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An Interactive Telehealth Program to Improve Attitudes Toward Treating Diabetes

Richard Wintermute, MSIV
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Abstract

Background

Currently 60% of the United States population is overweight or obese. Recent data has shown that 7% of the US population has Diabetes Mellitus Type 2 and New Mexico is above the average at 9%. Many studies have shown that good glycemic control with lifestyle changes or Metformin therapy can prevent or delay microvascular and some macrovascular complications of Diabetes. These findings have not been translated into routine care especially in New Mexico in large part due to NMs largely, rural, poor and medically underserved population. The Extension for Community Healthcare Outcomes (ECHO) is a project developed at the University of New Mexico Health Science Center (UNMHSC) that connects UNMHSC experts with providers in rural New Mexico using a tele-health network. Although the ECHO project was first developed to treat Hepatitis C, its design allows it to be replicated for other complex and chronic diseases such as Diabetes Mellitus Type 2. We sought to evaluate the project as a teaching tool for medical students participating in rural education programs. We hypothesize that medical students participating in the diabetes ECHO project will demonstrate improved knowledge and a positive attitude towards the treatment and care for patients with diabetes.

Methods

A total number of 14 first through fourth year medical students were assigned to either an intervention group or control group. The intervention group completed four to eight weeks of the Extension for Community Healthcare Outcomes (ECHO) telehealth program on diabetes knowledge and attitude towards treatment while in a healthcare rotation in a rural New Mexico community. The control group completed four to eight weeks of a rural New Mexico rotation but did not participate in weekly tele-health clinics. Surveys rating the participant's knowledge and attitude towards diabetes were given before and after the four to eight week clinics.

Results

There was at least one question with a significant change between the pre and post survey group that participated in the ECHO telehealth clinics in each survey. Two out of the thirty-three questions for the Diabetes Attitude Survey, one out of the seven for the Diabetes Knowledge Survey and, one out of the twelve questions for the Attitudes Diabetes Care Survey showed a significant change. There were no significant differences between the post survey intervention group compared to the post survey control group that did not participated in the ECHO telehealth clinics.

Conclusions

Although not statistically significant, the ECHO telehealth program showed improving attitudes and knowledge in treatment and understanding of type 2 diabetes mellitus.

Background

Over the last several years, landmark studies have demonstrated that 1) diabetes can be prevented with life style changes or Metformin therapy (1); 2) glycemic control prevents or delays microvascular and some macrovascular complications (3,4); and 3) control of

blood pressure and lipids delays or prevents the onset of micro and macrovascular disease (2,5,6). Unfortunately, these findings have not been translated into routine practice. This void is particularly severe in rural areas because providers are isolated from the customary methods of continuing education and consultation. These barriers include but are not limited to:

1. Lack of specialty care in rural and medically underserved areas.
2. Lack of resources for patients to travel to see specialists at distant sites.
3. Limited capacity to empower providers with new knowledge
4. Limited capacity to overcome provider's attitudes and beliefs regarding preventive initiatives.
5. High provider/patient ratios
6. High provider turnover
7. Patient beliefs
8. Overwhelming abundance of prevention guidelines for prevalent disease processes
9. Cost of health care

New Mexico (NM) is particularly susceptible to the inability to transfer new knowledge to prevent and treat diabetes, diabetic complications, and cardiovascular disease. NM is a largely rural and medically underserved state. NM has an area of 122,000 square miles but only 3 metropolitan areas with >100,000 residents and only one academic medical center, The University of New Mexico HSC. Over half of NM's 1.83 million residents are made up of minorities (44.7% non-Hispanic white, 42.1% Hispanic, and 9.5% Native Americans, and 3.7% other). NM's poverty rate (17.7%) led the nation in both 2000 and 2001 (national average 11.7%). Of the states 33 counties, 32 have been designated as Medically Underserved Areas (MUA's) by the Department of Health and Human Services (DHHS). In addition, 14 counties are designated as Health Professional Shortage Areas (HPSAs) for primary care physicians. Only 20% of NM's licensed physicians practice outside of urban areas and very few of them specialize in complex diseases (14). Because minorities are at greater risk for diabetes, NM has a higher prevalence of diabetes compared to other states (9% compared to the national average of 6%) (15). The fragmented health care system, lack of resources, rural demographics, provider shortages, large minority populations, high rates of medically uninsured patients and poverty all contribute to poorer outcomes for diabetic patients in NM than elsewhere. As a result, developing more effective methods for delivering diabetes care to medically underserved areas should be one of state's highest priorities.

