology (STROBE) methodology for cross-sectional studies.[17] The population distribution was analysed for prevalence by gender, exposure to CVD risk factors, and number of risk factor counts. Statistical associations were tested between independent variables and risk factors, and the direction of association was determined.

This study does not require ethical approval or subject consent. However, approval for use of anonymised data was required. This was received from the office of the Caldicott Guardian, NHS Highland. The NHS Scotland guidance and regulation on the use of anonymised data of patients does not require recourse to patients on the use of data for the purpose of clinical research inputs meant for hospital benefits.

Setting

Retrospective data from patients who had undergone PCI at Raigmore Hospital in Inverness, NHS Highland from 4th of January 2016 to 31st of December 2019 were included in the study. Eligible patient's demographic and clinical data were collected at the point of admission for a PCI.

Participants

Patients who have had at least one elective or emergency PCI.

Variables

Demographic details include age, gender, geographic deprivation groups, economic deprivation ranks, family history of coronary artery disease, and risk factor counts; procedural, administrative, and clinical details such as body mass index, total cholesterol concentration, blood sugar concentration, blood pressure status and smoking status.

Data source and measurements

Age at the time of the data collection was grouped into four ranges: below 40, 40–59, 60–79, and 80 and above years.[18] Geographic deprivation groups were derived from postcode data-match with the Scottish Index of Multiple Deprivation, SIMD 2019.[19] The SIMD 2019 defines geographical location postcodes in Scotland as six groups: 'accessible rural', 'remote rural', 'accessible small towns', 'remote small towns', 'large urban areas' or 'other urban areas' - these groups were re-classified into 'SIMD groups' and expressed as 'urban', 'accessible' and 'remote'. Economic deprivation ranks were derived from postcode data-match with the Scottish Index of Multiply Deprivation, SIMD 2020.[19] The SIMD 2020 defines geographical location postcodes in Scotland as economic rank 1 (most economically deprived data zone) to rank 6976 (least economically deprived data zone) and classified as 'SMID ranking' in quintiles from one to five. BMI ranges were defined using the WHO adults' BMI classification: underweight (below 18.5), normal weight (18.5–24.9), pre-obesity (25.0–29.9), obesity class I (30.0–34.9), obesity class II (35.0–39.9), obesity class III (above 40).[20] These were grouped into 'low or normal weight' ($\leq$24.9) and 'elevated BMI' ($\geq$25.0) to capture the preventive and corrective nature of intervention. Cholesterol concentration was defined using the BHF measurement and grouped $\leq$5mmol/L as healthy and >5mmol/L as high.[21] Blood sugar and blood pressure were qualitatively defined from the original dataset.

Body mass index (BMI) was derived from patients' weight and height data and measured in kg/m^2. All dependent variables (BMI, total cholesterol, blood sugar concentration, and blood pressure) used the National Health Services, NHS Scotland measurement units.[22] These variables were grouped based on exposure as high cholesterol and healthy cholesterol (cholesterol concentration), diabetic and not diabetic (blood sugar concentration), hypertensive and not hypertensive (blood pressure), elevated BMI and not obese (BMI group), smoking and not smoking (smoking group). Units are available in appendices.

Bias

The study data has a few repeat patient PCI visits resulting in point duplicates. This was noted and reported in the results section. The study data did not provide sufficient detail of collection for the cholesterol variable (for hyperlipidaemic exposure), resulting in missing data >50%. Fitness analysis was conducted to measure the effect of this bias on concerned variable. Goodness of fit was tested to measure the representativeness of the data.

Data analyses

The distribution of the population by gender was presented in tables. Tests for differences in means (Welch two sample t-tests) and equality of proportions (3-sample prop-tests) were conducted to check for variance between groups. The prevalence of each risk factor by exposure within the population was

analysed by proportions. Risk factor counts proportions were reported for each risk factor within the population.

Missing data were checked (missing compare test) for fitness as missing completely at random (MCAR) to validate the nature of missingness in variables with >10% missing data e.g. hyperlipidaemic variable, for exposure to cholesterol. Goodness of fit (Pearson's Chi-squared test) was conducted to ascertain the representativeness of the data in the general population.

