Effectiveness Evaluation of a Diabetes Ramadan Conversation Map Intervention for Managing Type 2 Diabetes during Ramadan

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BACKGROUND

» Individuals with diabetes who wish to fast during Ramadan despite medical recommendation against it, may have increased risk of adverse outcomes.

» The Ramadan Diabetes Conversation Map (Ramadan Map) is a one-time self-management group-based education intervention for Muslim patients with type 2 diabetes addressing management during Ramadan.

» Clalit Health Services nurses from primary care and diabetes specialist clinics are trained and certified as Map™ program instructors to lead the sessions that started in 2014.

» No study to date has evaluated the effect of participation in the Ramadan Map intervention on subsequent health outcomes and healthcare utilization.

AIM

To evaluate the effectiveness of the Ramadan Map for participants, assessing short-term clinical outcomes and healthcare utilization.

METHODS

» This was a retrospective rolling cohort study of 1,732 Clalit Health Services' members with T2DM who participated in the Ramadan Map intervention between 2014 and 2017.

» The follow-up period was 6 months following the end of the Ramadan month and the pre-period was six months previous to the start of Ramadan.

» We used a difference-in-differences design with self-comparison group to examine the effect of the Ramadan Map intervention on changes in laboratory results and healthcare utilization over a six month follow-up.

» We compared differences in these clinical indicators between pre- and post-intervention during the intervention year to differences in indicators pre- and post-Ramadan in the year previous to the intervention.

» Mixed model linear regressions and Poisson regression models were used to estimate continuous and count outcomes, respectively both among the total population as well as a sub-group of members with A1c >7% previous to the intervention.

RESULTS

» A total of 1,732 individuals were enrolled in the Ramadan Map intervention over the four-year study period.

» Among the study population, 1,099 individuals had HbA1c above 7% at the start of intervention.

» The cohort was mainly between the ages of 45 and 74 years (83.3%), female (71.9%), of lower socioeconomic status (92.1%), with a diabetes duration of ten years or more (51.7%), obese (64.0%), and had never smoked (73.8%).

» In the adjusted difference-in-differences models (Table 1) participants experienced a significant reduction in their glucose and HbA1c levels (8.6 mg/dL and 0.3%, respectively) but not in their LDL cholesterol levels (p=0.060) over the 6 month follow-up period.

» In the sub-group analysis among participants with HbA1c>7% pre-intervention (Table 1), there was a significant reduction in glucose and HbA1c levels (17.0 mg/dL and 0.6%, respectively). There was also a significant reduction in LDL cholesterol level of 4.8 mg/dL and 0.2 less primary care visits between the pre- and post-periods.

The independent covariates that were positively associated with a reduction in different laboratory results

