Md. Jalal Uddin

DATA 698: Final Research Project

Final Project: <u>Preventing Chronic Disease of South Asian Community through Engagement with Community and Faith-Based Organizations in New York City.</u>

Introduction:

South Asian Community in New York City experience an enormous burden from certain chronic diseases, such as cardiovascular disease (CVD), hypertension, and diabetes. Specific South Asian subgroups also report poor nutritional practices, further elevating CVD risk. Studies have demonstrated low medication adherence in some of those subgroups, a critical component of diabetes and hypertension management. Each of these risk factors is further exacerbated by barriers to accessing culturally and linguistically appropriate care and tailored health information for the South Asian Community in New York City.

Although Diabetes Management (DM)/Hypertension (HTN) prevention and self-management programs that enable lifestyle changes and enhance linkage to healthcare have been shown to be an effective method of promoting prevention and control of these chronic conditions, there is a lack of culturally tailored programs to promote DM/HTN prevention and management and existing programs are limited in their sustainability and scalability.

We propose to build on the important role that faith-based and community-based organizations can play in affecting the health of immigrants and racial and ethnic minority populations by implementing the Racial and Ethnic Approaches to Community Health for South Asian Community in New York City. The program IMPACT, the research project to control and manage hypertension and high blood pressure, has partnered with 15 different primary care clinics in Brooklyn, Bronx and Queens. The program Community

Service Plan (CSP) has partnered with mosques, social service agencies, and primary care settings in New York City. Both programs have substantial concentrations of South Asian communities to improve cardiovascular risk factors (including obesity, hypertension control, and diabetes management) and promote healthy eating. Specifically, focusing on:

1) Enhance and promote systematic and sustainable linkages to culturally and linguistically tailored community- and clinic-based resources to improve diabetes and hypertension prevention and management in South Asian communities.

2) Implement reinforcing and integrated evidence-based approaches to improve access to environments promoting nutrition in South Asian communities by introducing education and changes to communal food practices in faith settings.

(3) enhance city-wide campaigns on by disseminating culturally tailored communications and education on CVD risk reduction to South Asian communities.

Evidence shows that promoting systematic and sustainable linkages to culturally and linguistically tailored community and clinically based resources and improve access to environments supporting nutrition in communities' plays vital role to develop diabetes and hypertension prevention and management. Project IMPACT and CSP are closely working with community and clinic based primary care practice setting, mosques, and social service agencies in Brooklyn, Bronx, Manhattan, and Queens neighborhoods with substantial concentrations of South Asian Community to improve cardiovascular risk factors including obesity, hypertension control, and diabetes management and promote healthy eating. For this purpose, I have engaged with CSAAH to collect data from project IMPACT and CSP.

Data collection:

I have contacted CSAAH (Center for the study of Asian American Health) under department of population health at NYU School of Medicine. CSAAH is working with 15 community-based primary care practice

setting patients and with four faith-based organization to prevent, manage and control patient's diabetes and hypertension. All fifteen community-based primary care practice setting, and four religious organization are in Brooklyn, Bronx, Manhattan, and Queens. The community-based primary care practice setting has more than 2000 hypertensive, and diabetes patients and more than 3000 congregants' members come during Friday prayer at all four-faith based organization. IMPACT and CSP conduct culturally appropriate health education workshops on hypertension management with South Asian participants. Implementing nutritional strategies, including education and changes to common food practices provide individual counseling and support, and assist participants with goal setting and lifestyle changes. Specifically, IMPACT and CSP are helping to improve blood pressure control and manage diabetes by promoting healthy eating using those approaches.

The IMPACT research project is on manage and maintain high blood pressure and hypertension. It is a clinic-base research and 15 private clinics was involved throughout Bronx, Brooklyn and in Queens. There was one private clinic in Parkchester, Bronx; three private clinics in Kensington, one clinic in Coney Island area in Brooklyn; one private clinic in Woodside, one in Jackson Heights, four in Jamaica Hillside, two in Richmond Hill, two in Ozone park area in Queens.

The IMPACT project had two different rounds, Round 1 and Round 2. The research period of each Round was six months. There was 8 clinics in Round 1 and 7 clinics in Round 2. Total 304 participants enrolled to the study where 167 participants in Round 1 and 137 participants in Round 2. In Round 1, total 77 male participants and 90 female participants enrolled and in Round 2 total 63 male participants and 74 female participants enrolled.

Each Round has two different intervention, Treatment and Control. The participants who enrolled in the Treatment intervention received monthly basis five educational classes on manage and control high blood pressure and hypertension. Those classes were on high blood pressure, food and nutrition, physical exercise, stress management and health care access. The educational classes were conducted by six different experienced Community Health Worker (CHW). All the CHW were trained from NYU School of Medicine. Those educational classes were held in participants own language so that they can properly understand about hypertension management. The participants were mostly Bengali, Hindi, Punjabi, and English speaking. Therefore, the education materials and the educational classes were also available for all those languages. The Treatment participant received on average eight phone follow-up and on average four in person one on one meeting with participants from CHW regarding hypertension management. Those bi-weekly follow-up phone calls to the treatment participants were mostly to follow-up the with plan and goal. In every two weeks, treatment participants received a bi-weekly plan or goal to reach in order to maintain their hypertension or high blood pressure. The goals were mostly to perform physical exercise and maintain healthy eating. The treatment participant also received free exercise tools, exercise DVD, healthy snacks etc. in almost every classes.

On the other hand, the participants who enrolled in the control group intervention did not receive any educational classes, educational materials, and follow-up phone calls. After enrolling to the program, the control and treatment participants were selected by randomization in the beginning of the study. The control participants completed one baseline survey in the beginning of the study and one endpoint survey after end of the study which is after 6 months from the baseline survey. Similarly, the treatment participants also completed one baseline survey in the beginning of the study and one endpoint survey after end of the study.

In Round 1, total 86 Treatment participants and 81 Control participants participated in the study. In Round 2, total 73 Treatment participants and 64 Controlled participants participated in the study. The distribution of the Treatment and Control participant and the distribution of the participants among CHW were presented in the R coding files attached in this final paper.

The goal of the study was to see whether the six-month intervention with in language educational classes, in language educational materials, one on one phone follow-up, one on one in person visits help the treatment participant to control, manage and maintain their hypertension, high blood pressure and stress compare to the control participants who did not receive any classes, educational materials and phone follow-up or in person meeting.

