Dealing with Diabetes During Disasters

STEFANIE C. NIGRO, PHARMD, BCACP, CDE ASSOCIATE CLINICAL PROFESSOR UCONN SCHOOL OF PHARMACY DECEMBER 12, 2020

1

Disclosures

I have no actual or potential financial conflicts related to this activity.

Learning Objectives Pharmacists & Technicians

At the conclusion of this presentation, the learner should be able to:

- 1. **Describe** the impact of previous disasters on glycemic control
- **2. Discuss** strategies for public health preparedness to address short term and long term needs of people with diabetes during disasters
- 3. Outline an emergency preparedness care plan for a patient with diabetes

3

Question:

For patients with diabetes, common causes for ER visits acutely after a disaster include all of the following **EXCEPT**:

- A. Retinopathy
- B. Hypoglycemia
- C. Diabetic ketoacidosis
- D. Diabetic foot infection

Question:

Which of the following should be part of an emergency kit for a patient with DM? **SELECT ALL THAT APPLY**

- A. List of active medications and supplements
- B. 3 months worth of medications
- C. Diabetes testing supplies
- D. Glucose tabs
- E. Water
- F. Soda











What is the impact to patients with diabetes?

- Levels of glycemic control (A1c) and weight were compared pre, during, and after the Gulf war in Tel-Aviv, Israel
- Patients with non-insulin dependent diabetes and insulin dependent diabetes were evaluated
- Stress and tension were cited as reasons for worsening control
- Levels returned to baseline after the war

Gulf War, 1991

Table 1. Glycated haemoglobin results (%) in patients before and after the Gulf Wa

	Male	NIDDM Group	Total	IDDM Group Male Female Total			
	wate	remarc	Total	marc	remate	Total	
n	46	20	66	5	11	16	
Period 1:	10.1 ± 2.1	10.1 ± 2.0	10.1 ± 2.0	9.5 ± 1.5	9.6 ± 2.0	10.0 ± 1.8	
Period 2:	10.8 ± 2.0	11.2 ± 2.0	10.9 ± 2.0	10.3 ± 1.7	10.2 ± 1.9	10.2 ± 1.8	
Period 3:	10.2 ± 2.0	10.5 ± 2.0	10.3 ± 2.0	9.4 ± 1.5	9.8 ± 2.4	9.7 ± 2.1	

Scheffe F-test for multiple comparison shows that period 1 is significantly different from period 2 (F = 28.806, p < 0.05) and period 2 is significantly different from period 3 (F = 17.48, p < 0.05). No significant difference was found between period 1 and period 3 (F = 1.407, p = NS). Period 1: before the war; period 2: during the war; period 3: after the war.

Table 2. Mean and standard deviations of weight (kg) in the three periods for each group

	Male	NIDDM Group Female	Total	Male	IDDM Group Female	Total
n	46	20	66	5	11	16
Period 1: Mean	78.7 ± 10.3	70.1 ± 8.9	76.1 ± 10.6	67.4 ± 10.6	61.3 ± 14.6	63.2 ± 13.4
Period 2: Mean	79.9 ± 10.4	72.0 ± 10.0	76.0 ± 11.0	69.2 ± 10.5	62.6 ± 15.1	64.7 ± 14.0
Period 3: Mean	78.3 ± 10.4	70.0 ± 9.6	75.8 ± 11.0	67.7 ± 10.4	61.6 ± 14.4	63.5 ± 13.2
Scheffe F-test for mult significantly different f	tiple comparisons sh rom period 3 ($F = 2$	ows that period 1 is 34.199 , $p < 0.05$).	s significantly differ No significant differe	ent from period 2 (ence was found betw	F = 27.437, p < 0. ween period 1 and	05) and period 2 period 3 ($F = 0$.

Rubenstein A. Diabetic Medicine. 1993;10:774-776

11



What is the impact to patients with diabetes?

- Patients with diabetes in Kobe were compared to age-matched controls with diabetes in Osaka
- A1c levels were significantly higher in the patients from Kobe compared to Osaka following the earthquake
- A1c levels peaked 3 to 4 months after the earthquake
- Believed to be highly influenced by psychological stress

What is the impact to patients with diabetes?

