

DIABETES EDUCATION

2309-PUB

2307-PUB

Strategies for Dissemination and Communication in Patients with Non-Insulin-Treated Type 2 Diabetes

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Understanding communication strategies to improve diabetes self-management in patients with non-insulin treated type 2 diabetes (NITDM) is important. As part of the Monitor Trial, a pragmatic clinical trial of home glucose monitoring, we explored patients' and practice staff's communication experiences and their preferences and suggestions for dissemination of diabetes research results. A total of 65 individual 30-minute phone interviews with NITDM patients and eight 60-minute focus groups with 46 practice staff were conducted. Between 3 to 6 patients from each of the 15 participating primary care practices, were interviewed. Patients had a mean age of 60 years, were 61% female and 43% African American. Interviews and focus groups were coded and entered into ATLAS.ti. Patients said they look mainly to their providers, online searches, and social networks for information on diabetes and blood glucose testing. Additionally, they preferred communication by email, telephone and mail over in-person patient group meetings and text messages. Patients noted that long-term research study engagement strategies could facilitate their diabetes care. Key strategies included: highlight new discoveries, identify blogs on healthy eating and exercise, create space for interacting with others, and diabetes focused events. Practice staff discussed a list of strategies they use for communicating with patients, and many were consistent and reinforced what patients reported. Findings show that patients with NITDM seek pro-active discussions with providers, a frequently identified source of diabetes information. But, they want diabetes information in a variety of modalities. Identifying effective communication strategies such as these may offer information, connections, and guidance in self-management for patients with diabetes.

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2308-PUB

Factors that Affect Glycemic Control in Australian Adults with Type 1 Diabetes: Patients' Perspective

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It is often difficult for patients with type 1 diabetes mellitus (T1DM) to achieve good glycemic control, and the reasons why are not always clear. The aim of this study is to identify factors that influence glycemic control in patients with T1DM that attended outpatient service at the Diabetes Centre at Liverpool Hospital (Australia) (n=118). Two surveys were used for the study: 88 subjects completed the first survey on demographics and self-care practices, while 70 from this cohort performed the second survey which evaluated their perspective of factors that affect glycemic control. The median glycated haemoglobin (HbA1c) in this cohort was 8.1% (65mmol/mol) (range: 5.2 to 17.7% [33 to 169mmol/mol]). Factors named by subjects as having the most important impact on glycemic control were psychological factors (e.g., motivation) (25%), followed by exercise (22%) and healthy food (22%). Only 4% named consistency in insulin injections as important. When we analyse for the determinants of HbA1c, subjects with better glycaemic control (HbA1c≤8.0%) were less likely to miss basal insulin (26.7 vs. 51.4%, p=0.023) and had shorter duration of DM (13.1±11.4 vs. 20.6±13.1 years, p=0.006). Trends towards better control were also found for non-smokers, younger age, frequent BGL monitoring, and consistency with bolus insulin. There was no association between HbA1c and carbohydrate knowledge, education level, pump therapy or exercise. From a clinician perspective it is obvious that consistency in taking insulin results in better control. The importance of this does not appear to be recognized by our subjects who expect greater benefit from psychological factors, exercise and food. The effect of psychological factors on glycemic control was not assessed in the short answer survey but from the patient's perspective it is clearly an issue that warrants attention. Addressing psychological issues should be an essential part of managing patients with T1DM.

Aligned Clinician and Patient/Caregiver Education in T2D: Success at Improving Knowledge and Competence via an Online Initiative

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Although A1c levels of <7% have health benefits, nearly half of patients are not meeting these goals. Aligned physician-patient education supports shared decision-making and patient engagement, which improves outcomes. We sought to determine if an online parallel physician-patient education intervention could improve knowledge/competence of physicians and knowledge of patients/caregivers related to GLP-1 receptor agonists (RAs) in type 2 diabetes (T2D) management.

Two online CME activities were developed as expert discussions, with downloadable slides to reinforce key points. A chi-squared test assessed differences pre to post. The CME activities included links to three interactive patient/caregiver education modules. Patient/caregiver responses were pre-education were compare to post-education to measure changes in knowledge. All activities launched May 13, 2016 with data collection through June 15, 2016 for CME and September 10, 2016 for patient/caregiver modules.

A total of 760 primary care physicians (PCPs) and 160 diabetologists/endocrinologists (D/Es) participated and answered all questions; 1,722 patients/caregivers participated and completed the questions.

Physicians:

- Significant (P<.05) improvements post-assessment vs. pre-assessment were observed.
 - Differences between GLP-1 RAs (16% increase PCPs; 19% increase D/Es).
 - Administration requirements of GLP-1 RAs (38% increase PCPs and D/Es).

Patients/caregivers:

- Patients/caregivers demonstrated significant (P<.05) knowledge improvements related to:
 - 7% improvement in first-line use of metformin.
 - 26% improvement in differences between GLP-1 RAs and insulin.
 - 10% improvement in differences between long- and short-acting GLP-1 RAs.

This study demonstrates that well-designed aligned physician-patient education can be successful in improving knowledge/competence of key components of successful T2D management necessary to promote shared-decision making.

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2310-PUB

A Quality Improvement Initiative to Lower HbA1c and to Improve Outcomes in Patients with Uncontrolled Diabetes Mellitus in the Outpatient Clinic

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Introduction: Controlling diabetes mellitus is an ongoing problem in our society. There are many patients at the Out-Patient Clinic with poorly controlled diabetes. We implemented this continuous quality improvement initiative to identify patients with HbA1c>8 and institute interventions to improve outcomes.

Method: Electronic Medical Records of patients seen at our out-patient clinic with diabetes mellitus, and with a recorded HbA1c>8 between January, 2014 and January, 2015 were reviewed (n = 190). Pre-intervention HbA1c was documented. Project protocol was prepared and implemented in November, 2015. Interventions introduced were: 1. Educational sessions regarding diabetic management and titrating insulin for resident physicians. 2. Diabetic educational programs, financial assistance and insulin pens, as appropriate for patients. 3. Clinic staff: scheduling patient appointments on Tuesdays to mark as diabetic clinic day, performing capillary blood sugar and making reminder phone calls to patients regarding follow-up appointment. Post-intervention data was collected in March, 2016 and analyzed using paired t test.

Results: Patients who did not follow-up in the clinic during this study period were excluded and this resulted in 133 of study patients. The demographics showed 48.9% of male patients; age ranged between 24-84 years with a mean age of 49.2 years. There was a significant reduction of post-

Positive Impacts and Outcomes of Pharmacist-Led Diabetes Medication Therapy Adherence Clinic (DMTAC) in the Primary Care SettingCHIA WOON TAI, *Johor Bahru, Malaysia*

In Malaysia, 3.5 million (18%) people have diabetes in 2015, with the majority receiving treatment in primary care. Diabetes Medication Therapy Adherence Clinic (DMTAC) was setup in government clinics in 2011, with services delivered by trained pharmacists in accordance with a defined protocol to improve pharmaceutical care. The DMTAC program is conducted in collaboration with physicians, which include at least 4 individualized counseling sessions at monthly intervals. DMTAC allows pharmacists to evaluate glycemic control between physician appointments, provide self-management training and individualized management plans. UKPDS linked a 1% HbA1c reduction to 21% reduction in deaths related to diabetes and 37% reduction in microvascular complications. We evaluated the impact of DMTAC on glycemic control (HbA1c, fasting blood glucose (FBG)), medication adherence (8-item Modified Morisky Medication Adherence Score (MMMAS)), and understanding of treatment (% score) upon completion of at least 4 DMTAC visits. We included type 2 diabetes patients with HbA1c >8% who completed at least 4 visits between January 2015 and June 2016. Patients with ESRF or defaulted visits >3 months were excluded. Of 185 multi-ethnic (Malay, Chinese and Indian) patients enrolled into the program, 100 fulfilled the inclusion criteria. More than half (52%) were females with mean age of 60 years (SD=11), mean BMI of 27kg/m² (SD=5), and diabetes duration averaging 14 years (SD=8). Their HbA1c and FBG averaged 11% (SD=2) and 178mg/dL (SD=61), respectively. All were treated with either insulin only or dual combination therapy (oral antidiabetic agent with insulin). After 4 visits, there were significant improvements in HbA1c (mean reduction (MR)=1.03%, p<0.001), FBG (MR=20.2mg/dL, p=0.003), adherence (MMMAS from 7 to 8, p<0.001) and understanding of treatment (94.8% to 99.6%, p<0.001). This study supports the beneficial and positive impacts of DMTAC program in diabetes care.

2314-PUB**Results of a Survey of Graduates of Diabetology Fellowships: 2004-2016**AMBER M. HEALY, ROBERT J. TANENBERG, JAY H. SHUBROOK, JR., FRANK L. SCHWARTZ, *Athens, OH, Greenville, NC, Vallejo, CA*

The first physician in the United States to specialize in diabetes was Elliott Joslin, MD. He predicted that it would become an epidemic and today it is. In 2004 two diabetology programs were started in the United States to help serve a need for more providers of diabetes management. These programs have been targeted to primary care physicians. The programs are located at East Carolina University Brody School of Medicine (ECU) and Ohio University Heritage College of Osteopathic Medicine (OUHCOM).

The objective of this study is to assess the practice characteristics of the graduates of primary care diabetology fellowships. As of June 2016 there have been 39 graduates from the 2 programs, who we have surveyed. The goals of the survey were to determine program(s) effectiveness, community receptiveness of training, post-completion career paths, and diabetologists' barriers.

