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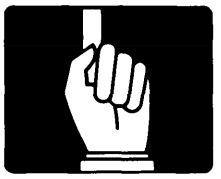

Understanding Diabetes Routines: A Professional Training Exercise

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As part of the continuing education programs conducted at the Washington University Diabetes Research and Training Center, 65 health professionals participated in a 4-day simulation exercise which required them to adhere to a diabetic regimen. Instructions covered injections, urine testing, recording results, and calculating and following a meal plan. Evaluation of the simulation focused on the degree of participant adherence to each component, the problems they encountered, and how the experience influenced their patient/clinician interaction. Mean scores for adherence over the 4-day period for each component of the regimen were injections (82%), diet (67%), urine testing (58%), and recording results (56%). Of the total number of adherence problems encountered by the participants, 52% were diet-related, 17% involved urine testing, 17% time constraints, 10% loss of spontaneity, and 4% involved injections. Analysis of the impact of the experience in the work setting indicated improved participant sensitivity to diabetic patient adherence problems and increased ability to effectively counsel patients and family members. DIABETES CARE 5: 537–541, SEPTEMBER–OCTOBER 1982.

A major determinant of regimen adherence in the management of chronic diseases is the quality of the patient/clinician interaction. As a recent conference[1] has suggested, sensitizing professionals to the psychosocial problems faced by diabetic patients should have a significant beneficial effect on clinicial abilities both to identify adherence problems and to offer alternatives in a nonjudgmental way. In an experiential approach to improving their sensitivity, we asked health professionals attending continuing education courses held at the Washington University Diabetes Research and Training Center (DRTC) to participate in a simulation experience requiring them to adhere to diabetes routines. We chose a simulation method because it is designed to achieve consciousness-raising outcomes. Wolf and Duffy[2] define simulation as an educational method that attempts to replicate essential aspects of reality so that an actual situation may be better understood and/or controlled. Further, it provides a more integrated view of phenomena than is generally possible by other educational modes. Other authors[3–10] suggest that simulation is helpful for improving understanding of oneself and for enhancing empathy and interpersonal relationships with others.

Although requesting health professionals to simulate the role of a diabetic patient is not a new approach to learning, only one report on the subject[11] appears in recent literature. In that study, 12 professional hospital staff members volunteered to participate in a 1-wk simulation of the lifestyle of an insulin-dependent diabetic patient requiring urine tests, insulin injections, and diet therapy. The study was designed to assess the subjects' ability to make insulin adjustments in response to varied urine test results, and to eat prescribed meals and snacks. Adverse "episodes" such as ketoacidosis, major and minor hypoglycemia, sugar consumed, and error in final insulin dose were scored according to the subjects' compliance to the regimen. Minor hypoglycemia caused by omission of snacks contributed to 32 of the total 64 adverse episodes. A further 19 episodes were caused by the subjects' consuming concentrated sugars. Finally, 3 of the 12 participants made the correct change in insulin dosage.

Although these findings indicate that the techniques described can help clinicians predict the type and consequence of errors that patients may make in managing their diabetes, the goals of our study were different. We were interested in examining participant adherence to the components of the regimen, identifying specific adherence problems, and determining how the experience influenced the patient/clinician interaction.

METHODS

The simulation contributed an experiential component to week-long continuing education programs conducted at the DRTC which were designed to provide comprehensive education on the care and management of persons with diabetes. Over a 1-yr period, 65 health professionals attending the continuing education programs were asked to participate in the 4-day living with diabetes simulation. Of the 65 participants, 40 were registered nurses, 11 were dietitians, 7 were licensed practical nurses, and 7 were other health professionals. The specific routines explained on the first day of each program covered daily subcutaneous injections of 15 U of saline solution in different sites, urine testing 4 times a day,* recording results, and calculation of and adherence to a meal plan.

Each person was given sterile saline solution, disposable U-100 insulin syringes of different sizes and types, alcohol wipes, a 2-drop Clinitest kit (Ames Co., Elkhart, Indiana), and a urine test record sheet. The participants then divided into groups of 4–5 persons and were joined by a DRTC staff member. A volunteer in each group of nurses was asked to demonstrate the correct technique for drawing up insulin, for administering the injection, and for the Clinitest method of urine testing. A short discussion with each small group about the demonstrated technique followed to correct or clarify the steps of the procedure. If the participants were dietitians or other professionals, time was allowed for further demonstration and individual practice of both insulin administration (including actual self-injection) and urine testing techniques. The time spent on this first phase of the activity varied between 60 and 90 min.

During the first day and evening of the program, participants calculated their own meal pattern, using the American Diabetes Association exchange system. For dietitians, this was a relatively quick and simple procedure. For other health professionals, who were unfamiliar with principles of nutrition, this task was more difficult. The DRTC dietitian therefore presented one teaching module on diet calculation and another on the exchange system, calculating examples in both modules to familiarize the nondietitian participants with these procedures. Using a workbook on meal planning,[12] participants were then requested to determine their individual caloric needs, to divide calories into grams of protein, carbohydrate, and fat, and to calculate their meal plan in exchanges.