Other independent risk factors were significantly associated with an improvement in the outcomes such as medication adherence, diabetes duration, and age group
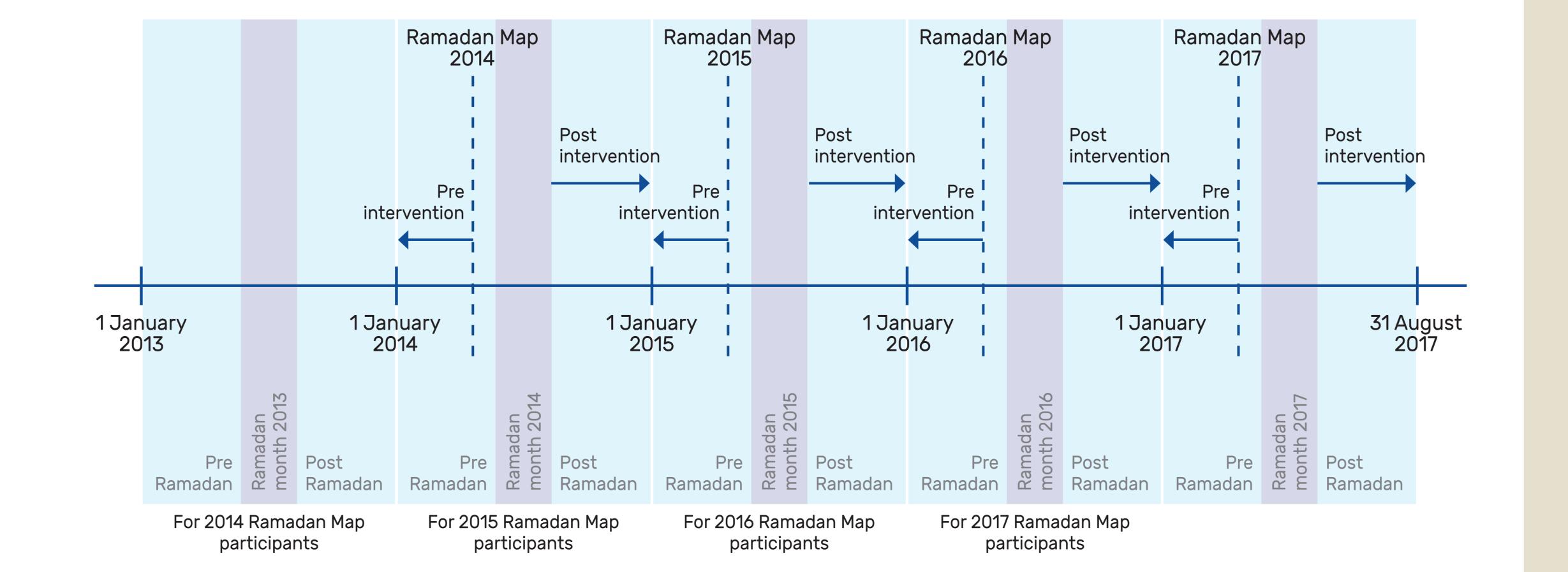
Table 1. Difference-in-Differences Analysis of Multivariable Mixed Linear Regression Models Comparing Differences Pre-And Post-Ramadan In The Intervention Year To The Year Prior

Characteristics	Entire sample			Sub-group of participants with HbA1c >7.0%		
	Estimate	Std. Error	p-value	Estimate	Std. Error	p-value
Glucose levels						
Ramadan Map (ref- a year prior)	7.90	2.25	<0.001	14.03	2.99	<0.001
Time (ref- pre)	4.44	2.19	0.043	9.17	2.81	0.001
Ramadan Map*Time	-8.61	3.08	0.005	-17.02	4.03	<0.001
HbA1c levels						
Ramadan Map (ref- a year prior)	0.28	0.05	<0.001	0.43	0.06	<0.001
Time (ref- pre)	0.32	0.05	<0.001	0.49	0.06	<0.001
Ramadan Map*Time	-0.34	0.06	<0.001	-0.63	0.08	<0.001
LDL levels						
Ramadan Map (ref- a year prior)	4.48	1.07	<0.001	6.26	1.36	<0.001
Time (ref- pre)	2.92	1.02	0.004	4.39	1.26	0.001
Ramadan Map*Time	-2.69	1.43	0.060	-4.83	1.80	0.007
Primary care visits						
Ramadan Map (ref- a year prior)				0.20	0.04	<0.001
Time (ref- pre)				-0.05	0.04	0.266
Ramadan Map*Time				-0.20	0.06	<0.001

All regression models are adjusted for sex, age group, socio-economic status, diabetes duration, body mass index, smoking status, insulin use, and medication adherence. Abbreviations: DID, difference-in-differences; LDL cholesterol, low-density lipoprotein cholesterol.

Study design:
A repetition of the design yearly over the four-year study period

CONCLUSIONS

» A Ramadan-focused T2DM management intervention provides effective tools for participants to better control their glucose and HbA1c levels.

» The intervention also demonstrates a substantial benefit in multiple outcomes (HbA1c, glucose, and LDL levels and primary care visits) for those individuals whose diabetes is uncontrolled (HbA1c>7%).

» These findings hold important global health impact for the millions of people with T2DM for whom Ramadan can pose a challenge in disease control.

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