Previous attempts to improve care in rural and medically underserved areas have met with limited success. For example, Kirkman et al devised a multifaceted intervention targeting primary care providers, patients, and the health care system of a rural county in Indiana (9). The local physicians devised guidelines for treatment of diabetes based on consensus; providers were given information about their overall performance based on the guidelines multiple times throughout the study. Practice aids were developed and distributed to providers, chart flow sheets were devised and implemented, and extensive patient and physician education sessions were held. Multiple outcomes were measured. At the end of the first year of the study there were significant improvements in the number of blood pressure measurements taken, referrals for annual eye examination,

annual foot examinations, and the number of HbA1C measurements done per year. However, by the end of the second year, despite ongoing intervention, only the number of blood pressure measurements and annual foot exams remained improved over baseline. Additionally, despite more testing there were no improvements in blood pressure or HbA1C.

Interventions that have demonstrated some success in improving implementation of diabetes guidelines have occurred in closed systems, including VAMCs and managed care organizations. These systems are unique in that they have multiple tiers of checks and balances in place to keep providers on target. Unfortunately, rural and medically underserved areas are not afforded similar resources as are available in managed care systems (15,16).

The University of New Mexico (UNM HSC) has recently developed a widely applicable model for providing specialty level care to patients with chronic, common and complex diseases who do not have direct access to specialists. This project entitled, “Project **ECHO** – **E**xtension for **C**ommunity **H**ealthcare **O**utcomes”, connects UNMHSC experts with rural providers using a tele-health network. Tele-health clinics are held weekly. Multiple providers are connected simultaneously and present real patients. The patients are co-managed by the rural providers and the UNMHSC specialist. The model utilizes case-based learning and evidence based disease management while simultaneously co-managing patients. The weekly telemedicine clinics serve as a “knowledge network”. Community providers in the network learn best practices in chronic disease management through “learning loops,” in which they co-manage diverse patients with the UNMHSC specialist while expanding their knowledge. Over time, these learning loops create deep knowledge, skills and comfort in offering state-of-the-art care in rural areas. Rural providers become champions or regional experts in specific chronic diseases thus increasing patient access to specialty level care. Project ECHO was initiated in 2004 to treat Hepatitis C (HCV) infected patients in rural and medically underserved communities of NM.

The design of the ECHO model allows it to be replicated for other complex and chronic diseases. Since the model was first tested for HCV, it appears to be robust enough to deliver best practices on many health conditions. ECHO can thus serve as a platform that is able to deliver and evaluate best practices for priority populations in rural and other underserved areas, not just those who live in close proximity to a large medical center. The purpose of this proposal is to design and implement the ECHO model in the prevention of diabetes and diabetic complications including cardiovascular disease in rural New Mexico. This proposal is based upon the premise that poor outcomes in diabetes prevention and treatment are at least partly due to providers’ lack of knowledge about cost-effective treatment, misplaced priorities, inertia, or lack of provider confidence. Project ECHO represents a novel method for not only improving provider skills in diabetes and cardiovascular disease but also for changing their attitudes about aggressive treatment.

The University of New Mexico School of medicine is internationally recognized for its innovating problem based learning curriculum as well as its rural medicine training and outreach. The ECHO model may represent an novel method to improve medical student education while on rural rotations. Our hypothesis states that students participating in the diabetes ECHO project will demonstrate not only improved

knowledge of the treatment of patients with diabetes but will also demonstrate a more positive attitude toward the care of patients with diabetes. The aims of this study were to assess the capability of the ECHO model to increase medical student knowledge on current best practices of care for the treatment of diabetes and diabetes complications and to assess the capability of the ECHO model to improve medical student attitudes toward treating patients with diabetes.