On the third day of each program, an hour-long discussion session was scheduled to allow the group to share their reactions to the simulation experience. The staff who usually attended these discussions included a nurse, a dietitian, and a social worker, one of whom led the discussion. The discussion focused on overall reactions to the regimen components, degree and relative ease of participant adherence, and attitude change as professional providers of diabetes care.

* Current participants are now requested to test blood glucose levels with Chemstrips BG in addition to urine testing.

All participants were asked to complete an evaluation form at the end of the last day of the experience. Questions were asked to determine participant adherence to the regimen over 4 consecutive days, the frustrations and the problems they encountered while following the regimen, and the perceived changes in their future patient/professional interactions. Five evaluation forms were not returned. Responses to the remaining 60 forms were analyzed.

Finally, a follow-up questionnaire was mailed to all participants, asking each one to (1) rate seven questions on a 1–5 scale according to the extent to which the experience was helpful in their work setting and (2) describe an incident in which their response was influenced by the simulation experience. The length of time between their course attendance and receipt of the questionnaire ranged from 7 to 16 mo.

RESULTS

Our findings are presented as they relate to the three goals of the study: to assess the degree of participant adherence, to identify the problems encountered by the participants, and to determine the impact of the experience in their work setting.

Self-ratings of the level of adherence to the four components of the regimen over 4 consecutive days are in Table 1, which shows a clear trend from good ("almost always") adherence to moderate ("about half the time") adherence over time. The injection component had the highest rate of adherence each day. Table 1 also shows that overall adherence scores for injection, urine testing, and recording decreased steadily as the novelty and learning value of these components declined. The scores for the diet, however, did not alter significantly over the 4 days, possibly indicating a greater commitment of participants to the one component that was "real," particularly if they had calculated a weight loss diet. The mean score for each component also enabled us to rank overall adherence to the regimen: 82% for the injection component, 67% for the diet component, 58% for urine testing, and 56% for recording of tests.

The problems affecting participant adherence were determined by coding responses to questions on the evaluation form completed at the end of the last day of the experience. The results are presented in Table 2. Fifty-two percent of the responses revealed that not only were there difficulties in understanding the restrictions and portion sizes of the exchange meal plan, but in planning the necessary food limitations and in actually adhering to the meal plan. Many of the diet-related problems became apparent when participants attempted to follow their meal plan when eating out in restaurants. A small number noted resentment toward some food restrictions and an increased desire for "forbidden" concentrated sweets.

For urine testing, which rated low on overall adherence, the double-void test required before lunch created the most difficulty. The time-consuming nature of the Clinitest method certainly contributed to this problem. The adherence problems within the "time constraints" category

TABLE 1
Adherence to regimen for 60 subjects

Component	Day	Percent of participants responding: Almost always	About half the time	Hardly ever	No response	Overall score (%)
Diet	1	53	23	17	7	70
	2	45	42	13	0	66
	3	38	43	12	7	64
	4	42	27	10	22	68
	Mean	44	34	13	9	67
Injection	1	87	—	10	3	90
	2	85	—	13	2	86
	3	70	—	23	7	75
	4	58	—	18	23	76
	Mean	75	—	16	9	82
Urine testing (4 × day)	1	48	38	12	2	69
	2	28	60	10	2	59
	3	23	53	17	7	54
	4	18	40	18	23	50
	Mean	30	48	14	8	58
Recording urine tests	1	57	20	20	3	69
	2	40	28	30	2	55
	3	35	27	32	7	52
	4	23	25	27	23	48
	Mean	39	25	27	9	56

Adherence is expressed as a percentage of the daily frequency with which each component was completed [e.g., 32 of the 60 subjects "almost always" adhered to their diet on day 1 (53%)]. Overall scores are expressed as daily total percentage scores for subjects who rated their adherence to each component [e.g., on day 1, 32 subjects received a perfect score of 100 for diet adherence, 14 subjects received a score of 50 for adhering "about half the time," 10 subjects received a score of 0 for adhering "hardly ever," and 4 subjects had "no response," resulting in an overall adherence score of 39/56 (70%)].

TABLE 2
Problems encountered by participants

Problems	% Total
Dietary	52
Adhering to meal plan	
Planning for and adapting to the meal plan	
Understanding the plan and its restrictions	
Eating out in restaurants	
Resenting restrictions	
Urine testing	17
Insufficient time for testing	
Forgetting to test	
Difficulty completing a double-void test	
Dislike of testing procedure	
Time constraints	17
Loss of spontaneity	10
Injections	4
	100

(17%), related to the time-consuming aspect of the regimen as well as the constant need to be planning ahead during each day, often requiring reorganization of lifestyles. Participants found that they had trouble finding the time to do urine tests, give injections, and plan and eat all their meals in addition to handling unexpected occurrences, such as traffic delays or car troubles. Closely related to the time constraint problems were those that identified a loss of spontaneity in daily activities (10%). Responses in the problem category of injection (4%) identified fear of self-injection and initial difficulty in performing the technique.