A test of association was performed (Pearson's chi-square test) to detect if there was any significant relationship (1) across independent variables (population's age, gender, deprivation groups, deprivation ranks, and risk factor counts) and CVD behavioural risk factor determinants (for all identified behavioural risk factors), and (2) within CVD behavioural risk factor determinants using a dependent variable of interest as a potential predictor based on initial association and prevalence scores. A unit score was assigned for overall level of prevalence and association significance across all CVD behavioural risk factor determinants. Unit scores were added to ascertain a preferential determinant of choice.[16,18]

Finally, the direction of risk in association was analysed for a preferred CVD risk factor determinant (general logistics modelling: odds ratio and co-efficient estimates) among notable predictors with significant association scores in order to inform a suggestive clustering for the purpose of targeting intervention design in the whole population.

Continuous data analysis was presented as means ± standard deviations (SD) while categorical data was presented in percentages. Data wrangling and analyses was done using the R Studio Version 1.3.1056 software.[23] All tests were two-tailed with level of significance set at $P<0.05$, and 95% Confidence Interval (CI).

Role of funding source

The sponsors, as acknowledged in this text were not involved in study design; the collection, analysis and interpretation of data, the writing of the report or the decision to submit this paper for publication.

Results

Participants

In total, there were 2,025 patient data with a mean (SD) age 69.47 (±10.93) years [95% CI, 68.99-69.94]. The women were older compared to men, mean age 71.14(±11.1) to 68.91(±10.8) years ($P=.0001$). Detailed characteristics (duplicates and missing data) of participants are described in Table 1.

Data description

Table 1 presents the population demographic and clinical data distribution by gender with *P* values (t-test and prop-test) for difference in means and equality of proportions. The hyperlipidaemia (cholesterol)

variable was marred with missing values by 44% (892 of 2025). Test for fitness (in comparison to independent variables, representative of the population, such as ‘age’ and ‘distance from hospital’) shows that missing data was not MCAR at $P<.05$. Additional fitness check (using the gender variable, which is also representative of the whole population) shows that missing value were not significantly different from observed values for proportions in both male (842 (55.6%), 673 (44.4%)) and female (294 (57.6%), 216 (42.4%)) populations ($P=.45$).

Prevalence of risk factor exposures by independent variables

Table 2 presents the distribution of variables by proportion for CVD risk factor exposures.

Prevalence of CVD behavioural risk factors by risk factor counts.

Figure 1 presents the prevalence of CVD behavioural risk factors by risk factor counts (multiple exposures within the population).

Test for association

Table 3 presents the association between independent variables and CVD behavioural risk factor determinants. Association scores and prediction scores are indicated by the counts of significant associations and levels of predictions, respectively.

Test for direction of associations

Table 4 presents a generalised linear model odd ratio and coefficient estimates (where odd ratios were over-estimated) with their respective confidence intervals and p values for exposure to obesity using ‘age’, ‘gender’, ‘family history CAD’, ‘risk factor count’, ‘SIMD groups’ (deprivation groups), and other risk factor determinants as predictors

Discussion

Key results

This study presents data analyses of CVD risk factors for patients living in a remote region who have undergone PCI over a period of four years. Data duplicates representing about 17% of the population revealed the annual burden of repeated procedures and extent of behaviour change challenge. Results show that elevated BMI (pre-obese and obese status) is the most prevalent CVD risk factor in the population with a significant difference in proportions in both gender ($P<.0001$), followed by hypertension ($P=.37$) and hyperlipidaemia ($P<.002$), with which further analysis shows existence of highest and multiple attributable risk within the population.[24]

A carefully modelled analyses by assessing overall prevalence, association significance, and direction of risk reveal a population with elevated BMI which is either hyperlipidaemic or hypertensive as clusters of

interest for health behaviour change intervention.

Limitation

This study dataset contains some missing data in the 'cholesterol concentration' variable, which had a significant count of missing values beyond the 10% theoretically benchmarked for the study. Also, the whole dataset is from a single centre and only looked at those who had a PCI intervention, which was not fully representative of the whole exposed population at risk. The bias in these limitations were either provided for or noted with their effects in the study.