Data Collection procedure:

Project IMPACT of the CSAAH has saved all their Round 1 and Round 2 data in REDCap. I have created report in the REDCap to export all the Baseline, End point data into SQL 2012. I created table under two instances named Data_698 and Data_698R2 and imported those REDCap data into SQL instances. Then, I cleaned the data, created table based on my research needs and finally I exported the cleaned data into excel files. Then, I used RStudio to research those final data. I have attached all the imported excel tables, SQL coding, R coding, and RStudio files (.Rmd files) attached with this final research paper.

Project CSP data was also saved in CSAAH REDCap. I collected CSP data from REDCap and exported to SQL. After cleaning the data from SQL, I exported to excel for final research. Among the four faith-

based organization, Assafa Islamic Center has a total of 1500 congregants and average weekly attendance at Friday Jummah prayers of 250 congregants. Madina Masjid has a congregation of 2000 and average weekly attendance at Friday Jummah prayers of 400 congregants. Muslim Community Center has a congregation size of 500 and average weekly attendance at Friday Jumma prayer is about 200. Jame Mohammadia has a congregation size of 200 and average attendance at Friday Jumma prayer is about 100. To facilitate the blood pressure and diabetes management program, CSP's community health workers trained 24 volunteers from these 4 mosques. These 24 volunteers are now providing free monthly blood pressure screenings and basic hypertension reduction and management strategies to the mosque congregants. Close to 400 mosque congregants received free blood pressure screening and consultations from the KOT volunteers. From all four mosques, a total of 207 KOT baseline surveys were collected. Participants were followed up at 6-months at all 4 sites and 12-months follow-ups were conducted at Madina Masjid and Assafa Islamic Center, with ongoing 12-month data collected at MCC and Jame Mohammadia to be collected in February 2019.

Methods and Results of IMPACT data: At first, I would like to present the distribution of the total participants of both Round 1 and Round 2 based on Treatment verses Control, Male verses Female, and Participants among CHW to introduce the structure and shape of my data. I have created a graph in RStudio regarding the program introduction where the information about
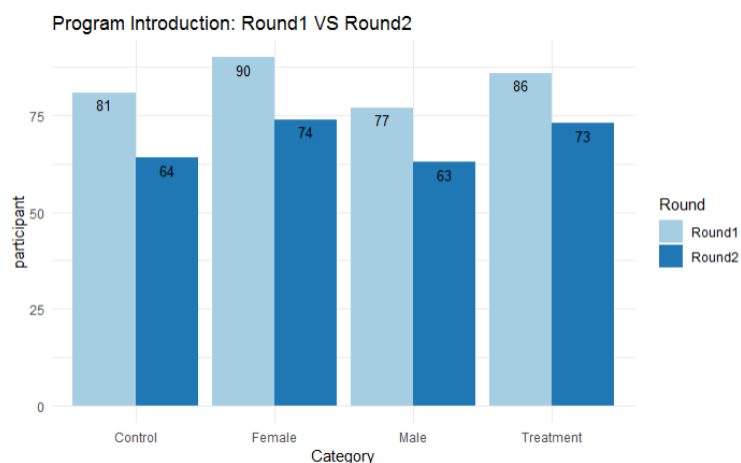

Treatment, Control, Male and Female participants are provided. According to the graph, there are 81 control participant in Round 1, 64 control participants in Round 2, 86 Treatment participants in Round 1,

73 Treatment participants in Round 2, 90 female in Round 1, 74 male in Round 2, 77 male in round1, 63 male in Round 2. Compare to Round 1, Round 2 has less participant because in Round 2 there are less private clinic compare to Round 1.

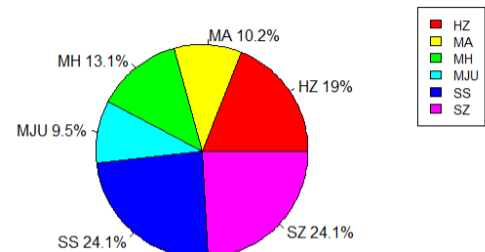**Distribution of participants in both Round 1 and Round 2 among the CHW:**

Now, I like to present the distribution of the participant among all the CHW in both rounds. I have created two pie charts to present my data. This distribution will show the workloads of each participants. According to the Round1 chart, except the CHW HZ and SS all the other has approximately equal work loads. Two of them has fewer workloads because they recently joint to the them and they were in learning process at that time. In Round 2, except MJU, MA, and MH all other has approximately similar workloads. I have included both the pie chart here to see.

Round1: Participant Distribution Among CHW
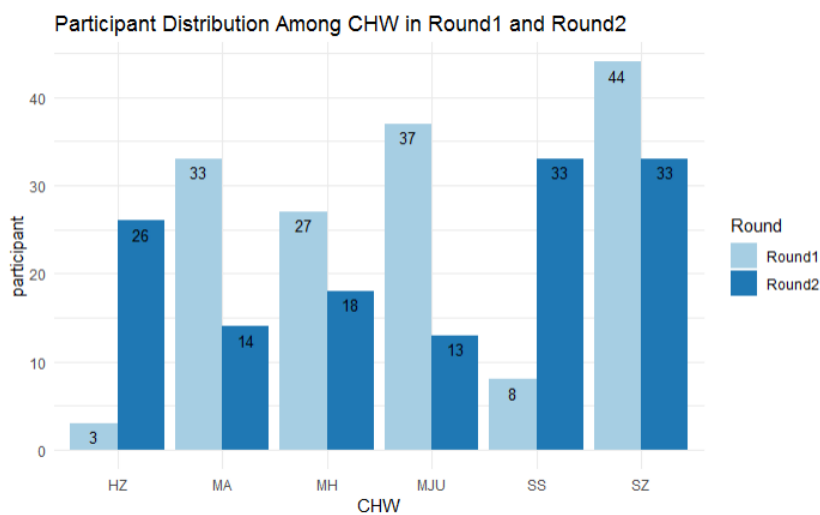
Participant Distribution Among CHW in Round1 and Round2
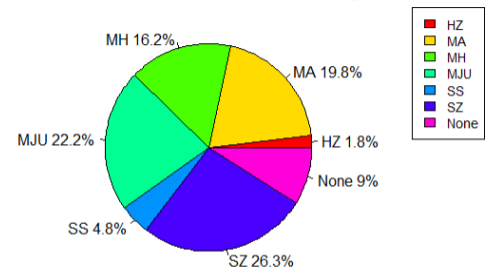

Round2: Participant Distribution Among CHW

Analysis on Baseline and Endpoint survey question:

Now, I like to present the analysis of the baseline (beginning of the study) and endpoint (end of the study) surveys collected from both Treatment and Control participants in both Round 1 and Round 2. Survey questions were based on general Health, taking blood pressure daily, Physical health, diet control, managing high blood pressure, perform physical exercise daily, and time spend on physical exercise. All the graph presented here is the comparison between control and treatment participants.

