Primary care based Intervention improves glycated haemoglobin level in type 2 Diabetes patients

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Introduction

- Worldwide, 3.2 million deaths are attributable to diabetes every year.
- Almost 80% of diabetes deaths occur in low- and middle-income countries
- The overall diabetes prevalence was 9.9% among Tunisian adults
- 16.7% of diabetic patients were considered well controlled

Objective

to improve the quality of care through

- medical adherence and healthy lifestyle habits
- glycemic control in type 2 diabetic patients

Source of funding: World Health Organization EMRO RPPH Grant 2010/2011_10-9.

METHODS

- **Study design:** Quasi experimental study in primary care centers in the region of Sousse Tunisia with intervention and control groups.

Study design

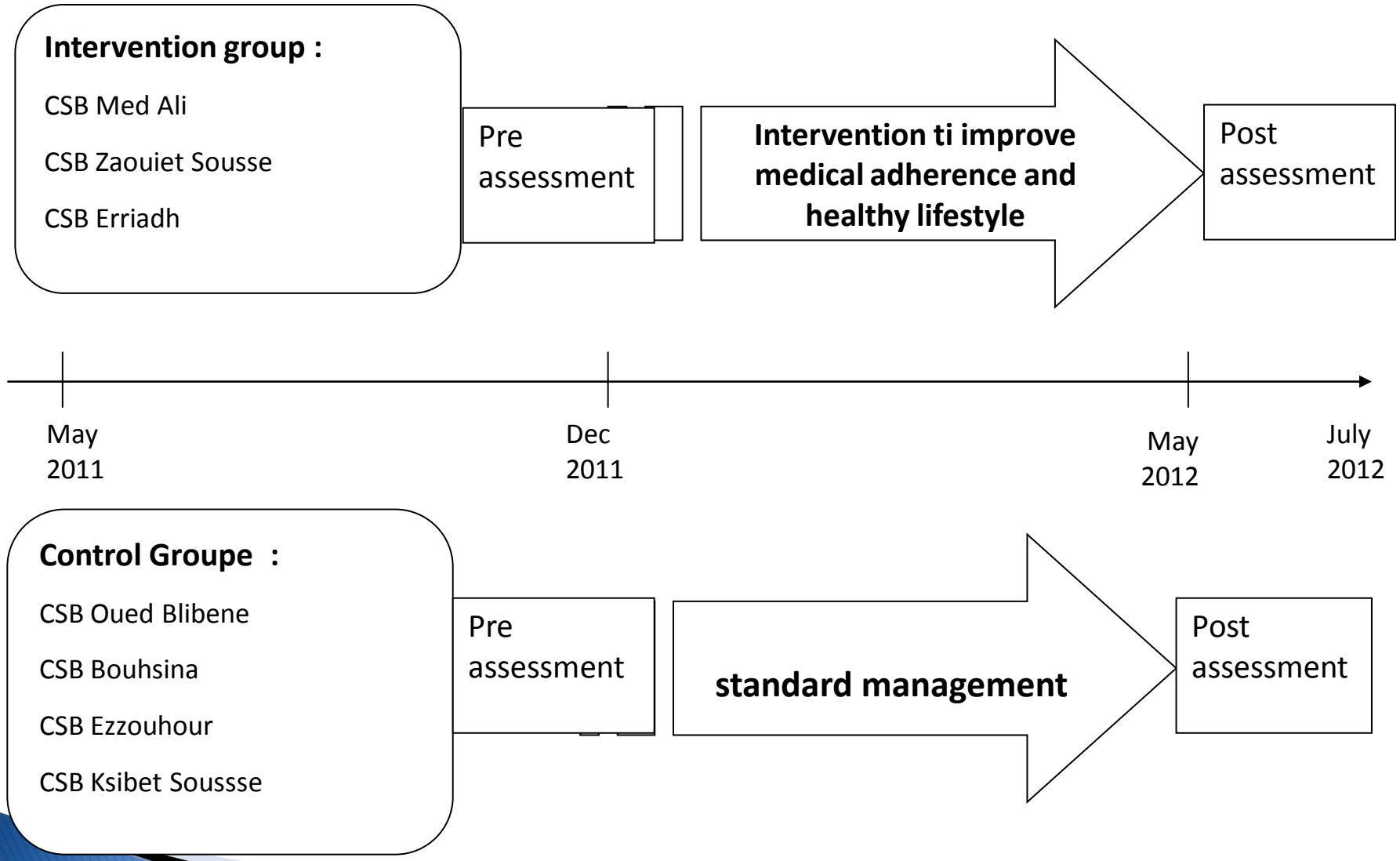


Figure 1: Stude design of intervention study to improve type 2 diabetes management in primary health care centers in Sousse, Tunisia

Study population

Patients are eligible if :

- 18 to 70 years old,
- have a clinical diagnosis of type 2 diabetes
- HbA1c $\geq$7%.