Interpretation

Confounders and determinants: In this study, age and risk factor count variables were significantly associated with all CVD risk factors. Though supported by clinical reports,[25] further tests indicating level and direction of association were conducted. They show that changes in these determinants do not have any effect (OR=1) on exposure to obesity as a major and dominant CVD risk factor and may therefore be considered confounders within the population - all patients were equally exposed to being obese irrespective of age or number of risk factor counts. This insight is validated in study findings by Ng et al.[26] The exposure effect (OR=1) of risk factor count is validated in that elevated BMI is a dominant risk factor within the population. This, when adjusted for, suggests highest multiple risk association level for obesity compared to other CVD risk factors, an observation similar to study by Mora et al.[24]

Association scores for variables highlight gender and SMID group scores worthy of closer observation. The former as the sole associate with BMI groups and the latter, BMI groups and smoking group, a finding similar to study by Damen et al.[27] Lastly, though with lower population proportion, the female gender has higher chance of exposure (OR=3) to obesity compared to the male. This finding validates gender as a determinant of exposure to obesity as also indicated in clinical reports by NHS Scotland.[22]

Rurality and obesity: This study deviates from previous research findings on intervention design subsidy that compare rural to urban areas.[13] The results show that the chances of exposure (Co-eff=20, *P*=.99) to obesity in the study population are high and equal for both rural and urban groups. This suggests that rural dwellers may not be regionally deprived when compared with their urban counterparts within a geographically remote population as also reflected in the study done by Teckle et al.[28] However, this finding could not affirm socio-economic status for the study population as SIMD ranking does not indicate a significant level of association with all the CVD risk factor determinants except in cholesterol concentration determinant and the smoking groups. This observation is similar to the Scottish Government report on Tobacco intervention.[29] It is worthwhile to note that a unit change to geographical accessibility does not have any effect on the chance of exposure to obesity. This suggests and affirms that exposure to and outcome of an elevated BMI is linked more to social-economic outcomes rather than to rurality or urbanity as supported in previous studies.[19,30]

Family history of CAD and obesity: Results show that having a family history of CAD increases the chance of exposure (OR=3) to obesity and not having a family history of CAD decreases chance of exposure (OR= -2) to obesity, an observation similar to studies done by Jin et al.[31]

Diabetes and obesity: For this study, the chance of exposure to obesity increases for individuals with diabetes compared to the individuals without diabetes, an observation supported in the clinical report by Diabetes, UK.[25] This association strength is 1.3 times as likely in diabetic individuals compared to their non-diabetic counterparts.

Hypertension and obesity: In the blood pressure variable, a unit change increases exposure (co-eff=17, *P*=.99) to obesity. To affirm association strength, the hypertensive individuals are seventeen times as likely to be obese compared to their non-hypertensive counterparts. This observation on association strength indicates a stronger level of association between hypertension and elevated BMI within this population compared to any other CVD risk factor. This, therefore, suggests the need for imminent intervention within observed cluster, a suggestion similar to study by Cesana et al.[32]

Hyperlipidaemia and obesity: Though with missing at random data within the population, the same association strength coupled with association significance is applicable for the cholesterol concentration variable and hyperlipidaemic individuals. This makes it a cluster risk factor of choice with obesity as also suggested by Iliodromiti et al.[33]

Smoking and obesity: Previous demographic reports suggests that intervention(s) already in place to reduce smoking within the study population seems to be increasingly and sufficiently effective.[29] This suggestion is validated in that the ex-smoker individuals within the non-smoking population has the highest prevalence within the smoking group. This appears to be responsible for the higher chance of exposure (co-eff.=23, *P*=.99) to obesity within the non-smoking population compared to the chance of exposure (co-eff.=5, *P*=.006) in the smoking population as validated in the study by Ginawi et al.[34] However, quitting smoking may be responsible for diminishing marginal effect on BMI thus reducing exposure to obesity as also reflected in study by Courtemanche et al.[35]

Generalizability

The study dataset is geographically localized - while its model is considerably replicable for use in public health behavioural risk factor interventions, the data outcomes may not be directly representative of intervention application in regions of the world with different CVD risk factor cluster profile. Studies have shown that CVD risk factor cluster profiles are region-specific.[36,37] The analytical model in this paper could therefore be used to make any generic intervention more targeted to specific local populations.

