Dealing with Diabetes During Disasters

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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

**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

Dealing with Disasters

Disaster impact influenced by:

- Size
- Type
- Duration
- Local infrastructure
- Socioeconomic factors
- Nature of the affected area
- People's experiences with disasters
Survivors of disasters are often left without:

- Means of communication or transportation
- Electricity / refrigeration
- Access to water
- Access to shelter
- Access to (healthy) food
- Access to (healthy) food
- Access to meds / medical care

Pause and ponder

Based on your experience, what has been the greatest threat to patient care during the COVID-19 pandemic?
What is the impact to patients with diabetes?

- Stress
- Lack of access

Worsening of glycemic control
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

<p>| Table 1. Glycated hemoglobin results (%) in patients before and after the Gulf War |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
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<tbody>
<tr>
<td>n</td>
<td>46</td>
<td>20</td>
<td>66</td>
<td>5</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>Period 1</td>
<td>10 ± 2.3</td>
<td>10 ± 2.0</td>
<td>10 ± 2.0</td>
<td>9.3 ± 1.5</td>
<td>9.6 ± 2.0</td>
<td>10.0 ± 1.8</td>
</tr>
<tr>
<td>Period 2</td>
<td>10.8 ± 2.0</td>
<td>11.2 ± 2.0</td>
<td>10.9 ± 2.0</td>
<td>10.3 ± 1.7</td>
<td>10.2 ± 1.9</td>
<td>10.2 ± 1.8</td>
</tr>
<tr>
<td>Period 3</td>
<td>10.2 ± 2.0</td>
<td>10.5 ± 2.0</td>
<td>10.3 ± 2.0</td>
<td>9.4 ± 1.5</td>
<td>9.8 ± 2.4</td>
<td>9.7 ± 2.1</td>
</tr>
</tbody>
</table>

Schiff's test for multiple comparisons showed that period 1 is significantly different from period 2 (p = 0.006, p < 0.05) and period 2 is significantly different from period 3 (p = 0.001, p < 0.05). No significant difference was found between period 1 and period 3 (p = 1.437, p = NS).

Kobe Earthquake, 1995 (Magnitude 7.2)

<p>| Table 2. Means and standard deviations of weight (kg) in the three periods for each group |
|-----------------------------------------------|-----------------------------|-----------------------------|-----------------------------|</p>
<table>
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<td>11</td>
<td>16</td>
</tr>
<tr>
<td>Period 1: Mean</td>
<td>79.7 ± 10.3</td>
<td>76.1 ± 9.9</td>
<td>76.1 ± 10.5</td>
<td>67.4 ± 15.6</td>
<td>63.1 ± 14.6</td>
<td>62.2 ± 13.4</td>
</tr>
<tr>
<td>Period 2: Mean</td>
<td>79.9 ± 10.4</td>
<td>72.0 ± 10.0</td>
<td>75.0 ± 11.0</td>
<td>69.3 ± 16.5</td>
<td>62.6 ± 15.1</td>
<td>64.7 ± 14.0</td>
</tr>
<tr>
<td>Period 3: Mean</td>
<td>76.3 ± 10.4</td>
<td>70.0 ± 9.6</td>
<td>73.8 ± 11.0</td>
<td>67.7 ± 16.4</td>
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Schiff's test for multiple comparisons shows that period 1 is significantly different from period 2 (p = 0.001, p < 0.05) and period 2 is significantly different from period 3 (p = 0.001, p < 0.05). No significant difference was found between period 1 and period 3 (p = 0.38, p = NS).


Inui A. Arch Intern Med. 1998;158:274-278
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 affected diabetes management, exacerbated disparities, and had health and economic implications

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
Preparation is key!

EARLY PLANNING MAY INCREASE THE RESILIENCY OF PEOPLE WITH DIABETES BEFORE, DURING, AND AFTER DISASTERS

“If you fail to plan, you are planning to fail”
- Benjamin Franklin
Pause and ponder

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

Addressing short-term needs: Hyperglycemia

SIGNS AND SYMPTOMS

MANAGEMENT

Make sure all patients have a sick day plan:

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

Addressing short-term needs:
Switching between insulin preparations

<table>
<thead>
<tr>
<th>Clinical scenario</th>
<th>Insulin conversions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPH → detemir</td>
<td>1:1 conversion given once daily</td>
</tr>
<tr>
<td>NPH → glargine U-100, glargine U-300, degludec</td>
<td>Once daily NPH: 1:1 conversion given once daily</td>
</tr>
<tr>
<td></td>
<td>Twice daily NPH: 80% of TDD given once daily</td>
</tr>
<tr>
<td>Glargine ↔ detemir</td>
<td>1:1 conversion</td>
</tr>
<tr>
<td>Glargine U-100 OR detemir → glargine U-300 OR degludec U-100 or U-200</td>
<td>1:1 conversion given once daily</td>
</tr>
<tr>
<td>Glargine U-100 OR detemir → NPH</td>
<td>1:1 conversion; give NPH twice a day</td>
</tr>
<tr>
<td></td>
<td>Can consider 20% dose reduction to be conservative</td>
</tr>
<tr>
<td>Rapid OR short acting ↔ short OR rapid acting</td>
<td>1:1 conversion; watch for meal timing</td>
</tr>
</tbody>
</table>
Addressing short-term needs: Insulin storage

- Insulin be stored in a refrigerator at approximately 36°F to 46°F.
- Most insulin products contained in vials supplied by the manufacturers (opened or unopened) may be left unrefrigerated at a temperature between 59°F and 86°F for up to 28 days and continue to work (See supplemental insulin handout)
  - An insulin product that has been altered for the purpose of dilution or by removal from the manufacturer’s original vial should be discarded within two weeks.
- Insulin loses some effectiveness when exposed to extreme temperatures.
- Under emergency conditions, you might still need to use insulin that has been stored above 86°F.
- Do not use insulin that has been frozen.
- Keep insulin away from direct heat and out of direct sunlight.

Available at: www.fda.gov/drugs/emergency-preparedness-drugs/information-regarding-insulin-storage-and-switching-between-products-emergency

Addressing long-term needs

- Infrastructure changes
- Community resources
- Formation of medical volunteer teams
- Continued education and training

Satoh, J. Diabetes Investig. 2019;10:1118-1142
Addressing long-term needs: Infrastructure

- Create flexible drug-dispensing policies
- Build partnerships among key stakeholders
- Investment in facilities, utilities, & communication networks
- Manage increased demand for healthcare workers
- Enhance patient follow-up and outreach

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: https://www.redcross.org/get-help/disaster-relief-and-recovery-services/find-an-open-shelter.html
- 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
Addressing long-term needs:
Volunteer groups

Team composed of various volunteer HCPs

Triage patients based on “risk”

High risk for hypoglycemia, DKA, death
Deteriorating glycemic control
Routine maintenance & depression screen

Addressing long-term needs:
Continuing education & training

Continued education programs for health care providers
Competency requirements for CDE training programs
Integration of emergency planning into DSME curricula
Develop training manuals for healthcare facilities

Satoh, J. Diabetes Investig. 2019;10:1118-1142
Pause and ponder

BASED ON YOUR EXPERIENCE(S), WHAT ARE OTHER WAYS DISASTER PLANNING & RELIEF EFFORTS CAN BE IMPROVED?

Developing an emergency preparedness care plan
Disaster Preparedness for patients

1. Obtain good diabetes education that emphasizes self-management skills and stresses management

2. Be up to date with all immunizations, including tetanus

3. Keep a waterproof and insulated disaster kit ready with:
   - Glucometer, test strips, and lancets
   - Medications, including insulin, syringes, and/or pen needles
   - Glucose tabs or quick source of sugar
   - Glucagon emergency kit
   - Prepared snacks
   - Ketone strips
   - Antibiotic ointments or creams (e.g., first aid kit)

Disaster Preparedness cont.

- Up-to-date, active medication list including doses and directions
- Photocopies of relevant medical information, particularly recent lab tests/procedures, if available
- List of contacts for local and/or national organizations / resources (See previous slides)

4. Evacuate early, if possible, taking the items listed above with you.
Other emergency preparedness considerations

- Wear protective clothing and wear sturdy shoes
- Stay well hydrated and avoid excessive outdoor activity in the heat
- Increase food and water intake during periods of increased exertion or physical activity
- Avoid periods of hunger and overindulgence
- Know nutrition options that will be useful in a disaster

Snack & food options

- Large box of unopened crackers
- One jar of peanut butter
- One small box of powdered milk
- One gallon of water per day
- Two packages of cheese and crackers or one jar of soft cheese
- One package dry unsweetened cereal or single serving boxes
- Six cans of sugar-free soda
- Six pack of canned fruit juice or sports drink
- Cans of tuna, salmon, chicken and nuts
- Can opener
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

Additional resources

- Lilly: 1-800-545-5979
- Sanofi-Aventis: 1-800-633-1610
- Novo Nordisk: 1-800-727-6500
- Omnipod: 1-800-591-3455
- Dexcom: 1-888-738-3646
- Medtronic: 1-800-633-8766
- Diabetes Disaster Response Coalition: 1-765-314-3372 or https://diabetesdisasterresponse.org
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FEEL FREE TO EMAIL ANY QUESTIONS TO:
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