Methods

We conducted a study involving medical students at the University of New Mexico who were surveyed on their attitude toward and knowledge of Diabetes Mellitus Type 2 before and after a four to eight week telehealth program modeled after the Hepatitis C ECHO program. There were two groups including an intervention group of seven students that participated in the weekly telehealth program and a control group of nine students who did not participate in the weekly clinics.

Participants

Eligibility criteria included medical students of all four years at the University of New Mexico who participated in a rural community rotation in New Mexico for a duration of four weeks or more. Students were excluded if they participated in a rotation that was not considered a rural community of New Mexico.

Analytical Methods

Eligible participants were assigned to either the intervention group or the control group depending on which group they chose to be a part of. Those in the intervention group were given a survey at the beginning (pre) of their rural rotation and then the exact same survey at the end (post) of the four to eight week telehealth program. There were three different surveys. The first was a diabetes attitude survey which included questions asking to rate the participants attitude on diagnosis, prognosis, and treatment of Diabetes Mellitus Type 2. The second was a diabetes care survey which asked the participant to compare the difficulty of treating DM Type 2 compared with other chronic conditions such as hypertension and asthma. The third was a diabetes knowledge survey. Each participant in the intervention group connected to the ECHO telehealth clinic weekly during their clerkship. Students presented one patient per session using a standardized format. Cases were discussed and treatment plans were devised by the ECHO team and the participating students.

Statistical Analysis

Pre and post surveys of the intervention group were compared using paired t-tests for each of the three surveys to analyze any significance before and after the ECHO telehealth conference program. Unpaired t-tests were used to analyze data between the post survey intervention group and the post survey control group for each of the three surveys. A p value of <0.05 was considered significant for both paired and unpaired t-tests.

Results

Adherence

All participants completed at least four weeks of the telehealth clinics. If a student did not have a specific patient to present that week they were able to listen to other participants presenting a patient problem and the treatment.

Diabetes Attitude Survey Outcomes

There were two questions with significant improvements between the pre and post intervention group for the Diabetes Attitude Survey (Table 1). The p values were 0.008 and 0.03 for question numbers 6 and 23 respectively. Although not statistically significant, there were improvements in many other survey questions from pre to post survey (1, 2, 6, 16, 18, 20, 23, 25, 31, 33). There were no significant differences in the post intervention group for Diabetes Attitude Survey compared to the post control group for Diabetes Attitude Survey (Table 2).

Table 1. Pre and post survey data of the interventional group for the Diabetes Attitude Survey. The table includes the pretest and posttest mean, the mean difference with a (-) number meaning a move towards agreement and a (+) number meaning move towards disagreement, and the p value comparing pre and post surveys.

Question #	Pretest mean	Posttest mean	Mean Difference (post – pre)	p value of difference
1	1.4	1.0	-0.4	0.07
2	3.9	4.3	0.4	0.07
3	4.7	4.7	0	1.0
4	1.6	1.7	0.1	0.6
5	2.3	2.7	0.4	0.4
6	1.9	1.1	-0.7	0.008
7	4.7	4.7	0	1.0
8	1.7	1.4	-0.3	0.17
9	1.1	1.0	-0.1	0.35
10	1.4	1.3	-0.1	0.35
11	4.4	4.4	0	1.0
12	1.7	1.6	-0.1	0.6
13	4.3	4.4	0.1	0.6
14	2.7	2.7	0	1.0
15	4.7	4.9	0.1	0.35
16	3.6	4.1	0.6	0.1
17	1.4	1.3	-0.1	0.35
18	1.7	1.3	-0.4	0.07
19	1.9	1.7	-0.1	0.35
20	1.7	1.4	-0.3	0.17
21	1.1	1.0	-0.1	0.35
22	1.6	1.6	0	1.0
23	4.3	4.9	0.6	0.03

24	1.3	1.7	0.4	0.28
25	2.7	1.7	-1.0	0.13
26	4.0	3.9	-0.1	0.6
27	1.6	1.7	0.1	0.6
28	4.6	4.7	0.1	0.6
29	2.1	1.9	-0.3	0.17
30	2.0	1.9	-0.1	0.35
31	2.3	1.4	-0.9	0.07
32	2.0	1.9	-0.1	0.35
33	1.1	1.4	0.3	0.17

Table 2. Post survey of the interventional group and post survey of the control group for the Diabetes Attitude Survey. The table includes the intervention post survey and control post survey mean, intervention and control post survey standard deviation, and the p value comparing intervention post and control post surveys.