Conclusion

Carefully modelled analysis measures revealed clustered behavioural risk associated with obesity within CVD population. The knowledge of the cluster structure could strategically and substantially inform

cardio-rehab interventions and further contribute to reduction in the burden of repeated procedures on existing clinical interventions.

Declarations

Funding

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Declarations of interest

The authors declare that there is no conflict of interest.

Data sharing

Use of patients' data in this study was approved by the Caldicott Guardian, NHS Highland. Data sharing is limited to the NHS Highland and University of the Highlands and Islands.

Ethics approval

Not applicable

Availability of data and material

The use of data was approved by the office of the Caldicott Guardian, NHS Highland.

Authors' contributions

ASA wrote the manuscript. ASA and WJ analysed data and reviewed analysed data. All authors contributed equally to manuscript review.

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Tables

Table 1: The NHS Highlands CVD PCI population distributions by gender, 2016 to 2019.

	Total (%)	Female (%)	Male (%)	*P* value
	n=2025[1] (100)	n=510 (25.2)	n=1515 (74.8)	..
Age, μ (± SD) years	69.5 (±10.9)	71.1 (±11.1)	68.9 (±10.8)	.0001
below 40	16 (0.7)	5(0.2)	11 (0.5)	.0001
40-59	426 (21.1)	80 (4.0)	346 (17.1)	.0001
60-79	1245 (61.5)	318 (15.7)	927 (45.8)	.0001
80 above	337 (16.7)	107 (5.3)	230 (11.4)	.0001
family history, CAD	869 (42.9)	213 (41.8)	656 (43.3)	.76
Diabetes	426 (21.0)	97 (19.0)	329 (21.7)	.22
dietary	378 (18.7)	83 (16.3)	295 (19.5)	..
insulin	48 (2.4)	14 (2.7)	34 (2.2)	..
hyperlipidaemia[2]	543 (26.9)	166 (32.5)	377 (24.9)	.002
Hypertension	1099 (54.3)	286 (56.1)	813 (53.7)	.37
obesity (BMI status)	..	..	..	.0001
elevated BMI	1570 (77.5)	356 (69.8)	1214 (80.1)	..
low/normal weight	453 (22.4)	153 (30.0)	300 (19.8)	..
smoking status	..	..	..	.001
current smoker	458 (22.7)	139 (27.3)	319 (21.1)	..
ex-smoker	815 (40.2)	169 (33.1)	646 (42.6)	..
never smoked	749 (37.0)	201 (39.4)	548 (36.2)	..
SIMD groups[3]	..	..	..	.29
accessible	244 (12.0)	69 (13.5)	175 (11.6)	..
urban	518 (25.6)	116 (22.7)	402 (26.5)	..
remote	1140 (56.3)	295 (57.8)	845 (55.8)	..
SIMD ranking[4]	..	..	..	.17
1	170 (8.4)	45 (8.8)	125 (8.3)	..
2	316 (15.6)	96 (18.8)	220 (14.5)	..
3	690 (34.1)	172 (33.7)	518 (34.2)	..
4	591 (29.3)	136 (2.6)	455 (30.0)	..
5	173 (8.6)	41 (8.0)	132 (8.7)	..
risk factor count	..	..	..	.15
0	96 (4.7)	31 (6.1)	65 (4.3)	..
1	504 (24.9)	122 (23.9)	382 (25.2)	..
2	801 (39.6)	188 (36.9)	613 (40.5)	..
3	512 (25.3)	133 (26.1)	379 (25.0)	..
4	106 (5.2)	33 (6.5)	73 (4.8)	..
5	6 (0.3)	3 (0.6)	3 (0.2)	..

[1]duplicates represent 345 counts and makes up to about 17% of the population dataset.

[2]missing data represents 889 counts and makes up to 44% of the population.

