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Developing Diabetes Pharmaceutical Care Databases (DPCD), Education and Teaching Documentation Record (ETDR) in Community Pharmacy

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INTRODUCTION

Diabetes mellitus (DM) is a chronic disease that affects approximately 14 million Americans (1-4). Almost 50% of these individuals are undiagnosed. Nearly 80 to 90% of patients with diabetes in this country have Type II or noninsulin-dependent diabetes mellitus (NIDDM) (1, 2). The prevalence of NIDDM increases with age; its diagnosis will continue to increase as the population grows older. Type I or insulin-dependent diabetes mellitus (IDDM) accounts for 5-10% of the diabetic population and develops during childhood or early adulthood (4). African Americans, Hispanics, Native Americans, and other minority groups have a higher prevalence of diabetes and are subject to more morbidity and mortality from the disease than are White (2).

DM is the fourth leading cause of death in the United States (1, 2). Among working-age adults, diabetes is the principal cause of new blindness and the primary cause of nontraumatic lower extremity amputations and endstage renal disease (1, 2, 5). Diabetes is a well-known for causing the following complications: cerebrovascular disease (stroke), peripheral vascular disease, ischemic heart disease, renal disease, ocular disease, and metabolic disorders (diabetes ketoacidosis, hyperglycemic hyperosmolar nonketotic coma). The direct and indirect economic costs associated with the management of diabetes are reported to be in excess of \$90 billion per year (1, 2). Current evidence (6) has suggested that maintaining normal blood glucose levels will result in preventing or lessening the degree of acute and chronic complications of diabetes. Education and empowerment were also major factors in the successes noted in this clinical trial.

Data from the U.S. Centers for Disease Control state that, 50-80% of the acute and chronic complications of diabetes are preventable and treatable with proper diabetes education and treatment; only 1 in 10 people with diabetes has

had any formal training in self-care; only 1 in 30 has an annual eye exam; and only 1 in 90 has a glucagon emergency kit (5). Considering all of these facts, pharmacists can play a unique role as interventionists/educators who can favorably impact this chronic disorder and its attendant morbidity and mortality. The goal should be the patient's understanding of the disease state and self-care techniques to achieve adequate control while maintaining a normal lifestyle (1, 7).

The profession of pharmacy has recently adopted the popular paradigm of pharmaceutical care. This concept, as originally espoused by Hepler and Strand in 1990, hold the profession responsible for achieving appropriate patient outcomes that will improve a patient's quality of life (8, 9). These outcomes are: (a) cure of a disease; (b) elimination or reduction of a patient's symptoms; (c) arresting or slowing of a disease process; and (d) preventing a disease or symptoms. To provide pharmaceutical care and ensure optimal outcomes, information gathered from patients must be recorded and stored in a manner that is easily accessible and usable (10). Acquiring patient information to develop pharmaceutical care databases is one of the most important steps in the delivery of pharmaceutical care (8, 10). Pharmacists can identify, assess, propose solutions, and prevent the patient's potential drug-related problems, as well as make appropriate triage decisions; prepare a pharmaceutical care plan, and identify patient variables that may affect the patient's therapeutic or toxic responses to therapy. This process will also help the pharmacist identify areas that need to be targeted for patient education and for other pharmacy interventions. Studies (3, 11) have shown a significant improvement in patient care (i.e., reduce the overall cost of disease as well as decrease both morbidity and mortality by enabling early detection and treatments of chronic complications) by documentation of the patient database, identification, and assessment area that require patient education.

Community pharmacists are well positioned to provide pharmaceutical care for the person with DM (1, 5, 7). They encounter DM patients five times more often than do physicians. These patients spend three to eight times more annually in the pharmacy than people without diabetes (5). Therefore, the community pharmacy can be a repository of patient information and diabetes care products and supplies. Pharmacists can monitor the patient's overall treatment plan and assist in their education, medical referrals, health screening, and follow-up.