Question #	intervention post mean	control post mean	intervention post std dev	control post std dev	p value
1	1	1.8	0	1.3	0.14
2	4.2	4.2	0.76	0.44	0.84
3	4.7	4.6	0.49	1.33	0.77
4	1.7	1.6	0.76	1.01	0.73
5	2.7	2.1	0.95	0.6	0.14
6	1.1	1.3	0.37	0.5	0.42
7	4.7	4.8	0.49	0.44	0.79
8	1.4	1.6	0.53	1.01	0.77
9	1	1.2	0	0.44	0.21
10	1.3	1.4	0.49	0.72	0.63
11	4.4	4.1	0.53	0.6	0.29
12	1.6	1.8	0.53	0.97	0.62
13	4.4	4.6	0.53	0.53	0.64
14	2.7	2.7	0.95	1.1	0.93
15	4.9	4.4	0.37	1.3	0.44
16	4.1	4.1	0.69	0.6	0.92
17	1.3	1.2	0.49	0.44	0.79
18	1.3	1.8	0.49	0.67	0.12
19	1.7	1.6	0.76	0.74	0.82
20	1.4	1.6	0.53	0.72	0.7
21	1	1.2	0	0.44	0.21
22	1.6	1.9	0.79	0.78	0.44
23	4.9	4.7	0.38	0.5	0.42
24	1.7	1.4	0.76	0.73	0.48
25	1.7	1.7	0.76	1	0.92
26	3.9	4.2	0.69	1.09	0.46
27	1.7	1.6	0.76	0.73	0.68
28	4.7	4.8	0.49	0.44	0.79

29	1.9	1.7	0.69	0.7	0.59
30	1.9	1.9	0.69	0.78	0.93
31	1.4	1.6	0.53	0.52	0.64
32	1.9	2.3	0.69	0.70	0.19
33	1.4	1.3	0.53	0.5	0.72

Diabetes Knowledge Survey Outcomes

There was one question that had a significant change between the pre and post interventions group for the Diabetes Knowledge Survey (Table 3). Question number 7 had a p value of 0.04 and a mean difference of -0.9. There were no significant differences in the post intervention group for the Diabetes Knowledge Survey compared to the post control group for the Diabetes Knowledge Survey (Table 4).

Table 3. Pre and post survey data of the interventional group for the Diabetes Knowledge Survey. The table includes pretest and posttest mean, the mean difference with a (-) number meaning a move towards agreement and a (+) number meaning move towards disagreement, and the p value comparing pre and post surveys.

Question #	Pretest mean	Posttest mean	Mean Difference (post – pre)	p value of difference
1	4.3	4.3	0	1.0
2	1.7	1.7	0	1.0
3	1.3	1.0	-0.3	0.35
4	3.0	2.9	-0.1	0.85
5	3.4	4.6	1.1	0.12
6	3.6	4.0	0.4	0.28
7	2.7	1.9	-0.9	0.04

Table 4. Post survey of the interventional group and post survey of the control group for the Diabetes Knowledge Survey. The table includes the intervention post survey and control post survey mean, intervention and control post survey standard deviation, and the p value comparing intervention post and control post surveys.

Question #	intervention post mean	control post mean	intervention post std dev	control post std dev	p value
1	4.3	4.4	0.76	0.52	0.62
2	1.7	2.4	0.48	1.51	0.24
3	1	1.1	0	0.33	0.39
4	2.9	2.8	1.78	1.48	0.92
5	4.6	3.7	0.53	1.22	0.09
6	4.0	3.6	1	1.23	0.45
7	1.9	2.1	0.89	0.73	0.47

Attitude Diabetes Care Survey Outcomes

There was one significant change from the post survey intervention group compared to the post survey intervention group for the Attitudes Diabetes Care Survey (Table 5). Question number 11 had a p value of 0.008 and a mean difference of -1.5. There were no significant changes in the post survey intervention compared to the post survey control group for the Attitudes Diabetes Care Survey (Table 6).