At the end of the simulation, participants were asked what effects they thought the experience would have on their future patient/clinician interaction. Their responses fell into four categories:

(1) 44%—A better understanding of the many problems diabetics experience in attempting to adhere to a management regimen. In general, participants were overwhelmed with the lifestyle adjustment that was needed to complete the tasks of the regimen. Thus, they were able to identify with newly diagnosed insulin-requiring diabetics whose initial concerns regarding the mastery of the regimen seem to outweigh concerns over the long-term meaning of the disease.

(2) 28%—More realistic expectations of their patients and a less judgmental response in regard to nonadherence. Participants stressed the importance of being sensitive to cultural and age differences among patients and of helping patients to set their own realistic goals.

(3) 16%—More effective education interventions. Participants recognized the importance of allowing patients the time to learn and integrate the regimen into their lives, as well as the need to periodically provide contact for reviewing the details of the tasks involved, and support or encouragement for continued adherence.

(4) 12%—A better understanding of the impact of the regimen on all family members. In recognizing their own family responses and adjustments to the regimen, the participants identified the crucial role in adherence of emotional support and understanding from family, friends, and professionals.

Finally, 43 of the mailed follow-up questionnaires were returned and analyzed. The respondents rated seven questions on a 1–5 scale according to the extent to which the simulation experience was helpful in their work setting. As shown in Table 3, these results support the perceived impact of the experience, since the highest rated helpful element was "improved sensitivity to diabetic patients." It is interesting to note that the mean ratings on all seven questions regarding the simulation were higher than the mean ratings for another experiential course component that involved 7 h of active participation in patient teaching activities at clinical sites.

Twenty-six (61%) of the respondents also described an incident in which their actions were influenced by the simulation experience. Ten (39%) of the incidents described patient regimen adherence problems, and respondents noted that the simulation had enabled them to respond with

TABLE 3
Mean scores for seven follow-up questions, rated on a 1–5 scale according to the extent to which participants found the simulation experience helpful in their work settings (1 = not at all helpful, 5 = extremely helpful). N = 43

Helpfulness of experience	Mean scores
Improved sensitivity to diabetic patients	4.60
Increased counseling of family members about difficulties in adhering to the regimen	4.00
Increased patience with compliance problems	3.98
Increased effectiveness in influencing patient adherence	3.84
Improved clinical skills	3.74
Increased involvement of the patient in planning his regimen	3.70
Improved effectiveness for planning educational interventions	3.65

greater understanding to the patients' problems. In doing so, they were able to generate more trust, respect, and cooperation from patients. Eleven of the incidents related to injection of insulin. Of these, four respondents had convinced patients to use the abdomen as an injection site by describing their own experience, and seven respondents reassured patients regarding initial insulin injections by demonstrating the procedure on themselves. The remaining five incidents described how participants had made specific suggestions to patients regarding either eating out, or fitting urine testing into a daily routine.

DISCUSSION

The evaluation of the simulation experience indicated that the participants encountered problems with the diet, urine testing, and recording, and hence adhered less to these components than to the injection component. Interestingly, the group discussion revealed a change of focus in many participants from concern and difficulty with self-injection early in the experience, to frustration with the diet and urine testing components as the simulation progressed.

Our finding of lower adherence rates with the urine testing and recording components is not surprising, particularly given the time-consuming nature and relative complexity of the Clinitest method. This method, however, continues to be recommended for the management of type I diabetic persons[13] and for this reason was chosen for the simulation experience. In addition, participants were possibly less motivated to adhere to the urine testing component because the results were always negative. This decline in adherence similarly may be found in diabetic patients because many do not adjust their own insulin dosages. Consequently, for those individuals the value of urine testing and recording results becomes less obvious.

The results of this study have led us to conclude that to increase patient adherence, professional effort could be redirected in at least three important areas of diabetes management. First, more effort could be devoted to simplifying effective meal planning. The problems that these health professionals experienced due to the complexities of the plan is an example of how adherence declines with increasingly complicated regimens.[14] Dietary adherence may be increased if the complexities of the plan were decreased and if the teaching of nutrition were offered on an ongoing outpatient basis. Second, the choice of urine and blood glucose monitoring methods should be made by the patient, based on a review of the advantages and disadvantages of each method. Third, the reason for patient self-monitoring should be emphasized and the patient or clinician should be instructed to use the results to adjust the insulin or diet component of the regimen.

In summary, a carefully conducted experience such as simulating diabetes routines is an effective educational tool for helping health professionals to recognize and explore feelings generated by the experience, and to develop greater sensitivity to the complexities of adherence to a therapeutic regimen. Further simulation exercises such as this may benefit from the incorporation of blood glucose testing with some "built in" positive results requiring the application of a formula for adjusting insulin dosages. Although individuals may have an intellectual appreciation of a patient's experience, a different level of knowledge is gained by active participation in that experience. By living a lifestyle expected of persons with diabetes, health professionals are able to acquire insight into the unique circumstances of the patient, to develop more realistic expectations of patients, and to recognize the importance of ongoing education and emotional support to enhance regimen adherence.

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