Because of more opportunity for community pharmacists to provide pharmaceutical care and serve as diabetes-patient educators, the author has developed Diabetes Pharmaceutical Care Databases (DPCD), Education and Teaching Documentation Record (ETDR) in community pharmacy. DPCD and ETDR will be the essential tools for collecting, using, storing, and retrieving patient information needed for the delivery of pharmaceutical care that will improve a patient's outcome and quality of life in the community pharmacy. They may also provide documentation for insurance company reimbursement for pharmaceutical care services. In addition, they will support the education and training of pharmacist and pharmacy students in developing and implementing pharmaceutical care skills in the community pharmacy. Furthermore, this will increase the movement toward making pharmacy a knowledge-basis clinical profession and gain professional recognitions.

MATERIALS AND METHODS

Data from scientific literature were identified by using MEDLINE, IPA search, and Advancing Pharmaceutical Care

Through Use of the Clinical Skills Program Module 2 and 3 of ASHP 1993. Data were extracted, evaluated and used for developing DPCD and ETDR in community pharmacy.

RESULTS

See Appendix A (DPCD)
Appendix B (ETDR)

DISCUSSION AND CONCLUSION

This article has presented the basic tools for collecting, using, storing, and retrieving patient information needed for the delivery of pharmaceutical care. It has also identified areas that need to be targeted for patient education and for other pharmacy interventions in community pharmacy. The documentation of collected information is a vital component in providing comprehensive pharmaceutical care.

DPCD and ETDR should be further piloted to prove effective as tools for providing pharmaceutical care in community pharmacy. Based on the pilot study, several structures can be modified to make them easier and more comfortable to work in community pharmacy. Afterwards, these databases and records may also be used in developing computer based data documentation systems.

By using DPCD and ETDR to appropriately evaluate and document patient outcomes, pharmacists can be confident that the quality of care provided to the patients is the best it can possibly be. In addition, pharmacists will be able to enhance the value to health care system and also provide positive outcomes for those suffering from diabetes.

Appendix A Diabetes Pharmaceutical Care Databases (DPCD)

Patient Demographics

Patient Identification Number: _____ Date: _____
 Last name: _____ Middle name: _____ First name: _____
 Address: _____ City: _____ State: _____ Zip: _____
 Telephone: Home _____ Work _____ Marital Status: _____
 Birthday: _____ Sex: _____ Race: _____ Ht: _____ Wt: _____
 Informed Consent Signed: _____ Education Level: _____
 Allergies: _____
 Primary Physician: _____

Address: _____ City: _____ State: _____ Zip: _____

Telephone: _____

For Children under age 18: Parent/Guardian:

Name: _____

Address: _____ City: _____ State: _____ Zip: _____

Telephone: Home _____ Work _____

Person to Contact in an Emergency:

Name: _____ Relationship: _____

Address: _____ City: _____ State: _____ Zip: _____

Telephone: Home _____ Work _____

Medical History

Do you have any other medical problems including any past surgeries? Yes _____ No _____

If yes, Please list them (with date): _____

When was your diabetes diagnosed? (Date): _____

What were your symptoms at the time of diagnosis: _____

Any past hospitalizations with reasons: _____

Do you have any of the following complications from your diabetes?

Kidney disease: Yes _____ No _____

Eye disease: Yes _____ No _____

Heart disease: Yes _____ No _____

Nerve disease: Yes _____ No _____

Peripheral vascular disease (poor circulation): Yes _____ No _____

What do you know about diabetes?: _____

Medications

Present Medications

Are you using any medications other than your diabetes medication? Yes _____ No _____

If yes, please indicate name, strength, regimen, quantity, and the conditions for which they were prescribed.

Date	Medication	Strength	Regimen	Quantity/Reason	#Refill/Last Refill/MD

Do you use any over-the-counter medications? If yes, please indicate name, strength, regimen, quantity, and the conditions for which they were used.

Date	Medication	Strength	Regimen	Quantity

Insulin and Oral Hypoglycemics

Are you using insulin? Yes _____ No _____

If yes, what types of insulin do you use? _____

What is your AM dose? _____ What is your PM dose? _____

What kind of insulin syringe do you use? (For example, lo dose, regular, 3/10 cc) _____

When do you take your insulin in relation to meals? _____

Do you rotate your injection sites? _____

Where do you store your insulin? _____

How do you dispose of your insulin syringes? _____

Do you take medication by mouth (oral hypoglycemic) for your diabetes? If yes, please indicate name, strength, regimen, quantity, and refill information if you know.