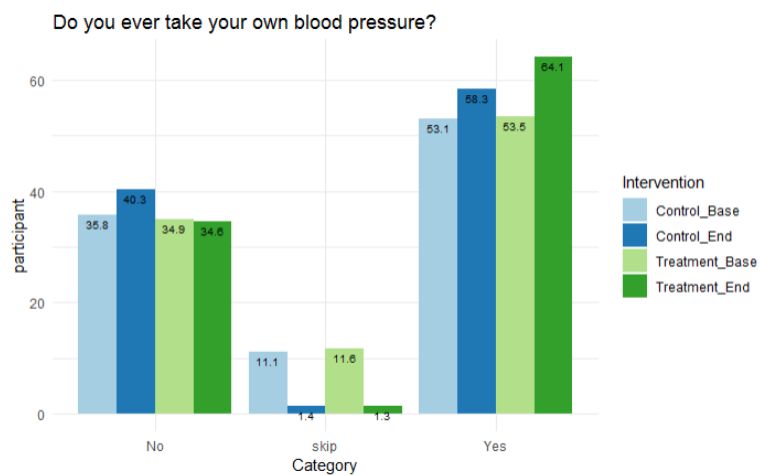**(a) The first survey question: In general, would you say your health is?**

This question was asked both Treatment and Control participants and the analysis of the result shows that 4.9% control baseline mentioned "Excellent" but 4.1% control endpoint mention "Excellent" which is clearly decline of the health condition. On the other hand, it is increase from 2.3% from Treatment baseline to 7.7% in Treatment
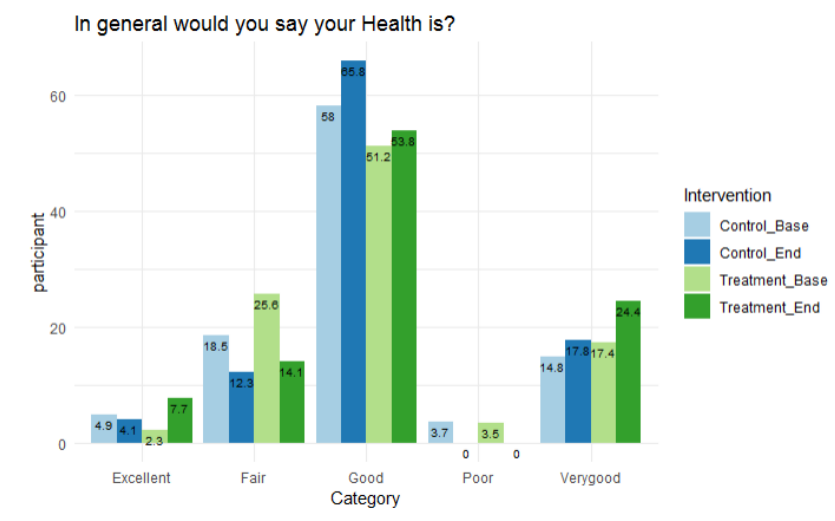
endpoint. Similarly, 14.8% control baseline mentioned "Verygood" where control endpoint mentioned 17.8%. It shows increase general health condition 3%. On the other hand, it is increase from 17.4% from Treatment baseline to 24.4% in Treatment endpoint which is the increase of 7%. We can also look the category "Fair" in the graph where it shows that the improvement of general health condition from treatment base to treatment endpoint much better that control baseline to control endpoint.

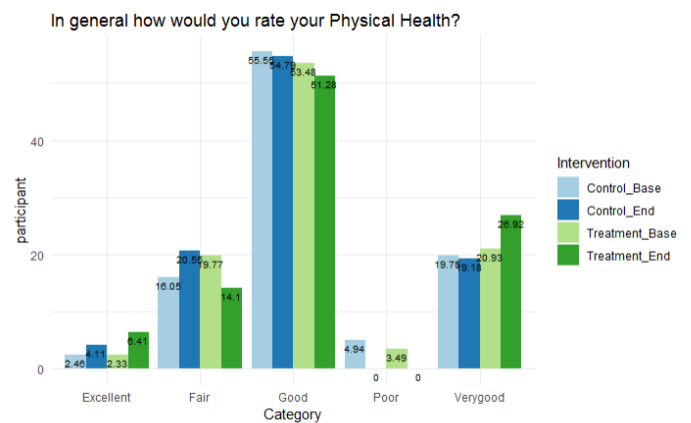**(b) Survey question: Do you ever take your own blood pressure?**

The result shows that 53.1% mentioned "Yes" in Control Base where 58.3% mentioned same in Control Endpoint where 5.2% increase. On the other hand, 53.5% mention "Yes" in Treatment Base where 64.1% mentioned same in Treatment Endpoint. This suggest that more people measure their own blood pressure in Treatment Base to Treatment Endpoint compare to Control base to Control Endpoint point. Similar result we see from the question answered "No" to the survey.

(c) Survey question: In general, how would you rate your Physical Health?

The result shows that 2.46% control baseline mentioned "Excellent" and 4.11% control endpoint mention same which is 1.64% increase of the health condition. On the other hand, it is increase from 2.33% from Treatment baseline to 6.41% in Treatment endpoint for the category "Excellent" which is 4.08% increase of the health condition. Similarly, 19.75% control baseline mentioned "Verygood" where control endpoint mentioned 19.18%. It shows physical health condition decline 0.57%. On the other hand, it is increase from 20.93% from Treatment baseline to 26.92% in Treatment endpoint which is the increase of 6%. We can also look the category "Fair" in the graph which also suggest that the physical

health condition from treatment base to treatment endpoint much better than control baseline to control endpoint.