Table 5. Pre and post survey data of the interventional group for the Attitudes Diabetes Care Survey. The table includes pretest and posttest mean, the mean difference with a (-) number meaning a move towards agreement and a (+) number meaning move towards disagreement, and the p value comparing pre and post surveys.

Question #	Pretest mean	Posttest mean	Mean difference (post – pre)	p value of difference
1	5.4	5.6	0.1	0.91
2	5.7	5.4	-0.3	0.68
3	5.6	6.1	0.6	0.41
4	5.1	4.6	-0.6	0.17
5	5.7	5.4	-0.3	0.6
6	6.1	5.1	-1.0	0.35
7	4.7	4.4	-0.3	0.82
8	4.3	4.7	0.4	0.53
9	6.4	5.7	-0.7	0.61
10	2.3	1.4	-0.9	0.07
11	5.9	4.4	-1.5	0.008
12	5.4	5.1	-0.3	0.71

Table 6. Post survey of the interventional group and post survey of the control group for the Attitudes Diabetes Care Survey. The table includes the intervention post survey and control post survey mean, intervention and control post survey standard deviation, and the p value comparing intervention post and control post surveys.

Question #	intervention post mean	control post mean	intervention post std dev	control post std dev	p value
1	5.6	5.1	1.17	2.42	0.68
2	5.4	5.0	0.97	2.18	0.66
3	6.1	5.1	0.44	2.89	0.37
4	4.6	5.4	0.62	1.51	0.20
5	5.4	4.8	0.97	1.54	0.49
6	5.1	4.3	1.31	1.77	0.45
7	4.4	4.4	1.43	1.51	0.99
8	4.7	5.6	0.96	2.13	0.39
9	5.7	5.8	1.33	2.28	0.95
10	1.4	2.3	0.51	1.58	0.19
11	4.4	4.2	0.90	2.17	0.83
12	5.1	5.7	0.94	1.58	0.51

Discussion

Diabetes Attitude Survey

There were two significant changes in the Diabetes Attitude Survey in the group that participated in the ECHO telehealth clinics. The first significant change was question six which asked the participant to rate from 1 (strongly agree) to 5 (strongly disagree) whether or not health care professionals should be taught how daily diabetes care affect's patients lives. The pretest mean was 1.9 and posttest mean was 1.1 with a significant p value of 0.008 (table 1). The participants went from an average answer of agree to an average answer or strongly agree. This is an interesting question as it asks the participant to think about how the patient's social life is affected by his/her disease. It is hard to teach physiology, anatomy, and pathophysiology in four years of medical school for every organ system let alone teaching the student to ask patient's how their disease is affecting their personal life. This study has shown that the ECHO project has touched on this topic and how important it is for providers to be educated not only on the physical aspects of a disease but how it may affect the patient socially.

The second significant question was question number twenty three which asked participants to rate from 1 to 5 if people who have type 2 diabetes will probably not get much payoff from tight control of their blood sugars. The pretest mean was 4.3 and the posttest mean was 4.9 with a significant p value of 0.03 (table 1). The average answer went from disagree to strongly disagree. This question reflects the challenges of type 2 diabetes treatment. This study has impacted the participants by teaching that proper treatment and therefore tight glycemic control will actually benefit the patient. Although there were only two significant changes in the Diabetes Attitude Survey, all thirty three questions showed a move in the direction of a more positive attitude towards diabetes and a better understanding of care (see Table 1 and Appendix 1 for additional information).

There were no significant differences between the post intervention group and the post control group for the Diabetes Attitude Survey (table 2). This could be due to the fact that we had a smaller number of participants in the intervention group compared to the control group. It could also mean that medical students at the University of New Mexico gain a more positive attitude and better patient care towards diabetes during their rural rotation regardless of any interventions. This is hard to establish because a pre control survey was not conducted to compare those students before and after their rural rotation who did not participate in the weekly ECHO telehealth clinics.