Date	Medication	Strength	Regimen	Quantity	#Refill/Last Refill/MD

When do you take your diabetes medication(s) in relation to meals? _____

Is it easy for you to take medication (oral hypoglycemic)? _____

If not, explain why: _____

Do you feel your medications are helping you? _____

How well? Working well: _____ Partially working: _____ Not working: _____

Is it causing any side effects? If yes, explain _____

Did MD explain purpose of medication? _____ Did MD explain how to take medication? _____

Would you like to know more about your medication? _____

Past medications

Did you use any medications and over-the-counter medications in the past other than present medications? Yes _____
 No _____ If yes, please indicate name, strength, regimen, quantity, and the conditions for which they were prescribed.

Date	Medication	Strength	Regimen	Quantity	Reason

Hypoglycemic Reaction

Do you ever have low blood glucose reactions (hypoglycemic reactions)? (e.g.; sweating, nervous/irritable, trembling/tremor, palpitation, dizziness/nausea, blurry vision, fainting etc.)

If yes, how often do they occur? _____

What are your symptoms of a low blood glucose reaction? _____

What do you think causes your reactions? _____

How do you treat these reactions? _____

Hyperglycemic Reaction

Do you ever have high blood glucose reactions (hyperglycemic reactions)? (e.g.; excess thirst, excess hunger, excess urination, nocturia, tired/weakness etc.) If yes, how often do they occur? _____

What are your symptoms of a high blood glucose reaction? _____

What do you think causes your reactions? _____

How do you treat these reactions? _____

Blood Glucose Monitoring

Do you check your blood glucose at home? Yes _____ No _____

If yes, do you use a visual strip or a meter?

Visual strip _____ Type _____

Meter _____ Type _____ Memory Yes _____ No _____

How often and when do you test your blood glucose? _____

Do you record the results of your blood glucose reading? Yes _____ No _____

If yes, please specify the usual blood glucose range of values _____

Do you make changes in your insulin/medication dose based on these results? _____

Yes _____ No _____ If yes, please specify _____

Do you share these results to your physician? Yes _____ No _____

Urine Glucose/Ketone Testing

Do you test your urine glucose? Yes _____ No _____

If yes, what testing strips do you use? _____

How often do you test? _____

Do you test your urine for ketone? Yes _____ No _____

If yes, what testing strips do you use? _____

How often do you test? _____

What do you do with the results? _____

Diet/Nutrition

Do you follow a diabetic diet everyday? Yes _____ No _____

If yes, how many calories? _____

Have you had any nutrition instruction? Yes _____ No _____

If yes, by whom _____

Do you follow any special diet? Yes _____ No _____

If yes, please describe _____

Daily Nutrition/Activity/Medication Schedule

What time do you:

	Weekdays	Weekends
Awake	_____	_____
Take AM insulin/oral medication	_____	_____
Eat breakfast	_____	_____
Leave for work/school	_____	_____
Have a mid-morning snack	_____	_____
Take Noon insulin	_____	_____
Eat lunch	_____	_____
Have a mid afternoon snack	_____	_____
Return from work	_____	_____
Take PM insulin/oral medication	_____	_____
Eat dinner	_____	_____
Eat a bedtime snack	_____	_____
Take bedtime insulin	_____	_____
Sleep	_____	_____

Do you participate in any sports, physical education class or exercise? Yes _____ No _____

If yes, what time during the day or evening do you participate in these sports? _____

Sport/Exercise	Weekdays	Weekends

Personal Hygiene

How often do you consult the physician? _____ Last appt _____ Referred to MD? _____

Name & address of MD _____

Comments on follow-up _____

How often do you consult the dentist? _____ Last appt _____ Referred to dentist? _____

Name & address of dentist _____

Comments on follow-up _____

How often do you consult the eye doctor? _____ Last appt _____ Referred to eye doctor? _____

