such as improved medication adherence. The objective of this study was to estimate the impact of type of pharmacy (chain/independent) on adherence to Oral Hypoglycemic Agents (OHAs) in patients newly diagnosed with type 2 diabetes. METHODS: Newly diagnosed type 2 diabetes patients during a four-year period were identified from a Medicaid claims database. The provider of the index prescription was classified as a chain or independent pharmacy. Utilization patterns (switching, augmentation, discontinuation, non-modification) and adherence to OHAs (Medication Possession Ratios) were computed for a 12-month follow-up period from the date of the index OHA prescription. A multivariate framework was used to estimate the impact of type of pharmacy on utilization patterns and adherence, controlling for demographics, co-morbidity, diabetes severity, and regimen complexity. RESULTS: A total of 1214 newly diagnosed type-2 diabetes patients were identified (independent pharmacy = 430; chain pharmacy = 784). Utilization patterns were not significantly different between patients filling their prescriptions at an independent pharmacy versus those filling prescriptions at a chain pharmacy. Independent-sample t-tests indicated that adherence to OHAs (Mean ± S.D) was significantly higher for patients filling their prescriptions at an independent pharmacy (0.90 ± 0.11) as compared to those filling prescriptions at a chain pharmacy (0.87 ± 0.13) [p = 0.02]. Results of a semi-log OLS model indicated that controlling for covariates, patients filling prescriptions at an independent pharmacy had 2.30% higher adherence to OHAs as compared to those filling prescriptions at a chain pharmacy [p = 0.04]. CONCLUSION: Patients filling prescriptions at independent pharmacies have significantly higher adherence to OHAs as compared to those filling prescriptions at chain pharmacies. This improved adherence may affect glycemic control and consequently incidence of diabetes related complications.

**PDB30**

**COSTS AND ADHERENCE ASSOCIATED WITH LONG TERM USE OF THIAZOLIDINEDIONE THERAPY IN MEDICAID ENROLLED TYPE 2 DIABETES PATIENTS**

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OBJECTIVES: Long-term adherence to medications among type 2 diabetes patients may have an impact on health care costs and hospitalizations. This study examined differences in medication adherence, and persistence, hospitalization and health care costs between patients with type 2 diabetes enrolled in the North Carolina Medicaid newly starting thiazolidinediones (TZD) therapy and those starting other oral antidiabetic agents. METHODS: A total of 1774 patients newly starting TZD therapy between July 2001 and June 2002 were compared to 216 patients starting metformin and 1199 patients starting sulfonylureas. Medication adherence was measured as Medication Possession Ratio using prescription refill patterns. Multivariate regression analyses were used to determine the difference in adherence rates adjusting for other covariates. RESULTS: Whites had highest mean medication adherence rate of 59% which was significantly different from Blacks (54%) (p < 0.05). Thiazolidinediones adherence rate of 60% was significantly higher than metformin (22%) and sulfonylurea group (57%) (both p < 0.05). Whites had higher adherence to all the therapies as compared to other races. In multivariate analyses, the adherence rate of black patients was found to be significantly lower by 12% as compared to whites after adjusting for other variables (p < 0.05). Metformin users were associated with 62% decrease in adherence rate as compared with the sulfonylurea group and 63% decrease in adherence rate as compared with thiazolidinediones (both p < 0.05). CONCLUSION: Antidiabetic medication adherence was associated with race as well as type of therapy. Future research should focus on investigating patient-related and therapy-related factors affecting medication adherence in type 2 diabetes patients.