**(d) Survey question: How well you managing your high blood pressure?**

The result shows that 8.6% control baseline mentioned "Very well" but 4.2% control endpoint mention same which is 4.4% decrease of managing high blood pressure on that category. On the other hand, it is increase from 9.4% from Treatment baseline to 10.3% in Treatment Endpoint for the category "Very well" which is 0.9% increase of
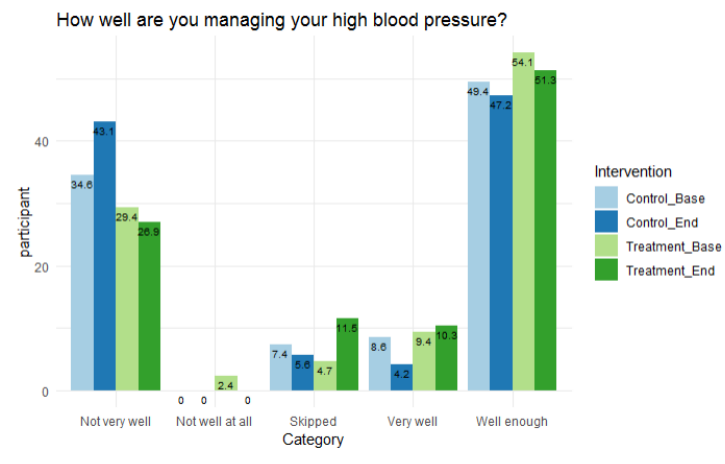
managing high blood pressure on that category. Similarly, 34.6% control baseline mentioned "Not very well" where control endpoint mentioned 43.1% which means 8.5% more people are not managing blood pressure well from Control baseline to Control Endpoint. On the other hand, 29.4% Treatment baseline mentioned "Not very well" where Treatment endpoint mentioned 26.9% which means 2.5% less people are not managing blood pressure well from Treatment Baseline to Treatment Endpoint. The category "Well enough" also suggest the same.

(e) Survey question: To what extend to you carry out your everyday physical activity?

The result shows that 25.9% Control Baseline mentioned "Mostly" and 26% Control Endpoint mention same which is 0.1% increase of daily physical activity. On the other hand, it is increase
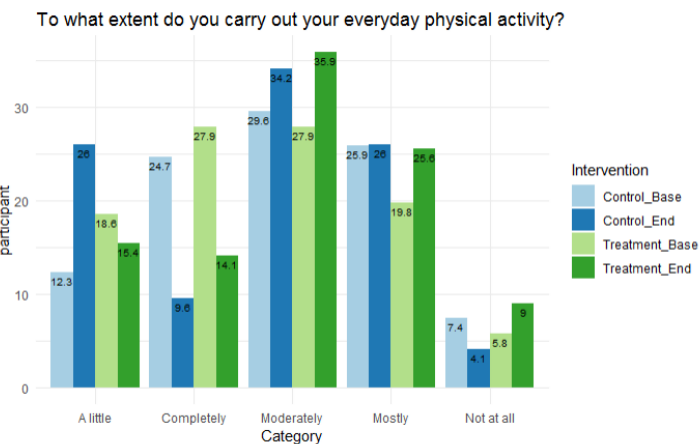
from 19.8% from Treatment Baseline to 25.6% in Treatment Endpoint for the category "Mostly" which is 5.8% increase of daily physical activity. Similarly, 29.6% Control Baseline mentioned "Moderately" where Control Endpoint mentioned 34.2% which shows 4.6% increase of daily physical activity on that category. On the other hand, it increases from 27.9% from Treatment baseline to 35.9% in Treatment Endpoint which shows 8% increase of daily physical activity on that category. We can also look the category "A little" and "Not at all" in the graph which also suggest that performing daily physical exercise from treatment base to treatment endpoint much better than control baseline to control endpoint.

**(f) Survey question: How much time do you usually spend doing moderate physical activity?**

The result shows that 50 participants used to spend doing moderate physical activity daily in Control Baseline, but it declined 36 participants in Control Endpoint. On the other hand, 47 participants used to spend doing moderate physical activity daily in Treatment Baseline and it increased 59 participants in Treatment Endpoint.
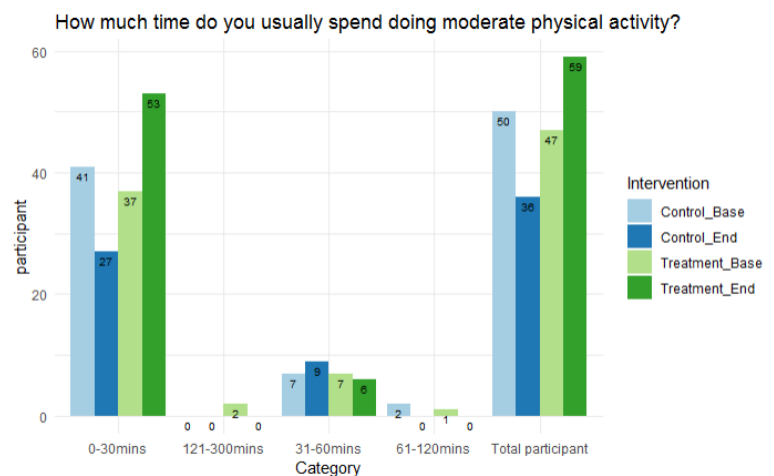
Similarly, 41 participants used to spend doing moderate physical activity for 0-30 minutes daily in Control Baseline, but it declined 27 participants in Control Endpoint. On the other hand, 37 participants used to spend doing moderate physical activity for 0-30 minutes daily in Treatment Baseline and it increased 53 participants in Treatment Endpoint.

Analysis on BMI Comparison between Control and Treatment participant of Round 1 and Round 2:

From the result of the survey question analysis, it is very clear that CHW helps hypertensive patients to manage and maintain their high blood pressure. I have done analysis to compare BMI between Control and Treatment participant for both Round 1 and Round 2 participants. In Round 1, average BMI of Control participants increases Basement to Treatment from 28.139 to 28.556. On the other hand, average BMI of Treatment participants decreases Basement to Treatment from 28.122 to 28.061.