An IRB-approved survey with 27 questions was distributed via email using Qualtrics to all graduates of the two programs. Thirty-five graduates of 39 responded to the survey. Colleague receptiveness to diabetology has been variable while patient receptiveness to diabetology has been very positive. Graduates of the diabetology fellowship programs are practicing in a variety of settings including endocrinology, internal medicine, family medicine, hospital-based practice, diabetology, pediatrics, and medicine pediatrics. Most graduates are in a hospital-based practice or in private practice. Twenty-one percent of graduates are at academic centers. Most graduates are in Ohio, California, or North Carolina. The barriers that face graduates of both programs are similar. The biggest concerns are the lack of board certification, insurance recognition as a specialty, time and reimbursement for the management of the complex diabetes patient, and defining the specialty itself. Despite these concerns satisfaction with having completed these programs is unanimously positive.

intervention HbA1c as compared to the pre-intervention HbA1c within the 4 month period of post intervention and patient follow-up. (Mean pre-intervention HbA1c=10.78, mean post-intervention HbA1c=10.28, p<0.011).

Conclusion: The pre-post intervention data showed that patients following at our out-patient clinic with uncontrolled diabetes had significant reduction in HbA1c after implementing this initiative. So we have expanded this initiative to a prospective study with more interventions and patients to improve outcome.

2311-PUB**One Minute's Instruction of Mixing Insulin Skill Improves Glycemic Control in Patients Using Conventional Premixed Insulin**URU N. OSADA, YURIA NAMIKI, HIROTO SASAKI, YUYA TAKANO, HIKARU TAKAMINE, KOJI INAZUMI, *Yokohama, Japan*

The conventional pre-mixed insulin of NPH and rapid-acting insulin requires patients of mixing procedure before injection. However, patients often encounter problems with the mixing skill. We first examined the adherence of mixing skill focusing on two components, which are 1) axis rotation (AR) and 2) vertical flip (VF). For all patients, the attending doctor gave one minutes instruction of mixing skill by demonstrating the two component skills. Regarding the study analysis, we first analyzed the association between the patients' mixing skill with HbA1c (NGSP) at baseline in a cross-sectional manner. We also analyzed the effect of instruction on HbA1c of later visits. In results, among the total of 20 patients, 11 were male, the mean age was 59 years old and HbA1c was 8.0 (7.6-8.5)%. As for the insulin devices, 13 were using twice daily biphasic insulin aspart 30/70 (BIAsp 30), 6 were using inulin lispro protamine/insulin lispro 50/50 (Mix 50/50) three times a day and one was using both. As for the mixing skill, only about half of patients were well conducting AR (sufficient n=11, insufficient n=7, no procedure n=2). The adherence for VF was even worse (sufficient n=1, insufficient n=12, no procedure n=7) and this tendency was prominent in older patients. While the patient' skills were not associated with HbA1c at baseline, the later glycemic control was significantly improved after instruction. HbA1c was 7.4±0.9% (visit 1, p=0.02), 7.1±0.7% (visit 2, p=0.0008) and 7.2±0.7% (visit 3, p=0.002).

In summary, the adherence for conventional pre-mixed insulin is generally poor, but only a short instruction can benefit patients in glycemic control. Our findings may also imply the usefulness of new generation's pre-mixed insulin that needs no mixing procedure.

2312-PUB**Diabetes Literacy, Glycemic Control, and Education in Patients with Diabetes from Urban Areas Attending a Primary Care Diabetes Clinic in Mexico City: The Empowerment Challenge and the Empowerment Opportunity**RUBEN SILVA-TINOCO, DANIELA MEZA-GUILLEN, EMILIO MERCHAK, LILIA CASTILLO-MARTINEZ, FRANCISCO OROZCO-GUTIERREZ, JULIO HERNANDEZ-DIEGO, GILBERTO ARISTA-HERNANDEZ, FRANCISCO SERNA-ALVARADO, ENRIQUE LEON-GARCIA, *Mexico City, Mexico*

Diabetes education is part of the integrated approach for disease management. Strategies and objectives of diabetes care must be patient-centered. There is limited evidence about diabetes literacy in urban population being attended in primary care of low- and middle-income countries (LMICs). This study evaluated essential knowledge for type 2 diabetes self-management and also its association with education and glycemic control (A1c), during first-time patient assessment at Centro Especializado en el Manejo de la Diabetes in Mexico City in the first half of 2016. It was administered to 171 patients the 10-item Spoken Knowledge in Low Literacy in Diabetes (SKILLD) questionnaire which evaluates substantive aspects of diabetes care (monitoring, recognition and management of acute and chronic complications, etc.). Each correct answer has 10 points value, and highest score obtainable is of 100. Scores ≥50 were considered satisfactory and scores <50 were considered unsatisfactory for diabetes knowledge. The sample is comprised of 58% female, with an average age of 52 years and had an average 12 years of living with diabetes. Average score of diabetes knowledge was 27 points (range 0-100). Subjects with unsatisfactory scores had worst glycemic control (A1c 9.8% vs. 8.9%, p=0.023) and a greater proportion of patients with primary school or less education (43% vs. 11.1%, p<0.0001). Subjects with primary school or less education had lower scores of knowledge in Diabetes (15.9 points vs. 33.3 points, p<0.0001). Diabetes literacy in patients with diabetes from urban areas attending a primary care diabetes clinic was poor. Poor diabetes literacy was associated with lower education and worse glycemic control. These findings suggest a role of diabetes literacy in diabetes care that must be explored, especially in urban areas subjects with low education and poor diabetes knowledge in LMICs.

For author disclosure information, see page A751.

2315-PUB

Participation of Latinos with Type 2 Diabetes in a Culturally and Linguistically Oriented Virtual Diabetes Self-Care and Education Program

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Latinos are the largest minority group in the United States with a high rate of type 2 diabetes (T2DM) and its complications. Scarce data exist on telemedicine programs to improve diabetes (DM) control in Latinos with T2DM. We are conducting a randomized clinical trial to evaluate the impact of a DM care and education program involving frequent tele-communication with patients using video-visits, text messaging (TM), and phone calls on DM related outcomes in this population. Baseline data in the overall study population: N=96; (mean \pm SD) age (54.1 \pm 12.1 yrs.); 58% female; 63.5% married; 26% live in poverty; 8% live alone; school yrs. completed (12.26 \pm 4.1); T2DM duration (15.1 \pm 1.1 yrs.); age at Dx (39.1 \pm 10.9 yrs.); A1c (9.7 \pm 1.5%); BMI (36.1 \pm 12.8); 79% use insulin; Health Literacy score (4.06 \pm 2.7); DM self-care inventory revised (55.4 \pm 11.3); Depression (PHQ-9) (4.4 \pm 4.2); median DM distress score (PAID) (30.4 \pm 21.1); 53% reported to be physically active. Subjects were randomly assigned to either the control (standard care) or intervention group. Forty-nine subjects were allocated to the 6-month study intervention consisting of standard care plus communication with a DM educator via weekly 30-min video-visits during the first trimester and via seven 30-min phone calls for the second trimester. They received a weekly TM and had a video-visit with the Endocrinologist at the educator's discretion due to medical necessity. Access to glucose meter synch technology and a physical activity tracker along with educational materials based on storytelling was provided. Eight patients withdrew from the intervention during the first trimester and >80% completed all study visits. Subjects participated in 77% of the video visits and 84% of the phone calls; 100% received weekly TM and > 50% used the glucose and exercise trackers. Our preliminary findings show that it is possible to successfully engage Latino patients with T2DM in this type of program.

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2316-PUB

Dietary Education toward an Aged Society

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The proportion of the elderly above 65 years old has increased from 14.5% to 26% over 20 years in Japan. The number of working age people will halve by 2060. At this point the current youth will be of working age never having experienced both a super aged society and workforce shortage. At present, 40 year-olds, the major producers of society, are suffering from an increasing incidence of diabetes. Therefore, it is increasingly necessary to keep those major producers of working age mentally and physically sound. Dietary education is an effective way for the future labor force to develop precautions against life-related diseases. School teachers (ST) aren't familiar with the development of diabetes, and health care professionals (HCP) aren't accustomed to educating youth. An HCP gave a lesson on dietary education to 240 students in the ninth grade concerning disease development. After a year, the same students plus an additional 250 students were given the same lessons. According to a survey, more than 60% of the ninth grade students were aware of their health and 95% had breakfast. However, the habit was dependent on their parents, and the decision to eat breakfast was not based on the students' own decision-making. Some breakfast content was inappropriate because knowledge was incomplete. A year later, only 10% of students remembered the contents of the lesson, however more than 50% was aware of linking their own health to diet. They were most interested in the amount of sugar contained in sugary drinks and refrained from ingestion of them. Students who had the lesson twice developed their own decision-making ability. Students should learn food metabolism, disease development process, and what happens when suffering from illness from HCP with a view to putting the knowledge to practical use by their own efforts, and transferring the skills to future generations. Cooperation between teachers and medical specialists is essential to transfer the dietary knowledge to students appropriately. It is urgent to achieve cooperation between education and medicine.

2317-PUB

Safe Prescription Writing of U500 High-Dose Insulin and Patient Education Tool Development

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U500 insulin prescriptions must be written to ensure clear communication to both the patient and pharmacist, to help promote safe administration. However, because there are no syringes that are calibrated for U500 insulin currently available, the provider and the patient need to convert the U500 dose to a U100 insulin syringe or to milliliters for a tuberculin syringe, which can increase error potential. The purpose of this project was to prevent potential dosing errors for patients who have been prescribed U500 high dose insulin therapy. A guideline was developed to assist healthcare providers in one urban-rural health group to write clear U500 prescriptions that included both the U500 dose and syringe markings for conversion to a U100 insulin syringe. A pre-post intervention quality improvement project was completed after guidelines were presented to providers regarding safe U500 prescription writing. There was a 40 percent improvement in safe prescription writing of U500, three months after implementation of the new guidelines. The results were highly significant as indicated by a confidence interval of 55.38-23.69%, P value <0.0001. Standardized educational tools were developed for the healthcare providers and educators to teach patients how to prepare and safely administer U500 insulin in vials and syringes.