Diabetes Knowledge Survey

The pre and post intervention group for the Diabetes Knowledge Survey showed one significant change. Participants in this survey rated their knowledge on type 2 diabetes treatments and disease processes by answering 1 (agree) to 5 (disagree). Question seven asked the participant whether insulin sensitizing agents offer significant advantages to patients with type 2 diabetes when used alone or in combination with sulfonylureas or insulin. The pretest mean was 2.7 and the posttest mean was 1.9 with a significant p value of 0.04 (table 3). This shows that the participants knowledge moved

from somewhat agree more towards agree. The treatment of type 2 diabetes is very complex with many different medications and combinations. It is very reassuring that the medical students in this study learned significantly more than they knew before. This knowledge can be taken back to other physicians in rural areas for better patient care.

Like the Diabetes Attitude Survey, all other questions showed a move towards better knowledge of diabetes treatments and disease processes. There were no significant differences between the post intervention group and the post control group for the Diabetes Knowledge Survey (table 4). This again may be due to the fact that there was smaller number of participants in the intervention group compared to the control group.

Attitudes Diabetes Care Survey

This survey was composed of two different parts. The first nine questions asked participants to rate the difficulty of treating diabetes compared to other chronic conditions such as hypertension or back pain. The participants rated the difficulty from 1 (easier) to 8 (harder). The last three questions asked the participant to rate again from 1 (strongly agree) to 8 (strongly disagree) on whether treatment is efficacious, the participant is confident in their own abilities, and if there is enough time and resources. There was one significant change in the pre and post intervention group. Question eleven had a pretest mean of 5.9 and a post test mean of 4.4 with a significant p value of 0.008 (table 5). This question asked participants to rate how confident they are in their own abilities in treating type 2 diabetes. This indicates that the ECHO telehealth program helped produce confidence in the treatment of diabetes through its education.

This survey also shows that medical students in both the intervention group and the control group on average believe that diabetes is harder to treat than other chronic conditions (tables 5 & 6). This indicates that the aim of the ECHO project to teach students on achieving better understanding of type 2 diabetes treatment is a much needed service.

There were no significant differences between the post intervention group and post control group for the Attitudes Diabetes Care Survey (table 6). The posttest means for both groups were relatively similar indicating that the clinics did not have much impact on how students felt about comparing how hard the treatment of diabetes is to other chronic conditions.

Limitations

There were a few limitations in this study that if were relieved may have had a more positive outlook for the ECHO telehealth project. First the study did not have the power that we originally had planned on. Each group should have had ten participants which fell short. Recruitment for the study was hard as medical students have a very busy schedule and may not want to take on another project.

A second limitation is that we failed to give pre surveys to the control group. The pre and post surveys could have been compared to see if there were any significant changes. This would have helped us to draw a conclusion to whether the rural rotation itself or the ECHO telehealth clinics had an impact on ~~students~~ student's attitudes and knowledge for type 2 diabetes.

Finally we did not take in to consideration which year each medical student was currently in. The control group may have been made up of third and fourth years while

the intervention group may have been mostly first years. In this case, the control group would by experience have more knowledge of diabetes than the preclinical first years therefore skewing the results.

Conclusion

In conclusion, our study showed that although not all significant, the attitudes and knowledge of type 2 diabetes moved towards a more positive and informative view in medical students at the University of New Mexico. As this is a pilot study, many aspects of the project can now be modified for future research.

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Appendix I

Diabetes Attitude Survey

Below are some statements about diabetes. Each numbered statement finishes the sentence “In general, I believe that...” You may believe that a statement is true for one person but not for another person or may be true one time but not be true another time. Mark the answer that you believe is true most of the time or is true for most people. Place a check mark in the box below the word or phrase that is closest to your opinion about each statement. It is important that you answer every statement.

Note: The term “health care professionals” in this survey refers to doctors, nurses, and dietitians.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that:					
1. ...health care professionals who treat people with diabetes should be trained to communicate well with their patients.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. ...people who do <u>not</u> need to take insulin to treat their diabetes have a pretty mild disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. ...there is not much use in trying to have good blood sugar control because the complications of diabetes will happen anyway.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. ...diabetes affects almost every part of a diabetic person’s life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. ...the important decisions regarding daily diabetes care should be made by the person with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. ...health care professionals should be taught how daily diabetes care					

affects patients' lives.