Similarly, In Round 2, average BMI of Control participants increases Basement to Treatment from 27.8 to 27.99. On the other hand, average BMI of Treatment participants decreases Basement to Treatment from 28.1041 to 27.428.
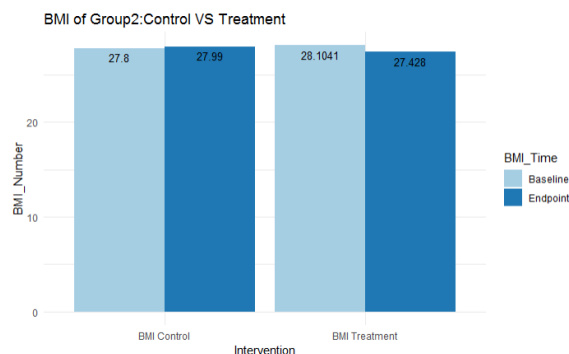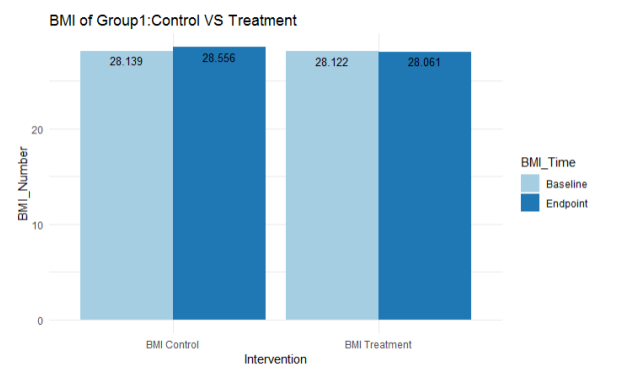
Analysis on Blood Pressure Comparison between Control and Treatment participant of Round 1:
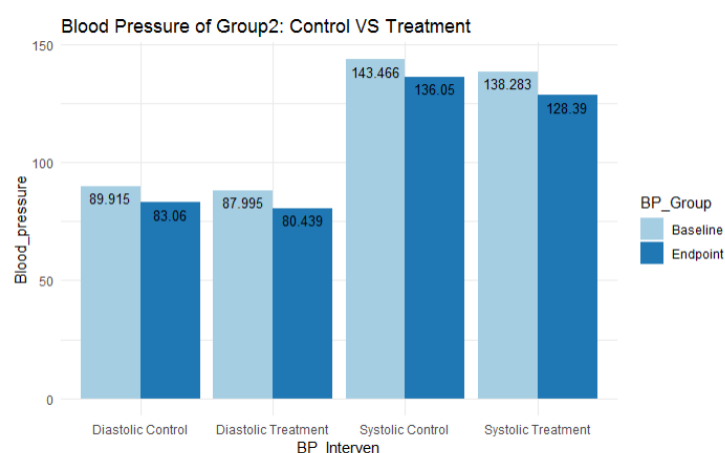
In Round 1, average diastolic blood pressure of Control participants increases Basement to Treatment from 88.049 to 88.459. On the other hand, average diastolic blood pressure of Treatment participants decreases Basement to Treatment from 85.379 to 82.495. Average
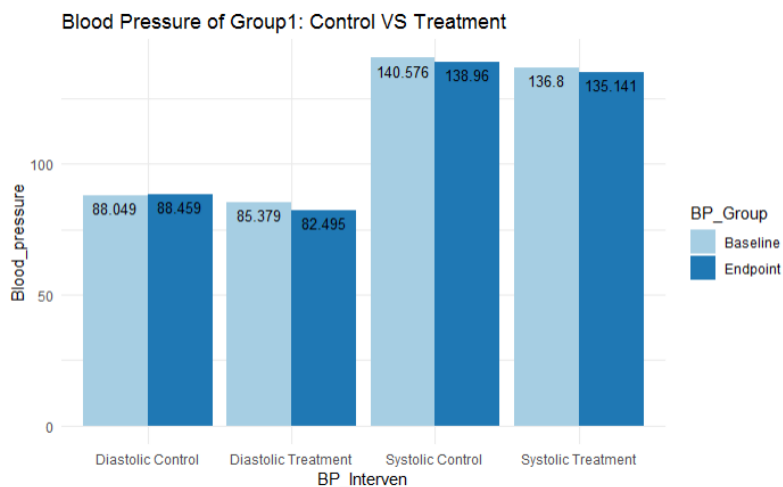
systolic blood pressure of Control participant decreases from 140.576 to 138.96 which is 1.61. And average systolic blood pressure of Treatment participant decreases from 136.8 to 135.141 which is 1.66. The decrease rate of Treatment participant is more than the control participant for systolic blood pressure.

Analysis on Blood Pressure Comparison between Control and Treatment participant of Round 2:

In Round 2, average diastolic blood pressure of Control participants decreases Basement to Treatment from 89.915 to 83.06. The decrease amount is 6.855. On the other hand, average diastolic blood pressure of Treatment participants decreases Basement to Treatment from 87.995 to 80.439. The decrease amount is 7.556. The

decrease rate of Treatment participant is more than the control participant for diastolic blood pressure. Average systolic blood pressure of Control participants decreases Basement to Treatment from 143.466 to 136.05. The decrease amount is 7.416. On the other hand, average systolic blood pressure of Treatment participants decreases Basement to Treatment from 138.283 to 128.39. The decrease amount is 9.893. The decrease rate of Treatment participant is more than the control participant for systolic blood pressure as well.

Data Analysis result from CSP data:

Preliminary results from baseline and 12-month KOT data at Assafa and Madina (n=25) show that mean systolic blood pressure (SBP) decreased from 128.8 at baseline to 120.2 at 12 months (p=0.027). Mean

diastolic blood pressure (DBP) decreased from 79.0 at baseline to 77.3 at 12-months (p=0.415). BP control (using cutoff of 140 for SBP and 90 for DBP) was 72% at baseline and 80% at 12-months (p=0.508). Health related self-efficacy (range of 1-4, 4=highest self-efficacy) also increased between baseline and 12-month follow-up; the mean score increased from 3.46 to 3.74 (p=0.002).

The program has also implemented nutrition strategies at all 4 mosques in Lower East Side and Sunset Park. During the month of Ramadan, at the sites in Lower East Side and Sunset Park, REACH FAR community health workers conducted 6 nutrition workshops where they discussed easy ways of adopting healthy foods. Through these workshops, about 1,000 congregants were reached. In addition, program staff members held more than 50 fruit distribution events at these sites. CSP sponsored fruits for the congregants at these events and the mosque members were delighted to have these kinds of health promotion activities and services. CSP staff members provided individual counseling on healthy eating and distributed healthy messages. Culturally tailored health materials such as approximately 250 plate planners, and 80 blood pressure booklets were distributed. Mosque leaders warmly hosted the events and helped throughout.