2318-PUB

The Importance of Diabetes Self-Care Diaries in Diabetes Management

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Diabetes is a chronic condition where the body fails to utilize the ingested glucose properly. Diabetes requires daily self-care and if complications develop, diabetes can have a significant impact on quality of life and can reduce life expectancy. International Diabetes Federation (IDF) estimates that there were 415 million people with diabetes worldwide. This figure will rise to 642 million people with diabetes by 2040.

In this study, 52 people with diabetes were recruited by snowball sampling in between February to June 2016 and follow them up for 6 months. The participants were given diabetes self-care strategies. The main self-care strategies were including monitoring blood glucose level, following diabetes diet, doing physical activity and taking medications. The participants were asked to write their self-care targets rigorously as diabetes diaries to prevent diabetes complications.

The participants' weight, waist circumference, body mass index (BMI), blood pressure and feet examination were checked constantly. Total and HDL Cholesterol and LDL Cholesterol, Triglycerides, Microalbuminuria and HbA1c and eGFR were also monitored. The doctors and the diabetes educators reviewed the diabetes self-management plan, physical activity, smoking status and the medications. The diet and healthy eating for diabetes were also monitored and the comprehensive eye examination was recommended.

According to the results, these diabetes strategies have had positive correlation with good glycemic control, reduction of complications and improvement in quality of life. Individuals with diabetes have been shown a considerable impact on the progression and development of their condition by participating in their own care and documenting the self-care strategies in their diabetes diaries.

The clinicians including doctors, the diabetes educators and the dieticians have pivotal roles in emphasising self-care targets among people with diabetes to prevent diabetes complications.

2319-PUB

Awareness of GDM among Polish Women after Childbirth: A Pilot Study

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Prevalence of GDM is increasing and ranges from 3-10% of pregnancies. Since guidelines recommend each pregnant women to have blood glucose test performed we aimed to test the general knowledge about GDM among women after childbirth.

There were 45 subsequent women hospitalized after the delivery in the obstetrician ward in Tarnowskie Góry (Poland) in November 2016 invited for this study. Women were surveyed with the Gestational Diabetes Mellitus Knowledge Questionnaire (GDMKQ, Hussain Z et al.). Medical history and anthropometric data were also collected.

15% of invited women declined to participate in the study. None of the remaining 38 women, in mean age 31.3 \pm 3.9 years, suffered from GDM,

even though 30 of them presented at least one risk factor for GDM. Women had the best knowledge in the category of basic information about GDM whereas questions about risk factors turned out to be the most difficult ones. Response to GDMKQ items is presented in Table 1, average score was 9.8/15 points (65%). There was no association between patient's school education or familial history of diabetes with knowledge of GDM ($p>0.005$, Mann Whitney U Test).

In the view of increasing number of patients with different types of diabetes worldwide, it seems essential to popularize knowledge about GDM among women with normal glucose tolerance during latest pregnancy because GDM may occur in the future especially among the ones with risk factors for GDM.

Table 1.

Questions	Right answer (%)	Wrong answer (%)
Basic knowledge about GDM		
Q. 1 Gestational diabetes mellitus is the type of diabetes that occurs:	92	8
Q. 2 In uncontrolled gestational diabetes mellitus the blood sugar level is:	89	11
Q. 3 What is the best way for testing blood glucose level for gestational diabetes mellitus patients?	73	27
Knowledge about risk factors		
Q. 4 You are at increased risk of developing gestational diabetes mellitus if you are:	60	40
Q. 5 You have increased chances of developing gestational Diabetes mellitus if:	8	92
Q. 6 You are more likely to develop gestational diabetes mellitus if you have:	71	29
Knowledge about diet/food values		
Q. 7 If you have gestational diabetes mellitus, you should avoid food containing high content of:	73	27
Q. 8 Which of the following food can be eaten without restriction during gestational diabetes mellitus:	76	24
Q. 9 What is the type of nutritional source mainly provided by rice?	76	24
Knowledge about management of GDM		
Q. 10 The most common sign of hyperglycaemia (high blood sugar) is:	39	61
Q. 11 The normal value of fasting plasma glucose (FPG) is:	60	40
Q. 12 If you feel the onset of hypoglycaemic (low blood sugar) symptoms, you should:	73	27
Knowledge about GDM complications/outcomes		
Q. 13 In uncontrolled gestational diabetes mellitus your baby may be:	44	56
Q. 14 If you have gestational diabetes mellitus you have:	60	40
Q. 15 gestational diabetes mellitus is a condition that:	81	19

Score 1 was given to every right answer and score zero was given to every wrong answer. Maximum score is 15 and minimum is 0.

2320-PUB**Knowledge of Target HbA1c among Type 2 Diabetic Patients in Rural Region of Upper Silesia, Poland—A Pilot Study**

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Nowadays trend in diabetology treatment puts an effort on tailored therapy individualization. In a view of the raising number of diabetic patients, the access to specialist care becomes difficult, especially among the inhabitants of rural areas what can lead to gaps in basic diabetes knowledge of diabetes control among them.

The aim of this study was to test whether patients attending outpatient diabetology clinics from rural area in Silesia are aware of target HbA1c value and HbA1c value definition.

The study was questionnaire based and performed in November 2016 in three Silesian outpatient diabetology clinics among 130 consecutive patients attending the clinic. They were asked to indicate the correct definition of HbA1c value and to determine their target value. Additionally, information on the current HbA1c value was recorded from patient's medical history.

110 patients with type 2 diabetes in mean age 67.8 years \pm 10.2 and diabetes duration of 10.8 \pm 8.8 years with mean HbA1c value of 7.1% \pm 1.3 agreed to participate. 54 patients (49.5%) were treated with insulin and 91 (83%) did not know neither the HbA1c value definition nor the correct value they should have. 50% of 25 patients (23%) who knew the definition did not know the target value. However 89 patients (81%) knew target FBG and 81 (74%) knew the target PPG.

There was no significant difference between knowledge of HbA1c value and target HbA1c in relation to treatment with insulin or oral antidiabetic agents nor diabetes control expressed by HbA1c.

Even though patients did know what the HbA1c value stands for and what their target HbA1c value should be, they mostly knew the target FPG and PPG values and their overall diabetes control was close to the one recommended for a general population of patients that is less than 7%. Nevertheless, this pilot study indicates that patients basic knowledge related to target HbA1c value, which is a main parameter that should be discussed with the patient, is poor.

2321-PUB**Application of WeChat App in Clinical Probation Teaching**

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WeChat, a cell phone app which texts, voice messages, videos, pictures could be sent or received for free, has becoming the dominant communicating method throughout China. Meanwhile, as the relationships between local Chinese doctors and patients has been growing tense, clinical training for interns are more difficult due to the decreasing number of patients who are willing to co-operate. Therefore, exploring a non-bedside probation teaching method would be of practical significance. Since type 2 diabetes are frequently characterized by being asymptomatic and negative in physical examination, interns subject to evaluate cases of type 2 diabetes were chosen to explore the application of this teaching method in a consecutive of four steps. First, a WeChat group was established for every 10-12 interns. Then, medical records of a representative case were distributed to students from the same group separately and cases varied from different groups. Every intern was required to upload the case report to the assigned chat group after analyzing the case independently. Second, group discussion on the differences of the group reports was followed. Next, key questions focusing on the main learning objective would be raised by the teacher such as how to differentiate type 2 diabetes mellitus from type 1 diabetes mellitus. Intra-group discussion would be encouraged before the teacher sum up. Key questions based class discussion was the third step. Finally it is the review and extending reading step. All the contents in the WeChat group could be saved for later reviewing. Further questions, comments, discussions could be continued as long as the WeChat group was not deleted. In addition, supplemental reading or video materials could be shared for extensive learning. All interns actively participated in each step. Required learning objectives were all covered in the class.

In conclusion, a four step algorithm based on WeChat group chat option was adopted in type 2 diabetic case analysis section of intern training course in this study.

2322-PUB**OGTT Performance among Polish Pregnant Women at Risk of GDM: A Pilot Study**

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Contemporarily, prevalence of GDM is increasing and ranges from 3-10% of pregnancies and it carries risks both for the mother and the unborn child. Since Standards of Medical Care in Diabetes and Polish Guidelines for the Management of Diabetes recommend each pregnant women not known to have prior diabetes to have blood glucose test performed we aimed to test the adherence to it.

There were 45 subsequent women hospitalized after the delivery in the obstetric ward in Tarnowskie Góry (Poland) in November 2016 invited for this study. Medical history and anthropometric data were collected.

15% of invited women declined to participate in the study. Of 38 women (75%) in mean age 31.3 \pm 3.9 years, mean declared BMI before pregnancy=

23.2±3.4 none suffered from GDM and 30 (78.9%) presented at least one risk factor for GDM. The risk factors according to international and Polish guidelines were: 8 women (21%) having first-degree relative with diabetes; 3 patients (7.9%) diagnosed with hypertension; 11 women (28.9%) being overweight or obese. The risk factors according to Polish Guidelines for the Management of Diabetes were: 11 women (28.9%) with a history of intra-uterine deaths and 7 females (18.4%) being older than 35 years at the time of pregnancy. Women who presented risk factors for GDM had the OGTT performed in mean 14±6 weeks following the first prenatal visit. Mean gestational week for the OGTT for women with risk factors for GDM was 21.8±4.7 hbd. What must be emphasized is that neither one had it done immediately after the first visit as is recommended.

Even though the examined group was sparse, the fact that 100% of women with risk factors for GDM didn't have the OGTT performed at accurate time indicates that it seems necessarily to increase awareness of recommendation regarding GDM testing among doctors taking care of pregnant woman. Since it is only a pilot study, larger number of tested women is needed to assess the adherence to recommendation.

2323-PUB

Knowledge and Attitudes to Insulin Therapy

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Introduction: Inappropriate management of hospitalized patients with diabetes on or requiring insulin therapy contributes to adverse events with a majority of hypoglycemic episodes related to insulin prescription errors.