Strongly Agree **Agree** **Neutral** **Disagree** **Strongly Disagree**

In general, I believe that:

7. ...older people with Type 2* diabetes do not usually get complications.

8. ...keeping the blood sugar close to normal can help to prevent the complications of diabetes.

9. ...health care professionals should help patients make informed choices about their care plans.

10. ...it is important for the nurses and dietitians who teach people with diabetes to learn counseling skills.

11. ...people whose diabetes is treated by just a diet do not have to worry about getting many long-term complications.

12. ...almost everyone with diabetes should do whatever it takes to keep their blood sugar close to normal.

13. ...the emotional effects of diabetes are pretty small.

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment.

Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called “adult diabetes.”

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that:					
14. ...people with diabetes should have the final say in setting their blood glucose goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. ...blood sugar testing is not needed for people with Type 2* diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. ...low blood sugar reactions make tight control too risky for most people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. ...health care professionals should learn how to set goals with patients, not just tell them what to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. ...diabetes is hard because you never get a break from it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. ...the person with diabetes is the most important member of the diabetes care team.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. ...to do a good job, diabetes educators should learn a lot about being teachers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. ...Type 2* diabetes is a very serious disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. ...having diabetes changes a person's outlook on life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in

the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called “adult diabetes.”

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
In general, I believe that:					
23. ...people who have Type 2* diabetes will probably not get much payoff from tight control of their blood sugars.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. ...people with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. ...Type 2* is as serious as Type 1† diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. ...tight control is too much work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. ...what the patient does has more effect on the outcome of diabetes care than anything a health professional does.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. ...tight control of blood sugar makes sense only for people with Type 1† diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Type 2 diabetes usually begins after age 40. Many patients are overweight and weight loss is often an important part of the treatment. Insulin and/or diabetes pills are sometimes used in the treatment. Type 2 diabetes is also called noninsulin-dependent diabetes mellitus or NIDDM; formerly it was called “adult diabetes.”

† Type 1 diabetes usually begins before age 40 and always requires insulin as part of the treatment. Patients are usually not overweight. Type 1 diabetes is also called insulin-dependent diabetes mellitus or IDDM; formerly it was called “juvenile diabetes.”

In general, I believe that:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
29. ...it is frustrating for people with diabetes to take care of their disease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. ...people with diabetes have a right to decide how hard they will work to control their blood sugar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. ...people who take diabetes pills should be as concerned about their blood sugar as people who take insulin.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. ...people with diabetes have the right <u>not</u> to take good care of their diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. ...support from family and friends is important in dealing with diabetes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix I cont.

Attitudes Diabetes Care 21:1391-1396, 1998. Larme et al

Compare the difficulty of treatment of diabetes with these other chronic conditions.

	1=easier					8= harder			
Hypertension	1	2	3	4	5	6	7	8	
Arthritis	1	2	3	4	5	6	7	8	
Cholesterol	1	2	3	4	5	6	7	8	
Depression	1	2	3	4	5	6	7	8	
Asthma	1	2	3	4	5	6	7	8	
Headache	1	2	3	4	5	6	7	8	
Back pain	1	2	3	4	5	6	7	8	
Heart Failure	1	2	3	4	5	6	7	8	
Peptic Ulcer Disease	1	2	3	4	5	6	7	8	

Please rate the following your beliefs about diabetes treatment.

	1=strongly agree				8= strongly disagree			
Treatment is efficacious	1	2	3	4	5	6	7	8
Confident in own abilities	1	2	3	4	5	6	7	8
Enough time and resources	1	2	3	4	5	6	7	8

Appendix II

Knowledge/attitude survey Diabetes care 22:19280-1932, 1999.