- Levels of glycemic control (A1c), blood pressure, and lipids were compared 6 months before and 6-16 months after Hurricane Katrina
- Patient charts from 3 different diabetes care centers were evaluated
- The impact effected diabetes management, exacerbated disparities, and had health and economic implications

Hurricane Katrina, 2005 (Category 5)

Impact of a natural disaster on diabetes

Table 2—Clinical and laboratory parameters among diabetic patients in three health care systems before and after Hurricane Katrina (28 February 2005–27 August 2005 and 1 March 2006–31 December 2006)

	n	Pre-Katrina mean value	Post-Katrina mean value	Difference in mean value	Patients with increased values*	Patients with decreased values†	Patients had no changes‡	P for change in mean value
A1C (%)								
TUHC	452	7.5 ± 1.6	7.4 ± 1.8	-0.1 ± 1.4	107 (23.67)	181 (40.04)	164 (36.28)	0.108
VA	748	7.3 ± 1.6	7.4 ± 1.6	0.1 ± 1.4	275 (36.76)	209 (27.94)	264 (35.29)	0.193
MCLNO	584	7.7 ± 1.9	8.1 ± 2.1	0.3 ± 1.8	279 (46.97)	149 (25.08)	166 (27.95)	< 0.01
Total	1,794	7.5 ± 1.7	7.6 ± 1.9	0.1 ± 1.6	661 (36.85)	539 (30.04)	594 (33.11)	< 0.01
Systolic blood pressure (mmHg)								
TUHC	262	130.0 ± 17.7	137.5 ± 21.6	7.5 ± 20.8	145 (55.34)	76 (29.01)	41 (15.65)	< 0.01
VA	723	130.7 ± 16.6	143.7 ± 18.6	13.0 ± 20.5	505 (69.85)	158 (21.85)	60 (8.30)	< 0.01
MCLNO	142	132.2 ± 17.7	136.0 ± 19.2	3.8 ± 17.1	84 (59.15)	41 (28.87)	17 (11.97)	< 0.01
Total	1,127	130.7 ± 17.0	141.2 ± 20.0	10.5 ± 20.4	734 (65.13)	275 (24.40)	118 (10.47)	< 0.01
Diastolic blood pressure (mmHg)								
TUHC	262	74.9 ± 11.0	76.3 ± 12.8	1.4 ± 13.7	115 (43.89)	91 (34.73)	56 (21.37)	0.093
VA	723	68.8 ± 12.0	74.2 ± 12.0	5.4 ± 12.8	418 (57.81)	183 (25.31)	122 (16.87)	< 0.01
MCLNO	142	75.0 ± 10.7	75.5 ± 11.8	0.5 ± 11.6	61 (42.96)	52 (36.62)	29 (20.42)	0.597
Total	1,127	71.0 ± 12.0	74.9 ± 12.2	3.9 ± 13.1	594 (52.71)	326 (28.93)	207 (18.37)	< 0.01
LDL cholesterol (mg/dl)								
TUHC	221	103.4 ± 32.6	115.5 ± 39.1	12.1 ± 34.6	141 (63.80)	45 (20.36)	35 (15.84)	< 0.01
VA	607	97.1 ± 31.9	104.3 ± 36.2	7.2 ± 32.7	317 (52.22)	194 (31.96)	96 (15.82)	< 0.01
MCLNO	343	107.9 ± 40.2	107.7 ± 41.4	-0.2 ± 39.6	155 (45.19)	142 (41.4)	46 (13.41)	0.948
Total	1,171	101.4 ± 35.0	107.4 ± 38.5	6.0 ± 35.5	613 (52.35)	381 (32.54)	177 (15.12)	< 0.01
HDL cholesterol (mg/dl)								
TUHC	228	40.4 ± 13.6	43.5 ± 14.2	3.1 ± 9.5	120 (52.63)	45 (19.74)	63 (27.63)	< 0.01
VA	543	42.1 ± 10.5	38.0 ± 11.9	-4.1 ± 8.6	91 (16.76)	338 (62.25)	114 (20.99)	< 0.01
MCLNO	343	47.6 ± 13.6	44.2 ± 14.0	-3.4 ± 8.4	68 (19.83)	190 (55.39)	85 (24.78)	< 0.01
Total	1,114	43.5 ± 12.5	41.0 ± 13.4	-2.4 ± 9.2	279 (25.04)	573 (51.44)	262 (23.52)	< 0.01
Triglycerides (mg/dl)								
TUHC	233	153.2 ± 99.6	158.2 ± 118.0	5.1 ± 111.7	98 (42.06)	101 (43.35)	34 (14.59)	0.491
VA	543	172.8 ± 134.9	161.4 ± 108.2	-11.4 ± 119.9	206 (37.94)	247 (45.49)	90 (16.57)	0.027
MCLNO	344	147.1 ± 104.5	154.6 ± 203.2	7.5 ± 173.9	130 (37.79)	154 (44.77)	60 (17.44)	0.422
Total	1,120	160.8 ± 119.8	158.7 ± 145.7	-2.1 ± 137.5	434 (38.75)	502 (44.82)	184 (16.43)	0.601

13

Key lessons learned from previous disasters

Disaster planning/coordinated relief efforts are often insufficient

- Lack of access to medications is the most pressing issue facing patients during/ after a disaster
- Patient (and provider) education and preparedness planning is lacking
- Older adult populations are most vulnerable to declining health after a disaster
- Disaster planning should include psychosocial interventions for patients with chronic diseases





"If you fail to plan, you are planning to fail" - Benjamin Franklin



HOW CAN PHARMACISTS HELP PATIENTS PREPARE FOR NATURAL DISASTERS?

