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Diet and cardiovascular risk factors in Bonaire population

According to WHO, cardiovascular diseases (CVDs) are the number one cause of death globally; representing 30% of all global deaths, meaning that more people die annually from CVDs than from any other cause.

The bad news is that the number of people who die from CVDs (mainly heart disease and stroke), will increase - CVDs are projected to remain the single leading cause of death.

The good news is that most cardiovascular diseases can be prevented by addressing risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity, high blood pressure, diabetes and raised lipids: behavioral risk factors are responsible for about 80% of coronary heart disease and cerebrovascular disease.

The effects of an unhealthy diet and physical inactivity may show up in individuals as raised blood pressure, raised blood glucose, raised blood lipids, and overweight and obesity (so called “intermediate risk factors”).

SJSM students performed a research on those risk factors that indicate an increased risk of developing a heart attack, stroke, heart failure and other complications in people in Bonaire.

Effects of Dietitian Intervention on CVD Risk Factors

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Introduction

Primary prevention with lifestyle modification has been shown to significantly reduce CVD development and events in many studies, especially for diabetics that are at two to three times the risk for CVD[1-8].
We performed a population-based, cross-sectional study of diabetics in Bonaire that compares non-variant-diet diabetics against a standard non-diabetic population along with pre-intervention measurement of modifiable CVD risk factors against post-intervention measurement. By evaluating measured modifiable risk factors before intervention and after, we were able to compare Bonaire results to similar studies[2-6] and evaluate the efficacy of intervention in Bonaire.

Materials & Methods

- Weight, BMI, SBP, DBP, TC, TC/HDL, HDL, & LDL were obtained by the study researchers for the control group using Fat Loss Monitor, Intellisense BP cuff, and Cardio Check P-A. (fig. 1).
- Statistical Data: Mean, standard deviation, and mean change were figured in Microsoft Excel. Paired t-test confidence intervals were calculated at ($P \leq 0.05$) on SPSS software.
- DM group data: Files obtained from DM clinic data base at Fundashon Mariadal, Kralendijk, Bonaire. Selection criteria for diabetics must have lipid panel pre and post-intervention, and had to be patients of a General Practitioner.

Figure 1
Automated Cuff: Omron, Bannckburn, Illinois, 60015, Intellisense, Model BP652; Bioimpedance: Omron, Fat Loss Monitor HBF-306CN
Lipid Panel: Polymer Technology Systems, Cardio Check P-A

The two working hypotheses were:

1. H_0: There is no difference between before and after lipid panel: (TC/HDL, TC, TAG, LDL, & HDL) with an intervention with a dietician.
   H_A: There is a difference between before and after lipid panel: (TC/HDL, TC, TAG, LDL, & HDL) with an intervention with a dietician.
2. H_0: There is no difference of before and after weight and BMI with an intervention with a dietician.
   H_A: There is a difference of before and after weight and BMI with an intervention with a dietician.

Results

Using a paired t-test for pre and post-intervention, the data indicated that the dietician had a significant impact in Weight (P=.002 & .004), BMI (P=<.001 & <.001), SBP (P=.001 & <.001), TC (P=.001 & .021), and TAG (P=<.001 & <.001). The data shows that the dietician has a significant impact on lowering the weight (P=0.032*) and BMI (P=0.034*) and H_0 was rejected (Table 1, fig. 2). There was no statistical significance that the dietician has an impact on diabetic's lipid panel levels in the timeframe of this study, and the H_0 was accepted (Table1).

Table 1 – After Intervention Changes in Bonaire Diabetic Population

Bonaire DM Population				
	CONTROL	BEFORE	AFTER	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean Change*	P-Value§
TC	150.29 ± 32.11	181 ± 38.68	169.3 ± 30.47	-11.7	0.066
TC/HDL	3.31 ± 1.10	4.11 ± 1.21	3.9 ± 1.11	-0.21	0.110
LDL	86 ± 25.37	106.32 ± 35.96	97.79 ± 30.50	-8.53	0.152
HDL	49.68 ± 18.95	45.89 ± 11.22	45.83 ± 12.38	-0.06	0.961
TAG	83.13 ± 44.11	139.87 ± 57.13	128.13 ± 53.91	-11.73	0.208
Weight	73.77 ± 25.03	92.02 ± 20.59	90.47 ± 19.19	-1.55	**0.032#**
BMI	26.15 ± 8.73	32.93 ± 6.29	32.39 ± 5.88	-0.54	**0.034#**

Control group for non diabitic population baseline.
* Mean change: before mean minus after mean.
§ P-Value, paired-t-test: before and after means.
# (significance at ≤ 0.05)
Control n=41, Diabetic n=30

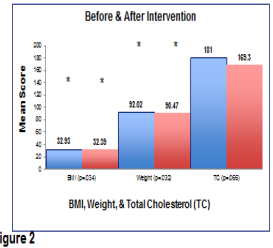

Figure 2
Blue represents mean before intervention, and red represents mean after intervention. P-values figured with paired t-test before and after and evaluated at $P \leq 0.05$, **"significant values. BMI: Mean difference -0.54, Weight: Mean difference -1.55, TC: Mean difference -11.7**

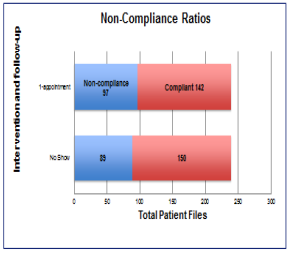

Figure 3
1-appointment: Data was collected from dietitian records where "Non-compliance", blue, represents those scheduled for only one appointment, whether they showed or not. "Compliant", red, represents those that were seen by dietitian.
Percentage was figured by dividing "Non-compliant" by n=239.
No Show: "Non-compliance", blue, is based on the total number of times from the population that patients did not show for an appointment, whether 1 or 2 times, versus those that made appointment with the dietitian, "Compliant".
Percentage was figured by dividing "Non-compliant" by n=239.

Discussion

Control group significance showed a need for intervention on modifiable CVD risk factors among the Bonaire diabetic population when compared to the control group[2-8]. Compared to other randomized, controlled studies completed in various countries[2,3,5], our study's weight and BMI significance (fig. 2) indicates efficacy in ≤6 months timeframe and shows reductions in lipid panel (Table 1).

Conclusions

Intervention and modification of lifestyle, diet, and glucose control are important in the reduction of CVD risks[2-8]. Long-term intervention has been shown to reduce weight, BMI, TC/HDL, and improve glucose management[2,3-6].

Limitations

Length of study compared to longer studies.
Cross-sectional rather than cohort.
Disease state of diabetics and age.
Non-compliance with dietitian (fig 3).

Application

Lifestyle changes that don't require medication, which targets only one aspect[5]. Lowered health care costs, and reduction of CVD risks and morbidity through primary intervention.

Acknowledgments

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