We excluded participants if :

- they have diagnosed diabetes for more than 10 years,
- severe and enduring mental health problems

Sample size

Sample size estimates were based on:

- a one-sided significance level of 0.05
- 80% power
- to detect between-group 1.5% point difference in glycated hemoglobin level.

Assuming a failure to consent rate of 20% and a dropout rate of 20%,

⟹ *200 participants (100 in each group)* are needed to be recruited.

Data collection

At baseline and at 6th month

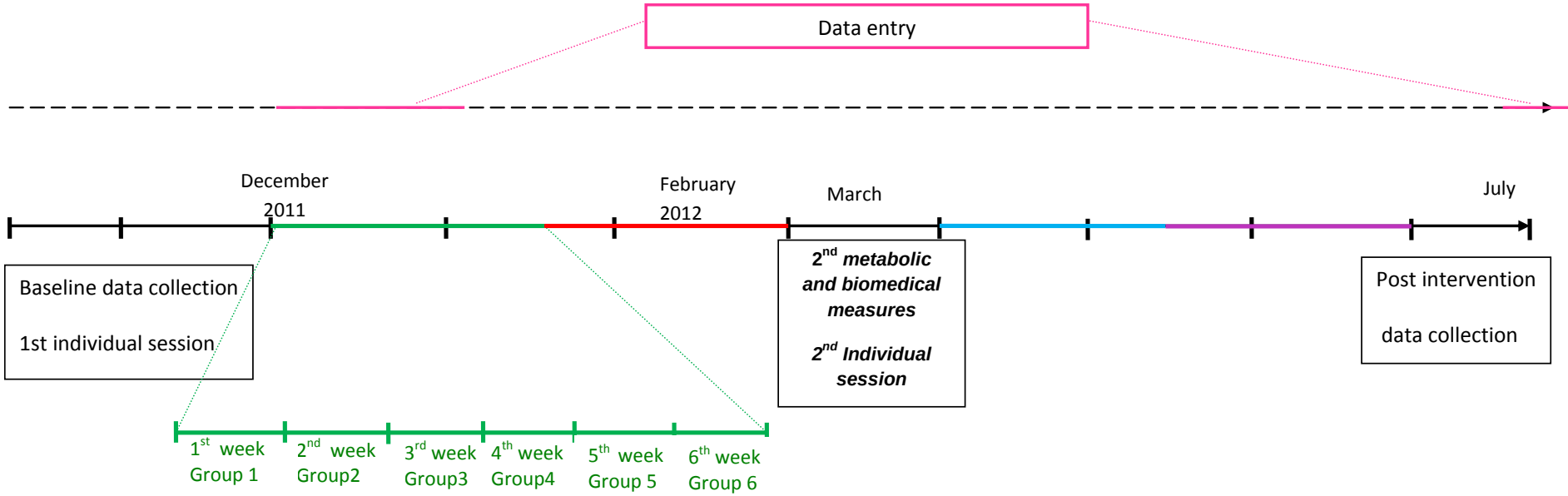
- The validated Summary of Diabetes Self-Care Activities questionnaire

- Metabolic control: hemoglobin A1c levels, lipid level

- Biomedical measures: hemoglobin A1c levels, blood pressure, body weight, and waist circumference

Intervention Program:

Figure 1: Time frame for the smooth running of the study

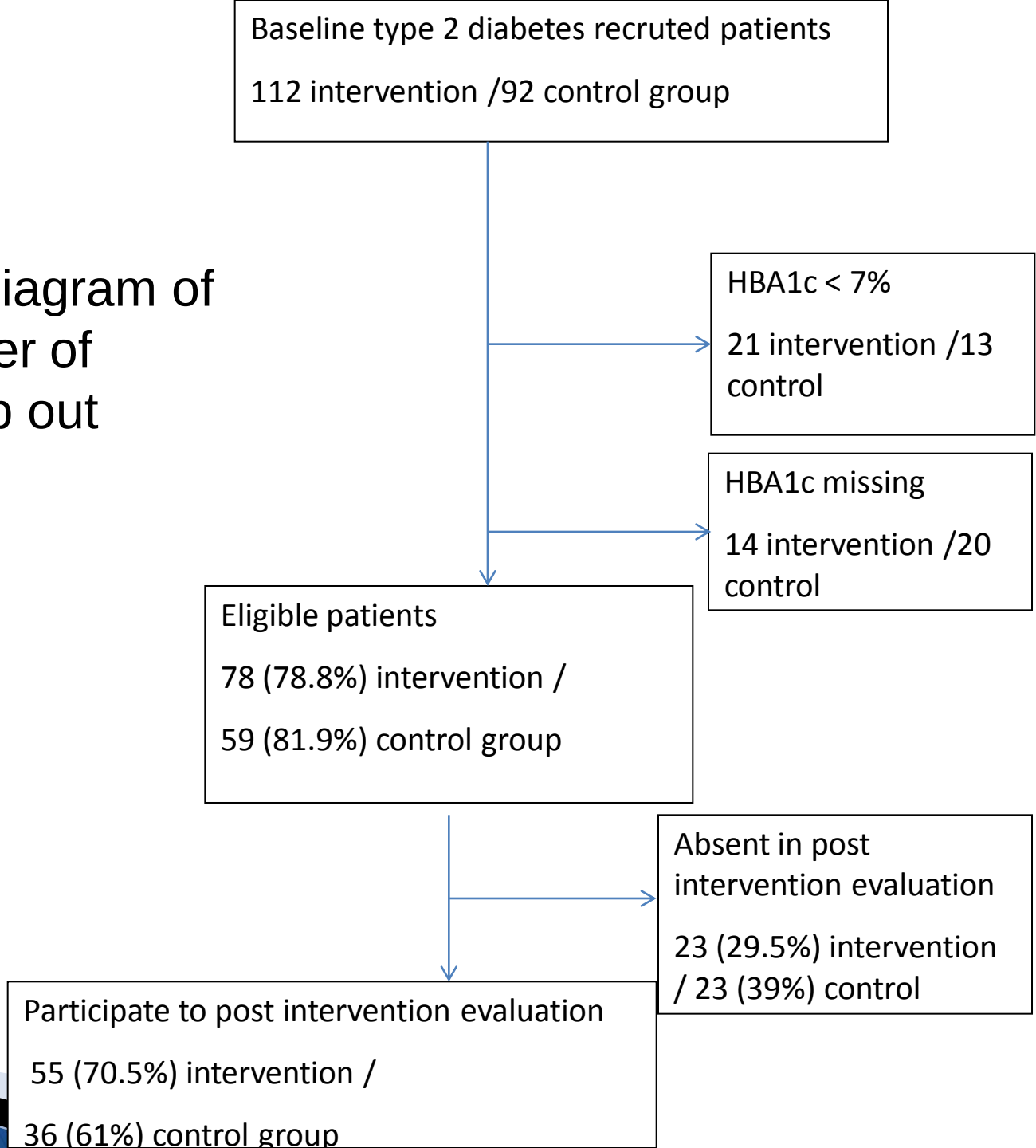


Ethical considerations:

- The protocol of the study has been approved by the Ethical Committee of the University Hospital Farhat Hached.

- All participants signed an informed consent before participating to the study.

Figure 2: The flow diagram of the study with number of participants and drop out patients.



Results

intervention group

- 52.64 ± 8.21 years
- 87.3 % women
- Primary level of education: 58.3%

control group

- 53.64 ± 8.68 years
- 75 % women
- Primary level of education :53.6%

Table I: Comparison of pre post **diet score** in intervention and control groups of type 2 diabetic patients in primary health care centers in Sousse Tunisia

	Intervention group			Control group		
	Pre mean (SD)	Post mean (SD)	p	Pre mean (SD)	Post mean (SD)	p
How many of the last SEVEN DAYS have you followed a healthful eating plan?	2.11 (2.89)	4.59 (2.89)	$<10^{-3}$	2.15 (2.82)	2.91 (2.66)	0.21
On average, over the past month, how many DAYS PER WEEK have you followed your eating plan?	2.43 (2.96)	4.38 (2.82)	0.001	2.53 (2.88)	3.00 (2.81)	0.42
On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?	2.23 (2.73)	4.21 (2.94)	0.001	2.82 (9.97)	3.56 (2.90)	0.32
On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy products?	4.74 (2.41)	5.48 (1.98)	0.95	5.62 (1.96)	5.57 (1.84)	0.90