A total of 153 cross-sectional surveys were collected from four mosque sites at baseline; to date, a total of 97 follow-up surveys have been collected from two sites with remaining follow-up surveys will be collected by May, 2019. Survey participants are predominantly men (99%), reflecting the demographics of the mosques' congregations. Preliminary results found improvements in self-reported measures related to health and healthy food availability. At baseline, 28.9% participants responded, "very good" or "excellent" to the question "How healthy is your overall diet", and at the 12-month follow-up, 32.3% responded "very good" or "excellent" (p=0.637). Additionally, at baseline, 13.5% of the respondents agreed with the question "It is difficult to choose healthy food options served at my mosque," while at follow-up, 8.5% agreed (p=0.298). For the question "The meals at my mosque do not serve healthy

options," at baseline, 21.1% agreed with this statement, and at follow-up, 8.5% agreed (p=0.021). Additionally, at baseline, 83.9% reported that fruit was always or usually available, compared to 89.7% at 12-month follow-up (p=0.297).

Conclusion:

Treatment patient in both Round1 and Round2 received in language educational classes, educational materials, phone follow up. From the analysis of IMPACT data, it was very clear that Treatment patient has much more improvement on managing high blood pressure, BMI and maintain healthy food, physical exercise regularly. Experienced CHW from NYU helps uncontrolled hypertensive Treatment patients to manage and control their hypertension. On the other hand, Control participant did not receive any of the care from the CHW. Therefore, overall health condition of treatment patient is much better than control patient. The analysis suggests that culturally tailored-education classes, education materials, one on one phone follow up and one on one in person visits helps hypertensive patients to lower their stress, BMI, High blood pressure. And in the long run, culturally and linguistically tailored clinic-based resources help participant to lower the Cardiovascular disease, CVD risk reduction. CSP data analysis results show that implementing nutrition strategies at mosques increases access to healthful diets for the congregants. While not all the measures show a statistically significant change, the change in measures indicates the expected direction of change, and we anticipate that a larger sample will allow for statistical significance.

R coding:

```
# BMI Comparison Between Control and Treatment Participant of Group1

library(ggplot2)

df <- data.frame(Intervention=rep(c("BMI Control", "BMI Treatment"), each=2),
          BMI_Time=rep(c("Baseline", "Endpoint"),2),
          BMI_Number=c(28.139, 28.556, 28.122, 28.061))
head(df)

ggplot(data=df, aes(x=Intervention, y=BMI_Number, fill=BMI_Time)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=BMI_Number), vjust=1.5, color="black",
        position = position_dodge(.9), size=3.5)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="BMI of Group1:Control VS Treatment")

# BMI Comparison Between Control and Treatment Participant of Group2


df <- data.frame(Intervention=rep(c("BMI Control", "BMI Treatment"), each=2),
          BMI_Time=rep(c("Baseline", "Endpoint"),2),
          BMI_Number=c(27.8, 27.99, 28.1041, 27.428))
head(df)
ggplot(data=df, aes(x=Intervention, y=BMI_Number, fill=BMI_Time)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=BMI_Number), vjust=1.5, color="black",
        position = position_dodge(.9), size=3.5)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="BMI of Group2:Control VS Treatment")



# Blood Pressure Comparison Between Control and Treatment Participant of Group1

df <- data.frame(BP_Interven=rep(c("Systolic Control", "Diastolic Control","Systolic
Treatment","Diastolic Treatment"), each=2),
          BP_Group=rep(c("Baseline", "Endpoint"),2),
          Blood_pressure=c(140.576, 138.96, 88.049,88.459,136.8,135.141,85.379,82.495))
head(df)

ggplot(data=df, aes(x=BP_Interven, y=Blood_pressure, fill=BP_Group)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
```

```
  geom_text(aes(label=Blood_pressure), vjust=1.5, color="black",
        position = position_dodge(.9), size=3.5)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="Blood Pressure of Group1: Control VS Treatment")
```

Blood Pressure Comparison Between Control and Treatment Participant of Group2

```
df <- data.frame(BP_Interven=rep(c("Systolic Control", "Diastolic Control","Systolic
Treatment","Diastolic Treatment"), each=2),
            BP_Group=rep(c("Baseline", "Endpoint"),2),
            Blood_pressure=c(143.466, 136.05, 89.915,83.06,138.283,128.39,87.995,80.439))
head(df)

ggplot(data=df, aes(x=BP_Interven, y=Blood_pressure, fill=BP_Group)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=Blood_pressure), vjust=1.5, color="black",
        position = position_dodge(.9), size=3.5)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="Blood Pressure of Group2: Control VS Treatment")
```

Piechart of Participant distribution Among CHW in Round1

```
x <- c(3, 33, 27,37,8,44,15)

CHW <-  c("HZ","MA","MH","MJU","SS","SZ","None")

pct<- round(100*x/sum(x), 1)

label<-paste(CHW,pct)
label<-paste(label,"%",sep="")

# Plot the chart.
pie(x, labels = label, main = "Round1: Participant Distribution Among CHW",col = rainbow(length(x)))
legend("topright", c("HZ","MA","MH","MJU","SS","SZ","None"), cex = 0.9,
  fill = rainbow(length(x)))
```

Piechart of Participant distribution Among CHW in Round2

```
x <- c(26, 14, 18,13,33,33)

CHW <-  c("HZ","MA","MH","MJU","SS","SZ")

pct<- round(100*x/sum(x), 1)
```

```
label<-paste(CHW,pct)
label<-paste(label,"%",sep="")

# Plot the chart.
pie(x, labels = label, main = "Round2: Participant Distribution Among CHW",col = rainbow(length(x)))
legend("topright", c("HZ","MA","MH","MJU","SS","SZ"), cex = 0.9,
  fill = rainbow(length(x)))


#Participant Distribution Among CHW in Round1 and Round2

df <- data.frame(CHW=rep(c("HZ", "MA","MH","MJU", "SS", "SZ"), each=2),
          Round=rep(c("Round1", "Round2"),2),
          participant=c(3, 26, 33,14,27,18,37,13, 8 ,33, 44,33))
head(df)

ggplot(data=df, aes(x=CHW, y=participant, fill=Round)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=participant), vjust=1.5, color="black",
        position = position_dodge(.9), size=3.5)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="Participant Distribution Among CHW in Round1 and Round2")


#Program Introduction: Round1 VS Round2

df <- data.frame(Category=rep(c("Control", "Treatment","Male","Female"), each=2),
          Round=rep(c("Round1", "Round2"),2),
          participant=c(81, 64, 86,73,77,63,90,74))
head(df)

ggplot(data=df, aes(x=Category, y=participant, fill=Round)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=participant), vjust=1.5, color="black",
        position = position_dodge(.9), size=3.5)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="Program Introduction: Round1 VS Round2")
```