Objective: To evaluate levels of confidence and knowledge among hospital staff managing patients with diabetes requiring insulin and to assess compliance with UK national guidelines.

Methods: An anonymized questionnaire (13 multiple choice questions) addressing confidence, knowledge and practicality issues of insulin management was circulated among hospital staff during September-October, 2016.

Results: Of 61 participants (Group 1[G1]-junior doctor cadre, n=28; Group 2[G2]-consultants, n=8; Group 3[G3]-staff nurses and physician associates, n=25), 85% of G1, 37.5% of G2 and 48% of G3 responded correctly to knowledge around insulin types and mode of action. The need for administering background insulin to patients with type 1 diabetes regardless of eating or fasting was correctly answered by 82% (G1), 62.5% (G2) and 88% (G3). The correct definition and management of hypoglycemia was recognized by 57% (G1), 50% (G2) and 68% (G3) respondents. Practicality issues, requiring subcutaneous insulin switch-over to variable rate insulin infusion in patients with type 1 diabetes undergoing surgery and timing of accurate administration of regular subcutaneous insulin after resolution of diabetic keto-acidosis was correctly answered by 78% (G1), 62.5% (G2), 75% (G3) and 50% (G1), 50% (G2) and 76% (G3), respectively. 22% (G1), 25% (G2) and 44% (G3) felt confident in managing patients on insulin.

Conclusion: There is lack of knowledge and confidence amongst medical practitioners around prescribing and administering insulin which may lead to adverse events in hospitalized patients. Additional, focused training on insulin management, free online modules on 'safe insulin prescribing' and the delivery of diabetes care are recommended. Further, multicenter studies will be required to address the full scope of the problem.

2324-PUB

Patients' Knowledge of Diabetes and Its Association with the Disease Complications

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Introduction: Diabetes mellitus is a major epidemiological and social problem nowadays, especially due to its chronic complications. Patients spend only several hours a year at a diabetology outpatient clinic and most of the time must deal with the disease itself. Therefore in order to minimize the risk of diabetes complications high level of knowledge about the disease seems to be essential. However, there are not many studies related to this issue performed up to date that could prove this hypothesis.

Material and Methods: There were 233 consecutive patients with uncontrolled diabetes mellitus hospitalized in the Diabetology Ward in Zabrze (Poland) invited to participate in the study. Those who gave informed consent were surveyed with the Michigan Diabetes Knowledge Test (MDKT) and anthropometric data as well as medical history was collected.

Results: Total of 199 diabetic patients agreed to participated in this study, 46 ones with type 1 (50% women) and 153 patients with type 2 (49% women) diabetes, in mean age 60.2±17.1 years and mean diabetes

duration 14.3±10.5 years. Kruskal-Wallis test revealed that higher score in MDKT was associated with lack of diabetes complications in general and particularly with lack of nephropathy and lack of coronary artery disease (p=0.001, p=0.001, p=0.02 respectively). Moreover, higher level of education was strongly associated with better knowledge about diabetes (p<0.0001) and lower number of complications (Chi² test; p=0.0002). Only 44% of university graduates and more than 70% of patients with lower education presented diabetic complications.

Summary: Better knowledge about diabetes is associated with lower number of diabetic complications, especially in regard of nephropathy and coronary artery disease. Patients with university degree present better knowledge of diabetes and have fewer complications than less educated ones. It seems essential to popularize knowledge about diabetes especially among patients with lower education level.

2325-PUB

Provider Communication and Patient Understanding of Glycemic Control Require Improvement

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Patient-provider communication is a vital element of diabetes (DM) care. Patients who understand their doctors are more likely to acknowledge health problems, understand treatment options, modify behavior, and follow medicine regimens. But communication is often flawed. Three areas were investigated: patient understanding, patient-provider communication, and patient knowledge.

To assess these issues, 115 type 2 DM patients returned pre- and post-visit patient-provider engagement surveys. Patients were 95% African American, 70% female, 88% single, mean age 60; DM duration 11.7 years.

Patients reported a self-assessed level of control and their perception of their MD's assessment with only moderate agreement (κ=0.54), indicating poor patient understanding of control or poor patient-provider communication.

Of the controlled (A1c<7) patients, 91% self-assessed as controlled, but only 78% reported their MD thought them controlled (poor communication). Of the uncontrolled (A1c≥8), 75% self-assessed as controlled (poor understanding) and 32% reported their MD thought them controlled (possible poor communication).

For 21 uncontrolled (A1c≥8), patients who reported their MD said they were controlled, electronic medical record review showed that for 62% the MD felt the patient was not controlled. For 14%, the MD wanted more information or was unclear. For 24%, the MD felt that the patient was controlled (poor communication).

To determine if poor knowledge caused poor understanding of control, patients were asked to identify their A1c goal. Only 30% picked a number between 6.5 and 7.5; 37% said they did not know; 19% said ≤6; 14% said >7.5. For 20 of the 21 patients, half reported A1c goal should be <7. Thus, knowledge is insufficient to explain all the poor understanding.

Patient self-assessment of control and retention of provider communication is poor. Patient knowledge of goals is poor. Providers need more training in communication and patient's need more education regarding goals.

Supported By: Genentech, Inc.

2326-PUB

Determinants of Awareness on Diabetes and Its Complications

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Diabetes mellitus, is a chronic disease that requires continuous medical care. Raising awareness and determining the factors that affect awareness about diabetes and its complications, has an important role achieving glycaemic control and preventing complications. In this study, socio-demographic properties of participants were obtained. Patients' awareness level and factors that affect awareness are determined. It is aimed to assign the relationship between these factors and diabetes regulation. 404 patients with diabetes who are applied to Istanbul Okmeydanı Research and Training Hospital, internal medicine and diabetes outpatient clinics were included in the study. They have asked to fill in diabetes knowledge questionnaire. Data about participants' survey results, socio-demographic facts, disease regulation, treatment methods and complications were analyzed. 61.6% of participants were female and 38.4% were male. Mean age was 54.5±11.4. 55.2% of patients were graduated from elementary school and 22.8% had no literacy. Mean score of the survey, consisting 23 questions, was found 16.1±3.6. The rate of patients who answered 50 percent or more of the survey correctly was 90.3%. Knowledge scores were positively correlated with education and income level, negatively correlated with age. Mean HbA1c value of participants was 8%±1.9. Regulated diabetes rate was

Effect of Cycling on Glycaemia and Weight in Young Individuals with Type 2 Diabetes Mellitus: A Pilot StudyASHOK K. JHINGAN, *New Delhi, India*

Introduction: Aerobic exercise is associated with significant improvement in glycaemia and weight loss in type 2 diabetes mellitus (T2DM). Cycling, a form of aerobic exercise can benefit young individuals with T2DM.

Aim: To assess effect of cycling on glycosylated haemoglobin (HbA1c) and weight over 6 months in young individuals with T2DM.

Materials and Methods: In this pilot, observational study, young (18-40 years) T2DM patients treated with ≤ 2 oral antidiabetic drugs and without insulin were identified from a core cycling group in a metro city from North India. Exercise involved cycling for 25 to 30 km per day for at least 5 days a week for consecutive 6 months. Before the start and after 6 months of cycling program, weight and HbA1c levels were assessed as part of routine clinical monitoring. Participants did not take any other form of exercise including resistance exercise during study period. Data compared using paired sample t test.

Results: In 20 patients, mean age was 35.6 \pm 2.6 years (29-38 years), five were <35 years and all of them were males. Cycling resulted in significant reduction in HbA1c (9.14 at baseline -7.96% at 6 months; mean change -1.18, 95% Confidence Interval [CI] 1.12, 1.24 p <0.0001) and weight (82.3-77.3 Kg; -5.0 kg, 95% CI -4.41, -5.58; p <0.0001). Reduction in HbA1c and weight was significant in patients aged < 35 years (p =0.018 and p =0.001 respectively) and \geq 35 years (p <0.0001 for both parameters). There was also an improvement in lipid profile (LDL and cholesterol) and blood pressure of the patients.

Conclusion: Core group cycling results in significant reduction in HbA1c and weight. It should be promoted as an ideal method for exercise in young T2DM cases to derive maximum benefits and to improve adherence to life-style intervention.

Effects of Underwater Treadmill Walk Training on Glycemic and Metabolic Control in Adults with Type 2 DiabetesRYAN T. CONNERS, JOHN M. COONS, DANA K. FULLER, DON W. MORGAN, JENNIFER L. CAPUTO, *Huntsville, AL, Murfreesboro, TN*

Objective: To document the influence of underwater treadmill walk training (UTWT) on glycemic and metabolic control in middle-aged adults with type 2 diabetes.

Research Design and Methods: Using a randomized, controlled, single-blind, crossover design, 26 adults with diagnosed, type 2 diabetes (age = 58.3 \pm 4.5 yrs; 16 females, 10 males) were randomly assigned to complete a 12-week control period followed by 12 weeks of UTWT (Group 1: G1; n = 13) or 12 weeks of UTWT (3 d-wk⁻¹) followed by a 12-week period of no UTWT (Group 2; G2; n = 13). During 4 months of UTWT, water height was maintained 10 cm below the xiphoid process, walking duration was increased from 30 to 60 minutes, and walking speed was initially set at a relative intensity range (RIR) of 40-50% of heart rate reserve (HRR) and increased to a speed corresponding to 50-70% HRR. Primary outcome variables included glycosylated hemoglobin (HbA1c), high-density lipoprotein (HDL), low-density lipoprotein (LDL-C), and triglyceride (TG). Using repeated-measures analysis of variance, post-treatment scores were compared to pre-treatment scores across G1 and G2 participants.

Results: Compared to pre-treatment values, HbA1c, LDL, and TG were reduced and HDL was increased (p < .05) following UTWT.

Conclusions: Our findings indicate that 12 weeks of underwater treadmill walk training featuring gradual and progressive increments in walking speed and duration can enhance glycemic and metabolic control in middle-aged adults with type 2 diabetes.