Table II: Comparison of pre post physical activity score in intervention and control groups of type 2 diabetic patients in primary health care centers in Sousse Tunisia

	Intervention group			Control group		
	Pre mean (SD)	Post mean (SD)	p	Pre mean (SD)	Post mean (SD)	p
On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity?	2.42 (2.77)	4.69 (2.57)	$<10^{-3}$	2.88 (3.01)	4.21 (2.84)	0.02
On how many of the last SEVEN DAYS did you participate in a specific exercise session other than what you do around the house or as part of your work?	0.53 (1.78)	0.84 (2.05)	0.5	0.15 (0.49)	0.00 (0.00)	0.19

Table III: Comparison of pre post **foot care score** in intervention and control groups of type 2 diabetic patients in primary health care centers in Sousse Tunisia

	Intervention group			Control group		
	Pre mean (SD)	Post mean (SD)	p	Pre mean (SD)	Post mean (SD)	p
On how many of the last SEVEN DAYS did you check your feet?	5.13 (2.98)	6.75 (0.76)	$<10^{-3}$	5.81 (2.37)	6.44 (0.98)	0.16
On how many of the last SEVEN DAYS did you inspect the inside of your shoes?	3.31 (3.38)	6.16 (1.57)	$<10^{-3}$	4.00 (3.36)	5.50 (2.61)	0.02
On how many of the last SEVEN DAYS did you wash your feet?	6.82 (0.89)	7.00 (0.00)	0.16	6.33 (1.79)	6.48 (1.69)	0.72
On how many of the last SEVEN DAYS did you soak your feet?	3.83 (3.19)	4.81 (2.84)	0.12	5.48 (2.47)	4.35 (3.05)	0.14
On how many of the last SEVEN DAYS did you dry between your toes after washing?	4.84 (3.10)	5.80 (2.62)	0.06	5.03 (2.56)	4.64 (2.95)	0.47

Table IV: comparison of pre post intervention **biomarkers** in intervention and control groups of type 2 diabetic patients in primary health care centers in Sousse Tunisia

	Intervention group			Control group		
	Pre mean (SD)	Post mean (SD)	p	Pre mean (SD)	Post mean (SD)	p
HbA1c	9.5(1.6)	8.6(1.6)	$<10^{-3}$	10.1(2.2)	9.3(2.5)	0.09
Blood glucose	11.4(4.2)	10.6(3.2)	0.18	12.7(7.3)	10.5(3.7)	0.09
Total cholesterol	5.3(1.3)	4.9(1.2)	0.01	5.0(0.7)	4.8(0.6)	0.24
LDL cholesterol	3.0(1.1)	2.6(0.9)	0.01	2.7(0.6)	2.8(0.5)	0.23
HDL cholesterol	1.3(0.4)	1.3(0.4)	0.94	1.8(0.9)	1.7(0.6)	0.05
Triglycerides	2.4(2.5)	2.2(1.8)	0.32	1.8(0.9)	1.7(0.6)	0.53

Table V: comparison of pre post intervention **biometric** measures in intervention and control groups of type 2 diabetic patients in primary health care centers in Sousse Tunisia

	Intervention group			Control group		
	Pre mean (SD)	Post mean (SD)	p	Pre mean (SD)	Post mean (SD)	p
Body mass index	31.9(5.4)	31.2(5.4)	0.003	33.0(10.3)	32.2(9.8)	0,001
Waist circumference	107.0(14.5)	101.5(16.5)	0.04	106.9(14.5)	97.5(17.7)	0.01
Systolic blood pressure	14.6(1.9)	13.7(2.0)	0.004	13.8(2.2)	13.1(1.6)	0.08
Diastolic blood pressure	8.3(1.1)	8.1(1.5)	0.21	8.4(1.4)	7.9(1.2)	0.2

Discussion

- Globally, our intervention was successful.
- One of few interventions in Tunisia
- use of multidisciplinary teams with medical doctors, dietician and physical activity teacher.

Limits : sample size

The main reasons of drop out of the study:

-We couldn't contact some patients who hadn't a phone.

- Some patients have been absent at data collection despite the fact that we contacted them at least twice.

- In control group, some patients changed their medical doctors and don't consult in primary health care centers.

- The success of the intervention depends essentially on health professional motivation and help from stakeholders.

Conclusion

- Our intervention proved that multidisciplinary teams with medical doctors, dietician and physical activity teacher could be efficient to improve diabetic management.