Survey Question Comparison between Control and Treatment Participant

```
#In general how would you rate your Physical Health?

df <- data.frame(Category=rep(c("Excellent", "Verygood","Good","Fair","Poor"), each=4),
          Intervention=rep(c("Control_Base","Control_End","Treatment_Base","Treatment_End"),5),
```

```
                participant=c(2.46, 4.11, 2.33, 6.41,
                              19.75, 19.18, 20.93, 26.92, 55.55,
                              54.79, 53.48, 51.28,16.05, 20.55,
                              19.77, 14.10, 4.94, 0, 3.49, 0))
head(df)

ggplot(data=df, aes(x=Category, y=participant, fill=Intervention)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=participant), vjust=1.5, color="black",
        position = position_dodge(.9), size=2.6)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="In general how would you rate your Physical Health?")


#Do you ever take your own blood pressure?

df <- data.frame(Category=rep(c("No", "skip","Yes"), each=4),
          Intervention=rep(c("Control_Base","Control_End","Treatment_Base","Treatment_End"),3),
          participant=c(35.8, 40.3    ,34.9, 34.6, 11.1, 1.4, 11.6, 1.3, 53.1, 58.3, 53.5, 64.1))
head(df)

ggplot(data=df, aes(x=Category, y=participant, fill=Intervention)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=participant), vjust=1.5, color="black",
        position = position_dodge(.9), size=2.6)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="Do you ever take your own blood pressure?")


#In general would you say your Health is?

df <- data.frame(Category=rep(c("Excellent", "Fair","Good","Poor", "Verygood"), each=4),
          Intervention=rep(c("Control_Base","Control_End","Treatment_Base","Treatment_End"),5),
          participant=c(4.9, 4.1, 2.3, 7.7, 18.5, 12.3, 25.6, 14.1, 58.0, 65.8,
                        51.2, 53.8, 3.7, 0.0, 3.5, 0.0, 14.8, 17.8, 17.4, 24.4))
head(df)

ggplot(data=df, aes(x=Category, y=participant, fill=Intervention)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=participant), vjust=1.5, color="black",
        position = position_dodge(.9), size=2.6)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="In general would you say your Health is?")
```

```r
#How well are you managing your high blood pressure?

df <- data.frame(Category=rep(c("Not very well", "Not well at all","Skipped", "Very well", "Well
enough"), each=4),
        Intervention=rep(c("Control_Base","Control_End","Treatment_Base","Treatment_End"),5),
        participant=c(34.6, 43.1,   29.4,   26.9, 0.0,     0.0,    2.4,    0.0, 7.4,             5.6,
      4.7,    11.5, 8.6,            4.2,    9.4,    10.3, 49.4,            47.2,   54.1,   51.3))
head(df)

ggplot(data=df, aes(x=Category, y=participant, fill=Intervention)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=participant), vjust=1.5, color="black",
        position = position_dodge(.9), size=2.6)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="How well are you managing your high blood pressure?")


#To what extent are you able carry out your everyday physical activity?

df <- data.frame(Category=rep(c("A little", "Completely","Moderately", "Mostly", "Not at all"),
each=4),
        Intervention=rep(c("Control_Base","Control_End","Treatment_Base","Treatment_End"),5),
        participant=c(12.3, 26.0,   18.6,   15.4, 24.7,     9.6,    27.9, 14.1, 29.6,            34.2,   27.9,
      35.9, 25.9, 26.0,           19.8,   25.6, 7.4,            4.1,    5.8,    9.0))
head(df)

ggplot(data=df, aes(x=Category, y=participant, fill=Intervention)) +
  geom_bar(stat="identity", position=position_dodge(),width=.9)+
  geom_text(aes(label=participant), vjust=1.5, color="black",
        position = position_dodge(.9), size=2.6)+
  scale_fill_brewer(palette="Paired")+
  theme_minimal()+
  labs(title="To what extent do you carry out your everyday physical activity?")

#How much time do you usually spend doing moderate physical activity?

df <- data.frame(Category=rep(c("Total participant", "0-30mins","31-60mins", "61-120mins", "121-
300mins"), each=4),
        Intervention=rep(c("Control_Base","Control_End","Treatment_Base","Treatment_End"),5),
        participant=c(50,    36,     47,     59, 41, 27, 37, 53, 7,        9, 7,            6, 2,   0,
      1,      0, 0,   0,      2,      0))
head(df)
```