WITHDRAWN

higher in the patients treated with oral antidiabetic agents than any other treatment groups (p <0.05). And also regulated diabetes rate was significantly higher in the patients without diabetic retinopathy than the patients with diabetic retinopathy (p <0.05). There was no significant relationship between awareness level and diabetes regulation (p >0.05). Despite the high level of awareness, regulated diabetes rate wasn't affected as expected. Efforts need to be focused on educational programmes with strategies to incorporate the knowledge into patients' lives.

Unexplained Persistent Blood Glucose Fluctuations in a Type 1 Diabetic Patient on Short-Acting Insulin—A Case of LipohypertrophyHERMANN T. SIMO, OMAR ORAIBI, ABHINAV TIWARI, JOHN JUN, *Toledo, OH*

Background: Lipohypertrophy is a reported complication of subcutaneous insulin injections and has rarely been associated with short acting insulin (1, 2).

Clinical Case: A 33-year-old male, with long-standing T1DM since age 12 and well controlled with insulin, presenting with altered mental status, multiple episodes of hypoglycemia and hyperglycemia for the past 2 months. On admission, BMI was 28.5 and blood glucose level 18, infection and diabetic ketoacidosis were ruled out. The patient was started on Dextrose 50 and his blood glucose improved to 170 and patient was continued on insulin Aspart. During his hospital stay, patient continued to have multiple episodes of hypoglycemia and hyperglycemia. Laboratory values showed glutamic acid carboxylase antibody (10.2), hemoglobin A1c (9.1), hypokalemia (2.6), undetectable C-peptide and pro insulin serum levels, very high titers of random insulin level (6325) suggestive of exogenous insulin source. On physical exam, significant lipohypertrophy in bilateral flank area at the insulin injection site was noted, explaining the episodes of blood sugar level fluctuations. New injection sites (thighs, arms) were used and the erratic blood glucose level as well as hypoglycemia resolved, random insulin level improved to 16. His condition improved and he was discharged home on his insulin home regimen.

Conclusion: Short acting insulin can cause lipohypertrophy. This case highlights the need for injection site inspection, counseling about needles reuse and injection sites rotations and the fact that lipohypertrophy should be considered in the differential diagnosis of unexplained persistent hypoglycemia.

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EXERCISE

Postprandial Walking Attenuates the Glycemic Effect of a Carbohydrate Load in Individuals with Type 1 DiabetesSAMANTHA L. HINOJOSA, CYNTHIA J. HEISS, *San Antonio, TX*

Because exercising muscle does not require insulin for glucose uptake, post-meal exercise has the potential to blunt the glycemic response to a carbohydrate load. The purpose of this study was to determine if 15 min of postprandial light walking has an effect on the glycemic response to a Boost® breakfast beverage containing 41gm carbohydrate in individuals with type 1 diabetes (T1D). Seven participants, 22.3 \pm 4.3 yrs, with T1D completed the two days of data collection. On day 1, participants measured baseline fasting blood glucose (BG) with a glucometer, consumed a Boost® beverage, and sat quietly, repeating BG measurements 15, 30, 60, 90, and 120 min post beverage consumption. On day 2, participants repeated the protocol, but walked 15 min at a light pace (50-60% max HR) immediately after beverage consumption. The difference between peak and baseline (peak-baseline) BG and iAUC were lower in all but one participant on the walking compared to the sedentary day. Peak-baseline BG was significantly lower on the walking day compared to the sedentary day (6.4 \pm 1.2 vs. 4. \pm 2.4 mmol/dL, respectively, P <0.05) as was the incremental area under the curve (iAUC), 468.6 \pm 94.5 mmol/L/120 min vs. 241.1 \pm 155.8 mmol/L/120 min, respectively, P <0.05). Fifteen minutes of light postprandial walking can blunt the spike in BG and overall glycemic response to a breakfast beverage in young adults with type 1 diabetes, and may be an effective and realistic component to the management of T1D.

Supported By: University of the Incarnate Word Feik School of Pharmacy

2332-PUB

Optimal Body Fat Percentage Cutoffs in the Chinese Adult Population: A Nationwide StudyAIHUA JIA, SHAOYONG XU, JIE MING, QIUHE JI, *Xi'an, China*

The direct assessment of body fat by using simple methods might be better alternative indexes of obesity other than body mass index (BMI). It is necessary to establish the body fat percentage (BF%) cutoffs suitable for Chinese populations, but the relevant literature is limited. Therefore, we aimed to investigate the optimal cut-offs of the BF% relating to metabolic disorders and cardiovascular risks in China. The data were from the 2007-2008 China National Diabetes and Metabolic Disorders Study. Participants with age of 20-75 years and with a BF measurement record were included. The BF was measured using the biological impedance method. Receiver operating characteristic curve was used to decide the optimal BF% cutoffs and to predict the probabilities of diabetes, hypertension, metabolic syndrome (MetS), and 10-year cardiovascular events (estimated by Framingham risk score). A total of 23,811 participants were enrolled with the mean age of 44.87 years and the male percentage of 40.6%. The correlation coefficients between BF% and diabetes, hypertension, MetS, and Framingham risk score were respectively 0.124, 0.237, 0.429, and 0.154 (all $P < 0.0001$) in men and respectively 0.138, 0.305, 0.436, and 0.404 (all $P < 0.0001$) in women. In men, the optimal BF% cutoffs for these four endpoints were 24.5%, 24.9%, 24.21%, and 24.3%, respectively. In women, they were 35.69%, 32.5%, 32.6%, and 35.5%, respectively. Based on the weights of these endpoints, the pooled optimal BF% cutoff was 23.7% and 32.9% in men and women, respectively. The optimal BF% cutoff showed no obvious fluctuation among different age groups. We suggest the optimal BF% cutoff in China to be 24% and 33% for men and women, respectively. Simple methods such as biological impedance, as a supplementary indicator other than BMI, are recommended to be used in clinical settings for measuring BF%.

2333-PUB

Effects of Different Fractions of Korean Red Ginseng on Glycemic Control and Complication Markers in Type 2 Diabetic NSY MiceJUNG HYE KIM, KAHUI PARK, YU SIK KIM, DA WOON HAN, BOMIN KOH, SU JEONG PARK, HO SEON PARK, SANG BAE LEE, JI HONG YOU, JI SUN NAM, JONG SUK PARK, CHUL WOO AHN, KYUNG RAE KIM, *Seoul, Republic of Korea*

Objective: Therapeutic properties of Korean red ginseng (KRG) on diabetes have been extensively introduced in the literature. Saponin, or ginsenoside, is considered as the major bioactive component mediating the therapeutic effects of KRG, the exact physiological mechanism underlying antidiabetic effects is, however, still not fully elucidated. More than 30 different saponins together account for only about 3-4% of KRG, thereby, it is assumed that non-saponin fraction of KRG also carry potential antidiabetic effects; however, there is no study reporting the differentiated effects of saponin and non-saponin fractions of KRG on glycemic indications and hyperglycemia-associated complication markers.

Methods: 12-week-old male Nagoya-Shibata-Yasuda (NSY) mice were allocated into 4 groups: control group given standard rodent diet (SRD) or treatment groups given either Korean red ginseng extract (KRG), saponin fraction from KRG extract (Spn) or non-saponin fraction from KRG extract (NSpn) admixed in SRD. The targeted administration doses of KRG, Spn and NSpn were all 200 mg/kg/day; all mice were fed assigned regimens for 24 weeks. Parameters for glycemic control, blood lipid profile, inflammation, oxidative stress, and anti-oxidant enzymatic activities were measured.

Results: KRG had positive effects on glycemic control by attenuating the increase in FBG at 24-week and by increasing glucose clearance and insulin response during i.p. GTT as compared to control. KRG also attenuated increases in TNF- α , oxidized LDL (oxLDL), advanced glycation end-products, and accumulation of malondialdehyde in skeletal muscle. Spn had a positive effect on insulin response while NSpn attenuated oxLDL as compared to control.

Conclusion: This study showed that antidiabetic properties of KRG are not mainly mediated by saponin, but the therapeutic potentials of KRG may be due to the orchestral effects of both saponin and non-saponin.

WITHDRAWN

2335-PUB

Positive Dietary Traits among Hispanic Women With or At Risk for Type 2 DiabetesSONIA VEGA-LÓPEZ, NANGEL M. LINDBERG, MAYRA ARIAS-GASTÉLUM, ELIZABETH SHUSTER, MICHAEL C. LEO, ERIN S. LEBLANC, RICHARD T. MEENAN, VICTOR J. STEVENS, *Phoenix, AZ, Portland, OR*

Background: The diet of Hispanic women with or at-risk for type 2 diabetes has not been thoroughly characterized, particularly when focusing on the traits that may help with diabetes prevention/control.

Objective: Describe favorable diet characteristics of Hispanic women with or at-risk for type 2 diabetes enrolled in De Por Vida, a culturally-tailored weight loss intervention.

Methods: Overweight/obese Hispanic women ($n=199$; age = 43.7 ± 10.1 y; weight = 86.6 ± 16.4 kg; BMI = 36.4 ± 6.4 kg/m²) completed the Southwestern Food Frequency Questionnaire to assess dietary data reflecting the prior 3 months of intake before randomization to the intervention.