**PDB31**

**ASSOCIATION BETWEEN RACE AND MEDICATION ADHERENCE IN TYPE 2 DIABETES MEDICAID ENROLLEES**

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OBJECTIVE: Medication adherence is an important factor in improving outcomes among type 2 diabetes patients. The primary objective of this study was to determine the association between race and medication adherence among type 2 diabetes patients. The secondary objectives were to determine the association between type of therapy and medication adherence and to determine if race has an influence in determining the medication adherence to specific antidiabetic therapy. METHODS: This retrospective cohort study was conducted using North Carolina Medicaid prescription claims. A total of 1774 patients newly starting Thiazolidinediones were compared to 216 patients starting metformin and 1179 patients starting Sulfonylureas. Medication adherence was measured as Medication Possession Ratio using prescription refill patterns. Multivariate regression analyses were used to determine the difference in adherence rates adjusting for other covariates. RESULTS: Whites had highest mean medication adherence rate of 59% which was significantly different from Blacks (54%) (p < 0.05). Thiazolidinediones adherence rate of 60% was significantly higher than metformin (22%) and sulfonylurea group (57%) (both p < 0.05). Whites had higher adherence to all the therapies as compared to other races. In multivariate analyses, the adherence rate of black patients was found to be significantly lower by 12% as compared to whites after adjusting for other variables (p < 0.05). Metformin users were associated with 62% decrease in adherence rate as compared with the sulfonylurea group and 63% decrease in adherence rate as compared with thiazolidinediones (both p < 0.05). CONCLUSION: Antidiabetic medication adherence was associated with race as well as type of therapy. Future research should focus on investigating patient-related and therapy-related factors affecting medication adherence in type 2 diabetes patients.

**PDB32**

**A SYSTEMATIC REVIEW OF ADHERENCE WITH DIABETES TREATMENT AND THE IMPACT OF NON-ADHERENCE ON HEALTH CARE COSTS**

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OBJECTIVE: The purpose of this study was to determine the extent of adherence among diabetic patients to treatments and
medications, to assess its impact on healthcare costs, and to deduce areas for further research. METHODS: A systematic literature search (1990–2004) using an exhaustive list of relevant search terms was performed to identify articles with qualitative and quantitative data on adherence with oral anti-diabetic agents (OAs) and insulin. Studies describing the economic impact of non-adherence, including impact of medication co-payment on level of adherence, were also reviewed. Electronic Medline® and PubMed® searches along with manual review of bibliographies were conducted in different phases for article retrieval.

RESULTS: Adequate documentation of adherence and its economic impact was found in 51 studies. Most adherence studies were conducted on OAs. Thirty-seven retrospective studies showed that adherence to diabetes treatment ranged from 31% to 90%, mostly measured by medication possession ratio, with levels slightly lower among insulin patients. Results varied due to a diversity of applied methodologies, where definitions of compliance and persistence were calculated differently. Race, multiple dosing, mode of administration, and patients’ behavioral factors were significantly associated with adherence levels. Economic consequences of poor adherence were identified from seven studies (five retrospective, one patient survey, and one longitudinal cohort study), which demonstrated an increase in hospitalizations, premature disability, and other adverse events resulting in higher healthcare costs. Increasing co-payments (7 retrospective studies) resulted in a decrease in taking medications leading to increased adverse events and subsequent healthcare costs.

CONCLUSIONS: This review confirms the lack of adequate treatment adherence among patients with diabetes and illustrates the considerable economic impact. More sophisticated methods of determining medication adherence have the potential to more accurately estimate adherence rates. Research demonstrating adherence to insulin therapies, particularly insulin pens, and related economic consequences are lacking in the literature.

PDB32

THE RELATIONSHIP BETWEEN HEALTH RELATED QUALITY OF LIFE (HRQOL) AND PAIN RESPONSE IN PATIENTS WITH DIABETIC PERIPHERAL NEUROPATHIC PAIN (DPNP)

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OBJECTIVE: The objective of this study was to investigate the association between pain response and health-related quality of life (HRQoL) in patients with diabetic peripheral neuropathic pain (DPNP). METHODS: EQ-5D data was collected at baseline and endpoint in three large placebo controlled randomised trials which evaluated duloxetine treatment for DPNP over a 12-week horizon. Patients had a clinical diagnosis of pain due to bilateral peripheral neuropathy caused by diabetes, had a mean 24-hour average pain severity score ≥ 4 on the 11 point Likert scale (“0 = no pain” and “10 = pain as bad as you can imagine”) and suffered from daily pain for at least 6 months. Treatment response was based on the level of change observed in the average pain severity score. Three levels of clinically meaningful pain response were defined: full response (≥50% change in average pain severity), partial response (30 to 49% change average pain severity), and no response (<30% change in average pain severity). Utility data at the trial endpoint were pooled and stratified into the corresponding pain response thresholds.