References

1. Klatsky AL, Tekawa IS, Armstrong MA. Cardiovascular risk factors among Asian Americans. *Public health reports (Washington, DC : 1974).* 1996;111 Suppl 2(Suppl 2):62-64.
2. Lee JWR, Brancati FL, Yeh H-C. Trends in the prevalence of type 2 diabetes in Asians versus whites: results from the United States National Health Interview Survey, 1997–2008. *Diabetes care.* 2011:DC_100746.
3. Mohanty SA, Woolhandler S, Himmelstein DU, Bor DH. Diabetes and cardiovascular disease among Asian Indians in the United States. *Journal of general internal medicine.* 2005;20(5):474-478.
4. Barnes PM, Adams PF, Powell-Griner E. *Health characteristics of the Asian adult population: United States, 2004-2006.* US Department of Health & Human Services, Centers for Disease Control and …; 2008.
5. Fei K, Rodriguez-Lopez JS, Ramos M, et al. Peer Reviewed: Racial and Ethnic Subgroup Disparities in Hypertension Prevalence, New York City Health and Nutrition Examination Survey, 2013–2014. *Preventing chronic disease.* 2017;14.
6. Giambrone AE, Gerber LM, Rodriguez-Lopez JS, Trinh-Shevrin C, Islam N, Thorpe LE. Hypertension prevalence in New York City adults: unmasking undetected racial/ethnic variation, NYC HANES 2004. *Ethnicity & disease.* 2016;26(3):339.
7. Hayes L, White M, Unwin N, et al. Patterns of physical activity and relationship with risk markers for cardiovascular disease and diabetes in Indian, Pakistani, Bangladeshi and European adults in a UK population. *Journal of Public Health.* 2002;24(3):170-178.
8. Islam NS, Kwon SC, Wyatt LC, et al. Asian Americans in New York City Face Disparities in Diabetes Management Compared to Other Racial/Ethnic Minority Groups. *American journal of public health.* 2015;105(0 3):S443.
9. Islam NS, Wyatt LC, Kapadia SB, Rey MJ, Trinh-Shevrin C, Kwon SC. Diabetes and associated risk factors among Asian American subgroups in New York City. *Diabetes care.* 2013;36(1):e5-e5.
10. Stella SY, Kwon SC, Wyatt L, Islam N, Trinh-Shevrin C. Weighing in on the hidden Asian American obesity epidemic. *Preventive medicine.* 2015;73:6-9.
11. Ursua RA, Islam NS, Aguilar DE, et al. Predictors of hypertension among Filipino immigrants in the Northeast US. *Journal of community health.* 2013;38(5):847-855.
12. Yi SS, Islam N, Trinh-Shevrin C. Comment on Hsu et al. BMI Cut Points to Identify At-Risk Asian Americans for Type 2 Diabetes Screening. Diabetes Care 2015;38:150–158. *Diabetes Care.* 2015;38(6):e90-e90.
13. Yi SS, Thorpe LE, Zanowiak JM, Trinh-Shevrin C, Islam NS. Clinical characteristics and lifestyle behaviors in a population-based sample of Chinese and South Asian immigrants with hypertension. *American journal of hypertension.* 2016;29(8):941-947.
14. Islam NS, Tandon D, Mukherji R, et al. Understanding barriers to and facilitators of diabetes control and prevention in the New York City Bangladeshi community: a mixed-methods approach. *American journal of public health.* 2012;102(3):486-490.
15. Kandula NR, Lauderdale DS. Leisure time, non-leisure time, and occupational physical activity in Asian Americans. *Annals of epidemiology.* 2005;15(4):257-265.
16. Kim E-Y, Han H-R, Jeong S, et al. Does knowledge matter?: intentional medication nonadherence among middle-aged Korean Americans with high blood pressure. *Journal of Cardiovascular Nursing.* 2007;22(5):397-404.

17. Patel VV, Rajpathak S, Karasz A. Bangladeshi immigrants in New York City: a community based health needs assessment of a hard to reach population. *Journal of immigrant and minority health.* 2012;14(5):767-773.
18. Rianon NJ, Rasu RS. Metabolic syndrome and its risk factors in Bangladeshi immigrant men in the USA. *Journal of immigrant and minority health.* 2010;12(5):781-787.
19. Taira DA, Gelber RP, Davis J, Gronley K, Chung RS, Seto TB. Antihypertensive adherence and drug class among Asian Pacific Americans. *Ethnicity and Health.* 2007;12(3):265-281.
20. Williams ED, Stamatakis E, Chandola T, Hamer M. Physical activity behaviour and coronary heart disease mortality among South Asian people in the UK: an observational longitudinal study. *Heart.* 2011;97(8):655-659.
21. Burke LE, Dunbar-Jacob JM, Hill MN. Compliance with cardiovascular disease prevention strategies: a review of the research. *Annals of Behavioral Medicine.* 1997;19(3):239-263.
22. Hsu Y-H, Mao C-L, Wey M. Antihypertensive medication adherence among elderly Chinese Americans. *Journal of Transcultural Nursing.* 2010;21(4):297-305.
23. Li W-W, Stewart AL, Stotts N, Froelicher ES. Cultural factors associated with antihypertensive medication adherence in Chinese immigrants. *Journal of Cardiovascular Nursing.* 2006;21(5):354-362.
24. Wong CC, Mouanoutoua V, Chen M-J, Gray K, Tseng W. Adherence with hypertension care among Hmong Americans. *Journal of community health nursing.* 2005;22(3):143-156.
25. Han H-R, Kim K, Kim M. Evaluation of the training of Korean community health workers for chronic disease management. *Health education research.* 2006;22(4):513-521.
26. Abuelezam NN, El-Sayed AM, Galea S. The Health of Arab Americans in the United States: An Updated Comprehensive Literature Review. *Frontiers in Public Health.* 2018;6(262).
27. El-Sayed AM, Galea S. The health of Arab-Americans living in the United States: a systematic review of the literature. *BMC Public Health.* 2009;9(1):272.
28. Ackermann RT. From programs to policy and back again: the push and pull of realizing type 2 diabetes prevention on a national scale. *Diabetes care.* 2017;40(10):1298-1301.
29. Ahn S, Basu R, Smith ML, et al. The impact of chronic disease self-management programs: healthcare savings through a community-based intervention. *BMC Public Health.* 2013;13(1):1141.
30. Tsui EW, Wang G, Zahler A, Simoyan OM, White MV, Mckee M. A multilingual population health management program. *The Journal of ambulatory care management.* 2013;36(2):140-146.
31. Li S, Kwon SC, Weerasinghe I, Rey MJ, Trinh-Shevrin C. Smoking among Asian Americans: acculturation and gender in the context of tobacco control policies in New York City. *Health promotion practice.* 2013;14(5_suppl):18S-28S.
32. Ursua RA, Aguilar DE, Wyatt LC, et al. A community health worker intervention to improve management of hypertension among Filipino Americans in New York and New Jersey: a pilot study. *Ethnicity & disease.* 2014;24(1):67.
33. Trinh-Shevrin C, Kwon SC, Park R, Nadkarni SK, Islam NS. Moving the dial to advance population health equity in New York City Asian American populations. *American journal of public health.* 2015;105(S3):e16-e25.
34. Islam N, Nadkarni SK, Zahn D, Skillman M, Kwon SC, Trinh-Shevrin C. Integrating community health workers within Patient Protection and Affordable Care Act implementation. *Journal of public health management and practice: JPHMP.* 2015;21(1):42.

35.   Islam NS, Wyatt LC, Taher M, et al. A culturally tailored community health worker intervention leads to improvement in patient-centered outcomes for immigrant patients with type 2 diabetes. *Clinical Diabetes.* 2018:cd170068.

36.   Islam NS, Zanowiak JM, Wyatt LC, et al. Diabetes prevention in the New York City Sikh Asian Indian community: a pilot study. *International journal of environmental research and public health.* 2014;11(5):5462-5486.