Results: Mean reported daily energy intake was 1650 ± 902 kcal. Mean carbohydrate intake was 218 ± 116 g, of which 24 ± 12 g were fiber, corresponding to $101 \pm 52\%$ DRI. Most participants reported consuming dairy (1.2 ± 1.2 servings/day of milk, $n=190$; 0.4 ± 0.5 servings/day of cheese, $n=182$); eggs (0.4 ± 0.4 servings/day, $n=173$); beans, nuts and seeds (0.8 ± 0.7 servings/day, $n=197$), whole fruit (2.7 ± 2.5 servings/day, $n=197$), vegetables (4.5 ± 3.1 servings/day, $n=198$), and fish (0.2 ± 0.2 servings/day, $n=172$). Few participants reported intake of fruit juice (0.3 ± 0.4 servings/day, $n=60$) and alcoholic beverages (0.1 ± 0.1 servings/day; $n=38$). Other beverages (6.0 ± 2.3 servings/day, $n=198$) provided 66 ± 124 kcal (14 ± 29 g sugars). Less than 40% of total sugars (84 ± 59 g) were added sugars (33 ± 34 g; 8% of total energy). Sugars, solid fats, and alcohol provided 22% of total energy. Although most participants reported consuming cakes/cookies/pastries ($n=175$) and candy/sweets ($n=176$), mean servings/day were 0.5 ± 0.5 (77 ± 79 kcal) and 0.5 ± 0.6 (51 ± 54 kcal), respectively.

Conclusions: De Por Vida participants reported adequate intakes of important food groups and nutrients including vegetables, whole fruit and fiber, and relatively limited intake of added sugars. These dietary traits should be promoted when providing dietary counseling to this subgroup of the population.

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2336-PUB

Glucose Profile in Children with Spinal Muscular Atrophy Type 1 and 2

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Spinal muscular atrophy (SMA) is a rare autosomal recessive disease due to mutation of the SMN1 gene causing degeneration of spinal cord motor neurons characterized by severe muscular atrophy, particularly in the most common and severe forms, SMA type I and II.

Two studies reported hypoglycemia during fasting and another one, in 7 SMA II children, showed insulin resistance (IR) in 6 of them. The severe changes in body composition (BC) could be the cause of glucose metabolism impairment: decreased lean body mass can cause hypoglycemia by reducing lipolysis, glycogen stores and protein catabolism whereas increased fat mass can lead to insulin resistance (IR).

In 42 SMAI and II children (2-10 yrs) we measured glucose and insulin plasma level, calculating HOMA IR and BC by anthropometry and DXA (Table).

Hypoglycemia (blood glucose <54 mg/dL) and hyperglycemia (blood glucose >100 mg/dL) occurred in one patient respectively, whereas HOMA-IR above cutoff value (>2.67) were found in 2 SMAI patients. SMAI compared to SMAII children showed both a worse nutritional status with lower LBM, and glucose profile with higher insulin and HOMA-IR values. Glucose, insulin plasma level and HOMA -IR were not related to BC.

In conclusion, impairment of glucose profile occurred in 10% of patients. The lack of association with BC suggests that other mechanisms could be involved in the deregulation of glucose metabolism in SMA disease.

Table.

	Total Sample		SMA Type I		SMA Type II	
	Mean	SD	Mean	SD	Mean	SD
Age (ys)	4,5	1,9	3,3	1,0	4,8*	2,0
Weight_Zscore	-1,8	1,9	-3,6	2,8	-1,5*	1,5
BMI_Zscore	-2,7	2,7	-5,8	2,2	-1,9*	2,3
FM%	38,0	7,3	37,0	7,9	37,8	7,5
FM_g	5757	2902	4191	2000	6116	3057
LBM_g	8470	2016	6344	1223	9030*	1841
GLIC_mg_dl	84,0	9,0	80,0	21,0	83,1	9,0
INS_μU_ml	4,92	3,8	8,51	6,76	4,24*	2,58
HOMA-IR	1,07	0,88	1,81	1,45	0,81*	0,57

* p<0.05

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2337-PUB

Assessing the Relationship between Nutritional Status and Adipocytokines Level in Patients with Metabolic Syndrome and Chronic Hepatitis C

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The objective of this study was to determine the relationship between nutritional status and adipocytokines level in this population.

Methods: This study is transversal and included 171 HCV infected patients (60 patients with HCV without MetS and 111 patients with HCV and MetS). They followed anthropometric indexes, biochemical parameters and adipocytokines level. MetS was defined according to the IDF. The nutritional status was assessed using: BMI; MNA score; INA score; NRI. Also, a score was calculated from malnutrition combined by merging the results of the above mentioned scores in a single combined score.

Results: The average age of the evaluated patients was 53.1±8.3 years. Of the total number of patients 64.9% had MetS. Using the combined score, malnutrition was present in 18 patients (10.5%). Of these, 12 patients (66.7%) belong to the group with MetS. Adiponectin level was significantly higher in patients without MetS compared to those with MS (6.76 ng/ml vs. 4.81 ng/ml). At the same time the level of proinflammatory cytokines was significantly higher in patients with MS and malnutrition than those without MS (leptin 21.25 ng/ml vs. 17.78 ng/ml, TNF-α 17.74 pg/ml vs. 12.76 pg/ml, IL-6 16.58 pg/ml vs. 14.63 pg/ml, resistin 15.83 ng/ml vs. 14.98 ng/ml, p<0.05). Another observation would be that the level of transaminases (AST, ALT) were significantly higher in patients with MetS and malnutrition compared to those without MetS (p<0.05).

Conclusions: In this study, the level of proinflammatory cytokines (TNF-α and IL-6) was significantly higher in patients with malnutrition, compared with those without malnutrition. It has been found that the addition of high levels of proinflammatory cytokines in patients with malnutrition can be considered a strong predictor for the progression of liver disease in people with HCV and MetS.

For author disclosure information, see page A751.

2338-PUB

Clinical and Nutritional Predictors for Length of Inpatient Care of Elderly Patients

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Background: The aim of study was to identify possible clinical and nutritional factors related a longer inpatient care in elderly.

Methods: Cross-sectional study carried out with elderly hospitalized from July 2015 to December 2016. The anthropometric measurements were: weight, height, arm perimeter, tricipital skin fold, abdominal perimeter, calf circumference (CC). The adductor pollicis muscle thickness (APMT) and the handgrip strength were analyzed in order to evaluate the patient strength, and for the risk of fall the Morse Fall Scale (MFS) was applied. The length of inpatient care was considered by median of all patients (above and below 14 days).

Results: A total of 523 patients were included, female sex (63%), ethnicity (48% white), average age 70.6 ± 6.9 years old, body mass index (BMI) 20.3 ± 7.9Kg/m² and 54% had type 2 diabetes mellitus. The elderly who had a longer inpatient care presented a reduction in some measurements that mark malnutrition, such as: CC (32.1 ± 4.2 vs. 34.9 ± 21.1cm, p= 0.003), APMT (10.1 ± 3.1 vs. 12.1 ± 3.5mm, p= 0.014) and handgrip strength (18.3 ± 7.6 vs. 22.5 ± 8.5kgf, p= 0.021). In addition, they presented a higher fall risk in the MFS (22.6±8.5 vs. 18.1±7.6, p= 0.021) and lower albumin serum level (3.5 vs. 4.0 g/dL, p= 0.024). In the analysis of multivariate logistic regression, after adjusting for age, sex and BMI, only the handgrip strength (OR= 0.91, p<0.001, 95% CI 0.90-0.96), APMT (OR= 0.92, p= 0.044, 95% CI 0.86-0.97) and MFS (OR= 1.02, p= 0.003, 95% CI 1.007-1.037) continued to be associated with length of inpatient care.

Conclusions: The elderly patients hospitalized over a long period have an increased risk for falls due to reduction of muscle strength of the handgrip and reduction of the thickness of the adductor muscle of the thumb. Handgrip strength, APMT and MFS can be used in the hospital routine in order to identify patients in fragility condition.

2339-PUB

Effects of Proton Pump Inhibitors and Metformin on Hypomagnesemia in Veterans With and Without Diabetes

KATHERINE DIGNAN, *Parma, OH*

Purpose: The purpose of this study is to assess serum magnesium concentrations in Veterans with and without diabetes (DM) prescribed Metformin and/or Proton Pump Inhibitors (PPIs) and to identify any relationships between clinical characteristics and hypomagnesemia.

Objectives: To observe relationships between magnesium levels and PPI and/or Metformin use. We hypothesize that Veterans on PPIs and/or Metformin will have lower serum magnesium levels compared to non-users. To identify patients at higher risk for hypomagnesemia; we hypothesize that those with diabetes and prediabetes will have lower magnesium levels compared to those without.

Methods: The study design included a cross-sectional, observational and retrospective chart review. Inclusion criteria encompassed any Veteran with or without diabetes, who participated in selected classes through the Cleveland Veteran Affairs Medical Center in the past 5 years. There was no exclusion criteria. All participants (n= 700) were divided into seven groups based on diabetes diagnosis and medication prescriptions.

Results: Groups with diabetes had significantly lower Mg²⁺ levels than non-DM groups. There was a significant relationship between having cardiovascular disease, hypertension or using Metformin and lower Mg²⁺ levels. There were no significant relationships between Mg²⁺ level and race, dyslipidemia, GERD or PPI use. In addition, no relationship was found between Mg²⁺ supplement or multivitamin users and Mg²⁺ levels. The individuals using one of these forms of supplementation were not found to have higher Mg²⁺ levels than non-users.

Conclusions: Overall, Metformin users along with diabetes diagnosis had lower Mg²⁺ than non-users. Metabolic Syndrome associations including diabetes, hypertension and cardiovascular disease were related to lower Mg²⁺ levels. PPI and Metformin users lack monitoring and supplementation of Mg²⁺ from providers even with research and the FDA alert.

2340-PUB

The Effect of Diabetes Bean-Based Diet with Insulin Intensive Care Therapy for the Newly Diagnosed T2DM PatientsQING XIONG, ZHI MING LI, RONG JIE NIE, LAN FANG FU, XUBIAO MENG, DI MING ZHENG, XUE JUN YANG, *Haikou, China*

Diabetes diet method is now a hot field on research and clinical management of T2DM patients.

Method: We recruit 40 newly diagnosed T2DM patients with insulin intensive care therapy and randomly divided into two groups, one group (20 patients) was fed with common diabetes diet, another group was fed by bean-based soup as breakfast for eight weeks.