Addressing short-term needs: Access to medication

BEFORE

- Use medication synchronization programs
- For chronic meds, get 90-day supplies
- Stockpile 5-14 days worth of meds
- Invest in watertight containers and coolers for medication storage



DURING/AFTER

- Contact drug plan for extended/emergency supplies
- Inquire about samples from provider's office
- Inquire with local community organizations to see what types of supplies have been donated
- Emergency legislative acts

Addressing short-term needs: Hypoglycemia

SIGNS AND SYMPTOMS



MANAGEMENT

Apply the 15:15 rule

- Check glucose. If < 70 mg/dL...
- Consume 15-20 g of carb (4 oz. or ½ cup of fruit juice, 1 tbsp sugar, 3-4 glucose tabs, etc.)
- Recheck glucose 15 minutes later
- Repeat until glucose normalizes

Severe hypoglycemia (< 54 mg/dL) – requires assistance from another person; often cannot be treated with oral carbs due to state of unconsciousness

 Glucagon kit → make sure caregivers & family know how to use

19

Addressing short-term needs: Hyperglycemia

SIGNS AND SYMPTOMS



MANAGEMENT

Make sure all patients have a <u>sick day plan</u>:

1. Test your blood sugar every 2 – 4 hours.

- 2. Continue to take your diabetes medications as prescribed.
- 3. Drink plenty of sugar-free liquids to prevent dehydration.
- 4. Eat your regular meal plan (if possible) to prevent hypoglycemia.
- 5. Check urine ketones if you have type 1 diabetes and/or blood sugars that remain elevated over 250 mg/dL.
- 6. Notify your primary care provider (PCP) that you are sick. Your PCP can provide you additional information about when to seek emergency care and how to safely adjust your medications if needed.

Addressing short-term needs: Dehydration & infection

DEHYDRATION

- Stay well hydrated
 - Water
 - Sugar-free liquids
- Avoid strenuous activity
- Avoid extreme heat environments

INFECTION RISK

- Make sure vaccines are up-to-date
 Influenza, pneumococcal, Hepatitis B, and others
- Bathe regularly
- Practice hand and oral hygiene
- Sterilize injection sites/use new needles
- Wear protective shoes and masks

21

Addressing short-term needs: Switching between insulin preparations

Clinical scenario	Insulin conversions
NPH \rightarrow detemir	1:1 conversion given once daily
NPH \rightarrow glargine U-100, glargine U-300, degludec	Once daily NPH: 1:1 conversion given once daily Twice daily NPH: 80% of TDD given once daily
Glargine $\leftarrow \rightarrow$ detemir	1:1 conversion
Glargine U-100 OR detemir → glargine U-300 OR degludec U-100 or U-200	1:1 conversion given once daily
Glargine U-100 OR detemir → NPH	1:1 conversion; give NPH twice a day Can consider 20% dose reduction to be conservative
Rapid OR short acting $\leftarrow \rightarrow$ short OR rapid acting	1:1 conversion; watch for meal timing









Addressing long-term needs: Community resources

• Patients with special needs should register with their respective towns/cities if possible

- Town webpages provide local information on shelters, locations for showering, charging stations, internet access, water, food pantries, and more
- State/government webpages provide information on how to prepare for emergencies
- Shelter information available at: <u>https://www.redcross.org/get-help/disaster-relief-and-recovery-services/find-an-open-shelter.html</u>
- 1-800-DIABETES for patient support and information
- 1-314-INSULIN for providers to request support or report supply shortages
- 1-800-985-5990 for the Disaster Distress Hotline



















Summary

- Patients with diabetes are at increased risk of complications from natural disasters
- The impact will be determined by a variety of factors
- Proper planning helps patients build self-efficacy and resilience
- Pharmacists can help educate patients and build preparedness plans
- Greater efforts are needed for improving the infrastructure/coordinating relief efforts



Dealing with Diabetes During Disasters

FEEL FREE TO EMAIL ANY QUESTIONS TO: <u>STEFANIE.NIGRO@UCONN.EDU</u>