Name & address of eye doctor _____

Comments on follow-up _____

How often do you consult the foot doctor? _____ Last appt _____ Referred to foot doctor? _____

Name & address of foot doctor _____

Comments on follow-up _____

Do you give any special care to your feet? Yes _____ No _____

If yes, please describe _____

Social/Psychological Factors

Do you smoke? Yes _____ No _____ If yes, how many cigarettes/packs per day? _____

Do you drink alcohol? Yes _____ No _____ If yes, how much do you drink per day/week? _____

Do you use any street drug? Yes _____ No _____ If yes, please specify: _____

Do you use any herbal/home remedies? Yes _____ No _____ If yes, please specify: _____

Are you under any unusual stress at this time? Yes _____ No _____

If yes, please describe _____

Do you have any disability/handicap that will make taking care of your diabetes a problem? _____

Yes _____ No _____ If yes, please describe _____

Do you travel frequently? Yes _____ No _____

If yes, how do you adjust your insulin/medication schedule? _____

* Drug-related problem lists

- Correlation between drug therapy and medical problems.
- Appropriate drug selection.
- Drug regimen e.g.; overdose, underdose.
- therapeutic duplication.
- Drug allergy or intolerance.
- Adverse drug events.
- Interactions: drug-drug, drug-disease, drug-nutrient.
- Social or recreational drug use.
- Failure to receive therapy e.g.; noncompliance.
- Financial impact.
- Patient knowledge of drug therapy.
- Others.

(Appendix A adapted from: references 4, 10- 18)

Appendix B Diabetes Education and Teaching Documentation Record (ETDR)

Patient's name _____ Patient's Identification Number _____
 Address _____ Telephone _____
 Pre-test scores _____ Post-test scores _____
 Date of teaching initiated _____

Content Areas/ Outcomes	Suggested Teaching Methods (✓)when initiated	Dates of Teaching	Patient's Response to Teaching (#Response Key*)	Staff Initial & Comments
<p>Pathophysiology</p> <ul style="list-style-type: none"> ■ Basic pathophysiology of DM ■ Predisposing factors ■ Normal blood glucose range (80-120mg/dl) ■ Importance of blood glucose control ■ Acute complications of DM (Diabetic ketoacidosis and hyperglycemic hyperosmolar coma) and their relationship to blood glucose control ■ Chronic complications of DM (nephropathy, neuropathy, retinopathy, cardiovascular, and peripheral vascular disease) 	<ul style="list-style-type: none"> <input type="checkbox"/> Booklets <input type="checkbox"/> Video <input type="checkbox"/> Discussion 		<p>and the benefits of blood glucose control</p> <ul style="list-style-type: none"> ■ Sick-day management <p><i>Outcome</i></p> <ul style="list-style-type: none"> - Patient or family and/or significant other describes a basic understanding of DM in own words - Pass post-test 	
			<p>Insulin/Oral Hypoglycemics</p> <ul style="list-style-type: none"> ■ Rational for insulin and/or oral hypoglycemic medications ■ Control with oral hypoglycemic medication - Name and strength of drug 	<ul style="list-style-type: none"> <input type="checkbox"/> Booklets <input type="checkbox"/> Video <input type="checkbox"/> Discussion <input type="checkbox"/> Demonstrate aseptic technique of using

- Dose and administration schedule
- Mechanism of action
- Common side effects and their avoidance
- Self-monitoring of drug therapy
- Drug interactions
- Action to be taken in the events of a missed dose
- Control with insulin therapy
- Name, strength, type of insulin
- Dose and appropriate time of administration
- Onset, peak, and duration of action
- Identification of plunger, barrel, and needle of syringe
- Method of drawing up correct dose
- Roll vial between hands to suspend insulin
- Use aseptic technique (i.e.; wipe top of bottle with alcohol swab)
- Inject air into vial to avoid formation of a vacuum
- Avoid air bubbles in syringe while drawing up insulin
- Insulin Mixing
- Injection technique
- Wipe skin with alcohol swab
- Pinch up skin and insert needle at a 90° angle
- Aspirate to avoid intravenous injection
- Release pinch
- Inject insulin onto subcutaneous space
- Do not rub injection site
- Disposal of syringe
- Site Rotation
- Rotate sites systematically (thighs, abdomen, arms, buttocks)
- Space injection 1 inch away from previous site until one area has been used
- Storage of insulin