Result: In bean-based diet group, the glucose tolerance test showed that he glucose and insulin responding was lower significantly on 2 and 3 hours point, ($P < 0.05$) whereas, the serum C peptide level was no significant changed compared with the common diabetes diet group. HbA1c decreased from $10.25 \pm 2.03\%$ to $7.435 \pm 0.67\%$. Fasting C peptide level increased from 1.41 ± 0.85 ng/ml to 3.3 ± 0.93 ng/ml. The whole day insulin consumption of insulin intensive care therapy was reduced from 36.35 ± 8.79 U to 11.75 ± 3.27 U In bean-based diet group, while there are no significant changes in HbA1c, fasting C peptide and whole day insulin consumption in common diabetes diet group.

Conclusion: diabetes bean-based diet intervention can promote the effect of insulin intensive care therapy and plays an important role on a potential intervention to the pancreatic β -cell function and insulin action for the newly diagnosed type 2 diabetes mellitus patients.

PSYCHOSOCIAL, BEHAVIORAL MEDICINE

2341-PUB

The Effects of an Adapted Walking Program on Fatigue Levels in Individuals with Type 2 Diabetes: A Mixed Methods StudyRUPALI SINGH, JESSICA BROOKS, ERIN DALY, CHRISTINA DENISON, JEANIE LAM, CAITLYN SHOOK, *Troy, NY*

Fatigue is a common complaint among people with type 2 diabetes (T2D) yet there is limited research on methods to decrease fatigue. The purpose of this study was to evaluate the effects of a 10 week walking program on fatigue and other contributing factors in individuals with T2D. A mixed methods approach was used, combining quantitative and qualitative methodology. The study is ongoing, data on 5 participants (3 male/2 female; average age 59.2 ± 10.6 years and BMI 36.06 ± 7.89 kg/m²) is presented. Each participant was given an individualized walking program with a weekly goal for number of steps determined by individual fatigue levels. Fatigue was assessed using Multidimensional Fatigue Inventory (MFI-20). Other outcome measures included; Body Mass Index, Fasting Blood Glucose, Pain (Visual Analog Scale), Quality of Life (Diabetes-39), general health status (Duke Health Profile), and 6 Minute Walk Test. Post intervention semi-structured interviews were conducted to assess walking intervention effectiveness. Wilcoxon Signed Ranked Test and Spearman's Rank Correlation test were used to determine effectiveness of walking intervention and to test the relationship between number of steps walked and other outcome measures. Decline in fatigue scores ($P = .041$) were seen post intervention with a negative correlation to Diabetes-39 subcategory: energy and mobility and amount of steps walked ($r = -.900$; $P = .037$). Qualitative findings elicited a more detailed perspective of the intervention experience identifying five themes; fatigue, causes of fatigue, effect of fatigue on physical activity, walking program as motivation and factors reducing motivation. The study seems to be promising despite the small sample size, it still needs to be validated by a large sample size. Exercise is a self-management strategy recommended for people with T2D and walking is a convenient form of exercise that can also affect fatigue levels.

2342-PUB

Quality of Life and Illness Perception in Type 1 DiabetesSILLA M. CONSOLI, GILLES LE PAPE, NATHALIE DUGARDIN, YACINE KHERBACHI, MARTIAL FRAYSSE, ANDRE GRIMALDI, *Paris, France, Grigny, France, Lille, France, Gentilly, France, Fontenay-sous-Bois, France*

Objective: To specify illness perception in type 1 diabetes (T1D) compared with insulin-treated type 2 diabetes (ITT2D).

Methods: 44 T1D and 90 ITT2D patients were interviewed by phone and answered a questionnaire focused on illness perception.

Results: T1D were younger, less overweighted, had less cardiovascular problems, but their duration of diabetes was comparable. General well-being score was similar in T1D and ITT2D. Adjusting for general well-being, illness perception indicated a greater impact of diabetes in T1D (6.09 ± 2.80 vs. 7.01 ± 2.39 ; $p = 0.039$). Respectively 34.1%, 25% and 40.9% of T1D reported having presented < 1 /month, 1/month to 1/week or > 1 /week hypoglycemic episodes vs. 60%, 18.9% and 21.1% of ITT2D ($p = 0.004$). A close percentage of T1D and ITT2D (22.7% vs. 22.2%) reported being very afraid of hypoglycemia. Formulations associated with the thought of insulin were more positive among T1D. In a multivariate analysis, after adjusting for general well-being and type of diabetes, illness perception was negatively associated with hypoglycemia frequency ($p = 0.002$) and fear of hypoglycemia ($p = 0.013$), with a synergistic effect (interaction: $p = 0.034$); taking into account these explanatory factors, there was no more any significant difference between T1D and ITT2D regarding illness perception. Satisfaction and expectations in terms of support by health care professionals were similar, excepted for a less satisfactory support by general practitioner and a lower expectation about information on disease in T1D, who showed a greater use of medical information available on internet.

Conclusion: Whereas the burden of diabetes looked higher at first sight in T1D, a synergistic effect of hypoglycemia frequency and fear of hypoglycemia largely explain this difference and plead in favor of treatments minimizing these disadvantages and making the patients feel more confident. T1D nevertheless exhibited a more positive perception of insulin treatment and proved more autonomous in the management of their health.

2343-PUB

Three Contrasting Perspectives on Diabetes PerceptionSILLA M. CONSOLI, NATHALIE DUGARDIN, YACINE KHERBACHI, MARTIAL FRAYSSE, GILLES LE PAPE, ANDRE GRIMALDI, *Paris, France, Lille, France, Gentilly, France, Fontenay-sous-Bois, France, Grigny, France*

Objective: To compare the experience and emotions associated with the disease and its treatment, expressed by diabetics, with those attributed to diabetic patients by family caregivers (FC) or by health care professionals (HCP).

Methods: 300 diabetics (14.7% of type 1 diabetes), 80 FC and 421 HCP (101 nurses, 110 general practitioners (GP), 109 pharmacists and 101 specialists) were interviewed by phone or by internet and answered questionnaires focused on diabetes perception.

Results: General well-being was of 6.8 ± 2.0 in patients, close to the level imagined by FC (7.2 ± 1.8 ; NS), but higher to that imagined by HCP (6.1 ± 1.2 ; $p < 0.001$). Similar differences were observed regarding diabetes experience (respectively: 7.2 ± 2.2 ; 6.8 ± 2.2 and 5.8 ± 1.3). GP and pharmacists looked more optimistic than nurses and specialists, especially for diabetes experience. Respectively 50.5%, 26.5% and 23% of diabetics evoked only negative, mixed or only positive emotions, in reaction to diabetes, with FC being more optimistic ($p = 0.001$) and HP more pessimistic ($p < 0.001$). Fifteen per cent of the patients felt negatively judged by others, due to their diabetes, whereas 32.4% of HCP thought diabetics were negatively judged. A great fear of hypoglycemia was expressed by 16.7% of the patients, and imagined by 22.5% of FC and 54% of HCP (65% of nurses and 60% of specialists). The comparison of expectations regarding follow-up, between patients and HCP, found similar results for quality of listening, encouragement, or providing an individualized support; by contrast diabetic patients expected more than the doctors thought information (32% vs. 13%; $p < 0.001$), and refocusing (14.3% vs. 2.9%; $p < 0.001$) and less health education (7% vs. 24.9%; $p < 0.001$).

Conclusion: In spite of a relative optimism, FC are close to the illness experience expressed by diabetics, whereas HCP, especially specialists and nurses, overestimate diabetes burden and underestimate patients' adaptation capacities. Patients expect information and refocusing, whereas HCP value education.

2344-PUB

WITHDRAWN

2346-PUB

Usage of Social Media for Diabetes Management in a Clinic-Based PopulationARUN REDDY NELAKURTHI, LYNNE M. JONES, MARY E. BOYLE, CURTISS B. COOK, JINGRUI HE, *Tempe, AZ, Scottsdale, AZ*

Introduction: The emergence of the internet has made it possible for people to go online to seek answers to their health related questions. Many patients use the Internet to find and join communities of individuals with similar health conditions in order to share information, and to provide and receive advice on management. However, little data is available on whether patients with diabetes mellitus (DM) utilize social media. The aim of our study was to investigate the likelihood of patients utilizing social media to offer or seek support from others for their diabetes management.

Methods: We developed and conducted survey in a convenience sample of patients with diabetes mellitus (DM) attending an academic outpatient endocrinology clinic in December 2016. The survey collected data on patient demographics, information on their DM, dietary habits, self-care activities, social media usage and likelihood of seeking or offering information to other patients on social media.

Results: There were 50 responses (mean age=62±13.2 yrs, 26 women). Most (61%) had type 2 DM, were Caucasian (66%), and were on insulin (58%). Mean hemoglobin A1c was 7.46±1.61%. Analysis showed that most of the respondent's (45 out of 50) do not actively utilize social media to offer advice or seek support from others for their diabetes management. Also, 5 patients out of 45 patients reported that they do not access social media but would like to get support from the social media for their diabetes management.

Conclusion: Preliminary data indicates that in this clinic based population, use of social media for purposes of assisting with DM management is low. Because other reports suggest that use of social media might improve outcomes and self-care behaviors, additional work is needed to better clarify why patients would not use this tool, and to determine if educating the patients in the of use social media would improve their diabetic health.