RESULTS: Patients had pain and utility scores measured at baseline (n = 1139) and trial endpoints (n = 998) across the three randomised trials. The average pain score at baseline was 3.8 ± 1.5 with a corresponding utility score of 0.58 ± 0.26. At trial endpoint, patients in the no response to treatment category had lower utility scores (0.61 ± 0.24) compared to patients with either a partial response (0.70 ± 0.16) or full response (0.78 ± 0.16). In addition, a statistically significant negative correlation was found, indicating that increasing pain severity was strongly associated with lower HRQoL in DPNP patients.

CONCLUSION: This review confirms the lack of adequate treatment adherence among patients with diabetes and illustrates the considerable economic impact. More sophisticated methods of determining medication adherence have the potential to more accurately estimate adherence rates. Research demonstrating adherence to insulin therapies, particularly insulin pens, and related economic consequences are lacking in the literature.

PDB34

HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH DIABETES MELLITUS—TYPE 1 AND TYPE 2

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OBJECTIVE: This study aimed to estimate the health-related quality of life (HRQL) utility score for patients with diabetes mellitus Type 1 and Type 2 on insulin and/or oral treatment using EQ-5D and to compare differences in HRQoL for controlled and uncontrolled patients. METHODS: We surveyed 157 patients in a cross-sectional study with treated Type 1 and Type 2 diabetes in Sweden (age range 20–65 years). Physicians recorded demographic and treatment information, including medications for diabetes. HRQoL was measured using the EQ-5D questionnaire and was filled in by the patients at a physician visit. We evaluated the differences between groups (e.g. treatment regimes) using GLM-models. All statistical tests were performed at the 0.05-level of significance and were all two-sided. EQ-5D was linked to utility weights using an algorithm that converges ordinal ratings into a weighed composite score. RESULTS: The mean utility score for the entire sample was 0.81 (SD 0.21) with a median of 0.79 (min –0.18, max 1.00). Patients with Type 1 diabetes had a higher mean utility score (0.88) than patients with Type 2 diabetes. Patients treated with a mixed regimen of oral antidiabetics and insulin reported a lower utility score (0.76). However, differences between treatment groups were not significant at the 5% level (p = 0.063). No significant difference was estimated in the health utility score for patients with controlled diabetes according to Swedish guidelines in comparison to uncontrolled patients. Women had significantly lower EQ-5D utility score than men, 0.76 and 0.85 respectively (p = 0.0217). The utility score ranged from 0.92 in the youngest age group (age 20–45) to 0.78 to the oldest age group (age 61–65) (p = 0.02). CONCLUSION: Type 1 diabetes patients reported a higher HRQL than Type 2 diabetes patients. Women had significantly lower EQ-5D score than men.

PDB35

TOPIRAMATE TREATMENT IMPROVES QUALITY OF LIFE (QOL) AND NERVE FUNCTION IN PATIENTS WITH DIABETIC NEUROPATHY (DN)

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OBJECTIVE: To test the hypothesis that improved nerve function using the anti-epileptic/migraine drug topiramate would translate to better quality of life (QOL). METHODS: Twenty patients with diabetic peripheral neuropathy were consented and entered into a study on topiramate. The dosage for each patient was titrated over a six-week period from 25 mg per day to 50 mg twice a day. The patients remained on 100 mg a day for 12 weeks and then were tapered off the medication over an additional 4-week period. Each patient received quantitative sensory testing, electromyography, skin blood flow, skin biopsies, and neurological examinations before and after treatment with top-