[3]missing data represents 123 counts and makes up to 6% of the population.

[4]ranking is in quintiles. Missing data represents 85 counts and makes up to 4.2% of the population.

SIMD = Scottish index of multiple deprivation. CAD = coronary artery disease

Table 2: The prevalence of CVD risk factor exposures by independent variables in NHS Highlands CVD PCI population, 2016 to 2019.

	Blood sugar concentration (%)		Blood pressure (%)		BMI groups (%)		Cholesterol concentration (%)		Smoking groups (%)	
	diabetic	not diabetic	hyper-tensive	not hyper-tensive	elevated BMI	low/ normal weight	high	healthy	smoking	not smoking
	21.1	78.9	54.3	45.7	77.5	22.5	26.9	29.1	22.7	77.3
Gender	..	..	..	..	..	..	..	..	..	..
Female	4.8	20.4	14.1	11.1	17.6	7.5	8.2	6.3	6.9	18.3
Male	16.2	58.6	40.2	34.7	60.0	14.8	18.6	22.9	15.8	58.9
family history of CAD	..	..	..	..	..	..	..	..	..	..
No	13.1	43.5	30.5	26.1	42.7	13.8	13.0	15.6	12.4	44.1
Yes	7.9	35.1	23.5	19.5	34.5	8.4	13.6	13.4	10.0	32.9
SIMD groups	..	..	..	..	..	..	..	..	..	..
Urban	5.5	20.1	13.6	12.0	19.4	6.2	6.9	7.6	6.6	19.0
Accessible	2.4	9.7	6.2	5.9	9.7	2.3	3.1	3.8	2.5	9.5
Remote	12.1	44.2	31.2	25.1	43.7	12.6	15.2	16.6	12.1	24.2
SIMD ranking	..	..	..	..	..	..	..	..	..	..
1	1.6	7.2	4.7	4.1	6.8	2.0	1.8	2.2	3.9	4.9
2	4.1	12.2	9.0	7.3	12.3	4.0	4.3	4.0	5.5	10.8
3	6.8	28.8	19.5	16.1	27.6	7.9	9.6	10.8	7.5	28.0
4	6.8	23.7	16.6	13.9	23.8	6.6	8.5	10.3	4.9	25.5
5	1.8	7.2	4.5	4.4	7.1	1.9	2.5	2.6	1.0	7.9
risk factor count	..	..	..	..	..	..	..	..	..	..
0	0	4.7	0	4.7	0	4.7	0	2.0	0	4.7
1	1.1	23.8	4.4	20.4	14.6	10.3	1.8	7.6	2.9	21.9
2	4.6	35.0	22.7	16.8	33.5	6.0	9.4	12.3	8.9	30.6
3	11.4	13.9	21.8	3.5	24.0	1.3	11.3	6.6	7.4	17.9
4	3.6	1.6	5.0	0.2	5.2	0	4.0	0.6	3.1	2.1
5	0.3	0	0.3	0	0.3	0	0.3	0	0.3	0

Table 3: Tests and scores of associations between independent variables and CVD risk factor determinants in the NHS Highlands CVD PCI population, 2016 to 2019.

Table 4: Summary of generalised linear model to determine level and direction of association in determinants for elevated BMI, showing odd ratios (OR) and co-efficient estimates (Co-eff.) in the in NHS Highlands CVD PCI population, 2016 to 2019.

	OR (conf. int.)	Co-eff. (p-value)
age	1 [0.96, 1.23]	..
gender (Male)	3 [0.12, 75.31]	..
risk factor count	1 [0.24, 4.62]	..
family history, CAD (No)	..	-2 (.99)
family history, CAD (Yes)	..	3 (1)
deprivation groups (Accessible)	..	1 (.63)
deprivation groups (Urban)	..	20 (.99)
deprivation groups (Remote)	..	20 (.99)
blood sugar concentration (Not diabetic)	..	1.3 (.35)
cholesterol concentration	..	17 (.007)
blood pressure (Not hypertensive)	..	17 (.99)
smoking groups (Smoking)	..	5 (.006)
smoking groups (Non-smoking)	..	23 (.99)