agree	agree somewhat	neutral	disagree somewhat	disagree
1	2	3	4	5
1. All oral agents used to treat diabetes are equally effective.				
1	2	3	4	5
2. Diabetes is a progressive disease that requires increasing numbers of therapies or doses of agents to control it over time.				
1	2	3	4	5
3. It is important for patients with type 2 diabetes to maintain a HbA1c < 7 %.				
1	2	3	4	5
4. Patients with insulin resistance do not have frank diabetes.				
1	2	3	4	5
5. As diabetic patients get older, it is better for them to have higher glucose levels, mimicking normal aging process.				
1	2	3	4	5
6. The progressive worsening of diabetes as one ages cannot be avoided.				
1	2	3	4	5
7. Insulin sensitizing oral agents offer significant advantages to patients with type 2 diabetes when used alone or in combination with sulfonylureas or insulin.				
1	2	3	4	5

References

1. Diabetes Prevention Program Research Group Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin. *N Engl J Med* 2003; 346:393-403.
2. UKPDS: Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes. UKPDS Study Group. *Lancet* 1998; 352:854-865.
3. UKPDS: Intensive blood glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes. UKPDS Study Group. *Lancet* 1998; 352: 837-853.
4. [Gerstein HC](#). Reduction of cardiovascular events and microvascular complications in diabetes with ACE inhibitor treatment: HOPE and MICRO-HOPE. *Diabetes Metab Res Rev*. 2002 Sep-Oct;18 Suppl 3:S82-5.
5. UKPDS: Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes. UKPDS Study Group. *British Medical Journal* 1998; 317: 703-713.
6. Colhoun HM, Betteridge DJ, Durrington PN, et al. Primary prevention of cardiovascular disease with atorvastatin in type 2 diabetes in the Collaborative Atorvastatin Diabetes Study (CARDS): multicentre randomised placebo-controlled trial. *Lancet* 2004; 364:685-696.
7. Wagner EH, Sandhu N, Newton KM, McCulloch DK, Ramsey SD, Grothaus LC. Effect of improved glycemic control on health care costs and utilization. *JAMA* 2001; 285(2):182-9.
8. Shafer K, Richardson A, Skipper B, Colleran K Disparities In Cardiovascular Disease Risks and Treatment: A Comparison Of Hispanic And Non-Hispanic Whites. *J Invest Med* 2005; 53(suppl.1):S101.
9. Kirkman MS, William SR, Caffrey HH, Marrero DG. Impact of a program to improve adherence to diabetes guidelines by primary care physicians. *Diabetes Care* 2002; 25(11):1946-51.
10. Ruoff G, Gray LS. Using a flow sheet to improve performance in treatment of elderly patients with type 2 diabetes. *Fam Med* 1999; 31(5):331-6.

11. Bailie RS, Si D, Robinson GW, Togni SJ, d'Abbs PH. A multifaceted health-service Intervention in remote Aboriginal communities: 3-year follow-up of the impact on diabetes care. *Med J Aust* 2004; 181(4):195-200.
12. Deichmann RE, Castello E, Horswell R, Friday KE. Improvements in diabetic care as measured by HbA1c after a physician education project. *Diabetes Care* 1999; 22(10):1612.
13. Benjamin EM, Schneider MS, Hinchey KT. Implementing practice guidelines for diabetes care using problem-based learning. A prospective controlled trial using firm systems. *Diabetes Care* 1999; 22(10):1672-8.
14. Bureau of Business and Economic Research (BBER), University of New Mexico website <http://www.unm.edu/~bber/>
15. Heart Disease. CDC National Center for Health Statistics 2003; Volume 2003.
16. Davidson MB. Effect of nurse-directed diabetes care in a minority population. *Diabetes Care* 2003; 26(8): 2281-7.
17. Panja S, and Colleran KM Getting Patients to Goal: Participation in a Dedicated Cardiovascular Risk Reduction Clinic Improves Risk Factors. *Diabetes* 2004; 53(suppl. 1):A185.
18. NMTOD Web page: www.nmtod.com
19. Anderson RM, Donnely MB, Gressard CP, Dedrick RF: Development of diabetes attitude scale for health-care professionals. *Diabetes Care* 1989; 12:120-127.
20. Larne AC, Pugh JA, Attitudes of Primary Care Providers Toward Diabetes. *Diabetes Care* 1998; 21:1391-1396.
21. UNM HSC Center for Telehealth web page: <http://hsc.unm.edu/telemedicine/>