2347-PUB

Psychosocial Factors Related to Quality of Life in Postoperative Diabetic Foot Ulcer PatientsPATRICIA N.E. ROBERSON, ERIN A. ROBERSON, JAVIER LA FONTAINE, DANE K. WUKICH, KATHERINE M. RASPOVIC, EASTON RYAN, LAWRENCE A. LAVERY, *Knoxville, TN, Dallas, TX, Washington, DC*

Little is known about the predictors of quality of life (QoL) for diabetic foot ulcer (DFU) patients after surgery other than the frequency and status of wounds impact QoL.^{1,2} An integrative care approach has been recommended to improve QoL.³ However, to effectively and efficiently improve QoL for these patients we must have a comprehensive understanding of the contextual factors which impact it. Using a psychosocial approach, the present study examines potential psychosocial factors related to QoL in DFU post-operative patients. We recruited 45 patients (data collection is ongoing) diagnosed with DFU pre-operatively. Patients completed measures both pre-operatively (T1) and at healing time (T2; up to 12 weeks). Using SPSS we ran a series of multiple-linear regression models to determine how psychosocial variables at T1 and wound status predict to T2 QoL while controlling for T1 QoL. Due to sample size, the statistical significant was set at $p < .10$ to detect small and medium effect sizes. Results indicated that several psychosocial and health factors predicted T2 QoL: General health quality ($B = -.90$, $p < .10$), co-living status (0 = live alone, 1 = don't live alone; $B = 2.00$, $p < .10$). However, frequency seeing family and friends ($B = -.60$, $p = .27$), experiences in social anxiety ($B = -.11$, $p = .14$), stress associated with social anxiety ($B = -.13$, $p = .12$), overall wellbeing ($B = -.04$, $p = .68$), experience of physical symptoms in daily life ($B = .03$, $p = .52$), stress associated with physical symptoms in daily life ($B = -.02$, $p = .70$), and T2 Wound status ($B = .65$, $p = .58$) were not predictive of T2 QoL. Results indicate that the presence of a social network in close proximity and initial physical health are related to post-operative QoL. Future research should further explore the impact social relationships have on QoL for DFU patients.

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2345-PUB

Validation to Brazilian Portuguese of a Measuring Adherence Survey for Adults with Type 2 DiabetesGABRIELA H. TELO, FERNANDO IORRA, BRUNA VELHO, KAREN SPARRENBERGER, BEATRIZ D. SCHAAN, *Porto Alegre, Brazil*

Background: To prevent complications, diabetes treatment requires dedication to demanding self-care behaviors in multiple domains, including diet, exercises, medications, and glucose monitoring. Currently, there is no specific adherence instrument validated to Brazilian adults with type 2 diabetes. The aim of this study was to validate, to this population, the Self-Care Inventory-revised (SCI-R), a 15-item adherence survey.

Methods: Type 2 diabetes outpatients of a tertiary hospital in Southern Brazil were recruited to examine the SCI-R psychometric properties, previously adapted to Brazilian adults with type 1 diabetes. We interviewed 40 selected patients to find out what they thought was meant by each survey item. A cognitive debriefing generated an adapted version of the SCI-R, which was applied to another 75 participants in order to analyze survey reliability and validity according to its association with HbA1c. We also analyzed the impact of removing each question on the value of Cronbach's α , which could lead to the exclusion of a particular item. Test-retest reliability analysis over 3 weeks was developed to stabilize the sample.

Results: Seventy-five patients (59% females; 71% Caucasians) responded to the adapted SCI-R version. The mean age was 59.9±7.5 years, diabetes duration was 16.5±8.6 years, and HbA1c was 8.6±1.5% (70±16.4 mmol/mol). The SCI-R was self-administered and completed in 8-10 min. Analyses showed that four items, primarily related to ketones and hypoglycemia, had low item-total correlation (<0.3) and were excluded from the final SCI-R version. These removal increased Cronbach's α from 0.61 to 0.63. In predictive validity analysis, HbA1c correlated significantly with the SCI-R score ($r = -0.38$, $P = 0.001$). The intra-class correlation coefficient for test-retest analysis between baseline and 3-week scores was 0.93.

Conclusions: The Brazilian Portuguese version of SCI-R yielded a valid tool to measure adherence treatment for adults with type 2 diabetes.

Supported By: Hospital de Clínicas de Porto Alegre, Brazil; Conselho Nacional de Desenvolvimento Científico e Tecnológico

**CLINICAL THERAPEUTICS/NEW TECHNOLOGY—
GLUCOSE MONITORING AND SENSING**

2348-PUB

Impact of CME on Improving Understanding of Advances in Glucose Data Interpretation

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A substantial advance in the field of glucose monitoring is the development of CGM devices. We sought to determine if online continuing medical education (CME) could improve the clinical knowledge and competence of diabetologists/endocrinologists (D/Es) and nurses regarding advances in glucose data interpretation. A CME activity was developed as an online video discussion between 2 experts. The effects of education were assessed using a 4-question linked pre-/post-assessment study design, McNemar's chi-squared test, and Cramer's V for effect size.

Baseline knowledge was higher among D/E compared to nurses:

- 63% of D/Es compared to 20% of nurses recognized similarities in glucose monitoring devices.
- 47% of D/Es compared to 22% of nurses recognized clinical application of glucose data.
- 55% of D/Es compared to 36% of nurses recognized an effective strategy for patient engagement using glucose data.

Significant overall improvements ($P < .05$) were seen for both D/Es ($n = 137$; medium effect $V = 0.171$) and nurses ($n = 763$; small-medium effect $V = 0.15$).

- 17% more D/Es and 24% more nurses correctly recognized A1c provides information about glucose exposure.
- 24% more D/Es and 8% more nurses correctly identified the ability to use glucose monitoring data for advancing therapy.
- 20% more D/Es and 17% more nurses selected an effective strategy for engaging a patient in their diabetes management plan using glucose data.

Additional education needed:

- 36% of D/Es and 54% of nurses failed to recognize similarities in glucose monitoring devices.
- 31% of D/Es and 71% of nurses failed to recognize information provided by measuring A1c.
- 53% of D/Es and 63% of nurses failed to recognize clinical application of glucose data.

This study demonstrates the success of a targeted educational intervention on improving knowledge and competence of D/Es and nurses regarding clinical application glucose data interpretation advances. Baseline knowledge was higher among D/Es. Additional education on advances in glucose data is needed for both groups.

Supported By: Abbott Diabetes Care

2349-PUB

Blood Glucose Telemonitoring at Retail Pharmacies in China: The Alternative Sites for Community Diabetic Care

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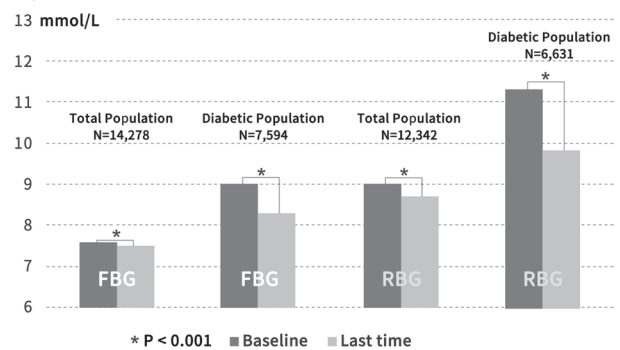
Objective: To implement a digital solution at retail pharmacies to improve community diabetic care.

Methods: We developed a digital solution that consists of bluetooth glucose meter, an App and a cloud database for diabetic care support, and implemented the solution in 1,146 retail pharmacies in 94 cities in China. Diabetic patients who were pharmacy members can receive in-store services of: 1) BG testing with the results synchronized to the cloud, 2) App-assisted personalized coaching, 3) App-assisted personalized meal plans, and 4) pharmacy consultation. This report profiles a diabetic population of 85,790 during Jun 6th 2015 and Nov 4th 2016.

Results: The study population had an average age of 59.7 ± 11.8 , BMI of 23.7 ± 3.4 , and male of 44.3%. A total of 204,887 BG tests were performed, and 28,492 people had at least 2 measurements. Both fasting blood glucose (FBG) and random blood glucoses (RBG) were improved (Figure). Plotting the baseline FBG readings against the category of each city's economic status found a strong negative correlation $r = -0.92$, $P = 0.029$, with the lowest baseline FBG in the economically most advanced cities. Yet the same analysis for the glycemic control effect indicated no correlation $r = -0.14$, $P = 0.817$.

Conclusion: Regional economic status affects the population BG level and pharmacists are effective in community diabetic control regardless the geographic difference.

Figure.



2350-PUB

Efficacy of PHR Integrated with EHR and Self-Monitoring Devices on Self-Care in Patients with Type 2 Diabetes

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Background: Digital Personal Health Records (PHR) with tele-medicine have been proved to be effective in treating diabetes. However, simply digitizing logbooks (improving recording, reviewing and sharing capability) may be enough to increase adherence.

Objective: To develop and evaluate the efficacy of a PHR integrated with Electronic Health Record (EHR) and self-monitoring devices.

Method: A 3-month multi-center randomized trial was performed to type 2 diabetes patients. Intervention group used the developed PHR "e-DM Diary," with BG monitor, digital scale, BP monitor and activity monitor. Control group used self-monitoring devices with paper logbooks issued by Japan Association for Diabetes Education and Care, a standard protocol in Japan. The e-DM Diary or paper logbook was referenced at doctor visits. There were no other modifications to treatment.

Overview of e-DM Diary: e-DM Diary is accessed by smartphone or PC. Self-monitoring results are automatically uploaded through patient's smartphone via Bluetooth. Patient's EHR, including test results, treatment goals, and prescription information were provided automatically. Patient's status of diabetes complications, self-monitoring goals and results, were presented in graphs.

Results: 28 participated were enrolled in this study (intervention=15/control=13, age avg. 54 y.o., HbA1c 6.9%). Summary of Diabetes Self-Care Activities Measure, glycemic control and body weight did not change before and after the study period in both groups, and there was no difference between groups. Patient's age, e-Health literacy did not influence the results.

In the intervention group, 12 of 15 patients answered that e-DM Diary was effective in reducing the "hassle" of self-monitoring. There were 3 cases where the patient's understanding of diabetes complication improved.

Conclusion: e-DM Diary's capability to reduce hassle of self-care was recognized, and self-care supporting capability was par to paper logbooks.

Supported By: Japan Ministry of Internal Affairs and Communications

2351-PUB

WITHDRAWN