Figures

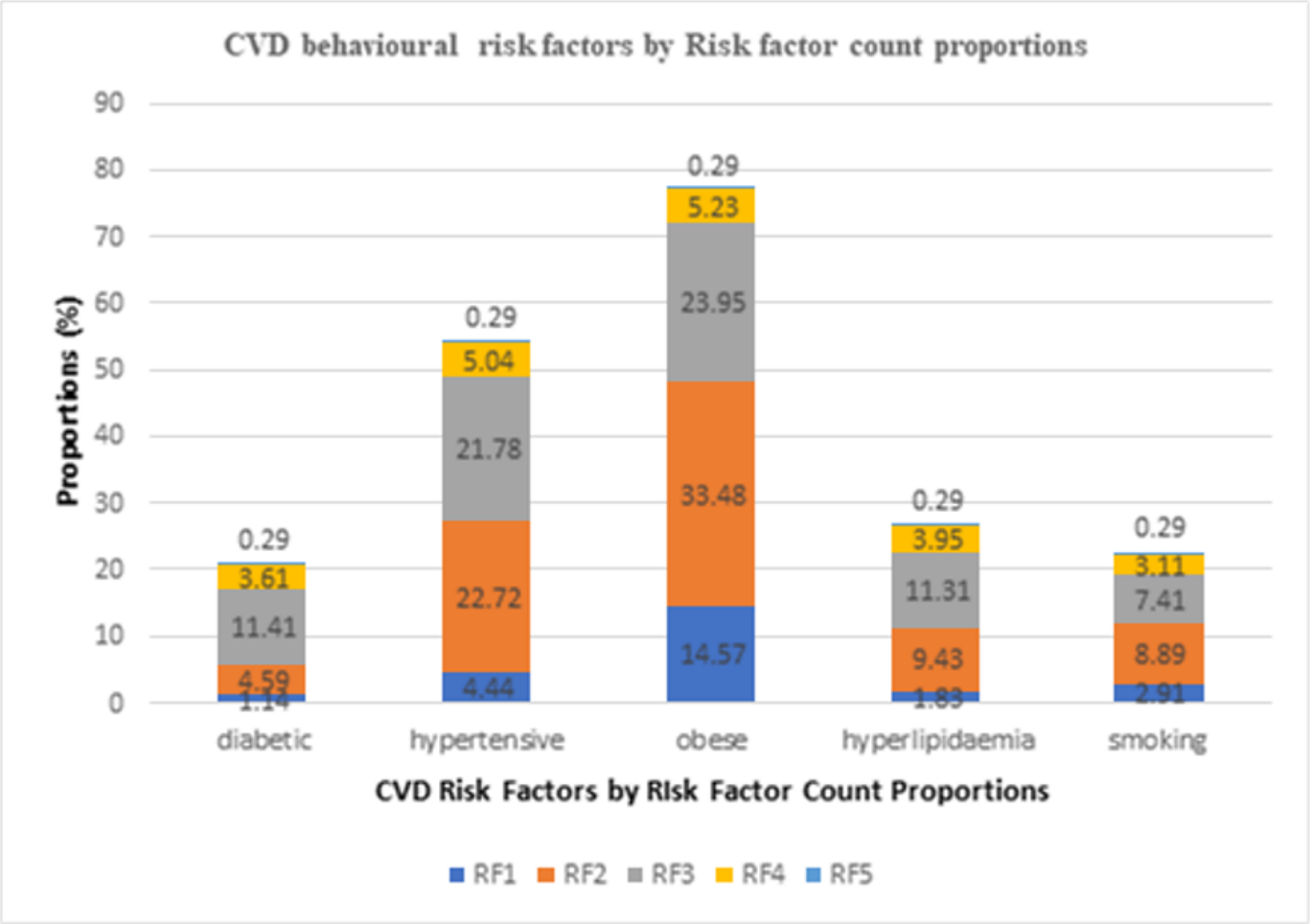

Figure 1

Prevalence of CVD behavioural risk factors by risk factor counts in the NHS Highlands CVD PCI population, 2016 to 2019.