Outcome

- Patient or family and/or significant other understands how to use insulin and/or hypoglycemic medications
- Patient safely administers own medications

syringe, drawing up and administration of insulin and patient practice

Hypoglycemia

- Causes (factors that lower blood sugar e.g.; skipping meals, over exertion, too much insulin) Booklets Discussion
- Some typical signs and symptoms of hypoglycemia
- Treatment
- Appropriate use of glucagon kit
- Importance of carrying readily available glucose (e.g.; candy, sugar cube)
- Wear I.D. bracelet or necklace
- Eat regular meal
- Exercise regularly

Outcome

- Patient or family and/or significant other will recognize hypoglycemia reactions and know how to treat appropriately

Hyperglycemia

- Causes (factors that raise blood sugar e.g.; infection, high fever, drugs, physical or emotional stress) Booklets Discussion
- Some typical signs and symptoms of hyperglycemia
- Treatment
- Importance of validating hyperglycemia symptoms with blood glucose monitoring
- Discuss or notify physician

Outcome

- Patient or family and/or significant other will recognize signs of hyperglycemia and will treat appropriately or see appropriate care

Blood Glucose Monitoring

- Rationale Booklets
- Proper technique of blood glucose testing Video Establish target blood glucose range
- Type Demonstrate & practice
- Appropriate time to test Discussion on how to interpret blood tests
- The importance of accurate record-keeping
- Optimal storage

Outcome

- Patient or family and/or significant other will demonstrate home glucose monitoring and record-keeping

- Self-monitoring diary

Urine Glucose/Ketone Testing

- Rationale
- Types of tests
- Times of day
- Optimal storage
- The importance of accurate record-keeping
- False positive and negative

- Booklets
- Demonstrate & practice
- Video
- Discussion with patient how to interpret of urine testing
- Self-monitoring diary

Outcome

- Patient or family and/or significant other will demonstrate an understanding of urine glucose/ketone testing

Diet/Nutrition/Alcohol/Drug Use

- Rationale
- Avoid sugars, alcohol, drug use
- Low fat/high fiber diet
- Meal plan
- Appt scheduled with nutritionist

- Booklets
- Nutritionist

Outcome

- Patient or family and/or significant other will demonstrate a basic understanding of meal plan, avoiding alcohol and drug use

Exercise

- Rationale for the role of exercise in lowering blood glucose
- Discussing how exercise might be safely integrated into patient's lifestyle

- Booklets
- Practice
- Discussion

Outcome

- Patient or family and/or significant other will demonstrate a basic understanding of the importance of exercise in DM

Personal Hygiene

- Foot care everyday
- Keep feet clean and apply lotion to dry areas
- To remove calluses, soak feet in warm water and rub with coarse towel
- Dry feet thoroughly after soaking
- Trim toenails carefully
- Wear clean, properly fitted shoes
- Avoid exposure to extremes in temperature
- Care of skin and mouth

- Booklets
- Demonstrate & practice
- Discussion

Outcome

- Patient or family and/or significant other will demonstrate a basic understanding of preventive personal hygiene

Follow-up and Refill medication

- Schedule written return appt (e.g.; foot doctor, eye doctor, primary care doctor, dentist)
- Provide continuing education in diabetes care
- Warning telephone or letter for refill medication
- Keep patient informed of current concepts

- Booklets
- Discussion
- Appt card

Outcome

- Patient or family and/or significant other will demonstrate a basic understanding of planning for health maintenance, refill prescription, and follow-up

★# Response Key

1. Indicates understanding or performs successfully.
2. Needs reinforcement/repetition.
3. Needs complete review.
4. Unable to complete teaching.
5. Not applicable.

(Appendix B adapted from: references 7, 14, 19, 20, 21)

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