

400

Evaluation of the use, efficacy and safety of second line agents in the treatment of uncomplicated type 2 Diabetes

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Introduction: Metformin remains as first-line drug in type 2 diabetes mellitus (DM) management due to its established efficacy and safety. There is no sufficient empirical evidence to support the use of one second-line agent over the other and when to initiate second-line drug is still under discrepancy.

Aims:To evaluate the utilization pattern with reasons for initiation, effectiveness and safety profile of second line agents in diabetes.

Methods:A retrospective study was carried out for a duration of 18 months A total of 240 patients diagnosed with uncomplicated type 2 DM who were ≥ 18 years receiving either metformin or sulfonylurea or combination of both and for the first time initiated on second-line add-on agents and continued for atleast 6 months were included in the study. The study sample was divided into four groups based on the four second-line agents being added to the existing antidiabetic drug namely, pioglitazone, Dipeptidyl peptidase-4 (DPP-4) inhibitor (sitagliptin/vildagliptin), α -glucosidase inhibitor (voglibose) and insulin (pre-mixed 30% regular/70% NPH). Fasting plasma glucose (FPG) and postprandial blood glucose (PPBG) values were taken at baseline, 3 months and 6 months respectively. The adverse drug reactions (ADRs) were recorded.Descriptive statistics along with ANOVA was used for analysis.

Results: Out of 240 patients, 54, 68, 52, and 66 were prescribed pioglitazone; DPP-4 inhibitor, voglibose, and insulin respectively. 61% of patients received triple therapy (metformin + sulfonylurea + second-line drug). The prime reasons for initiation of second-line agent were high glycosylated hemoglobin, obesity and dyslipidemia. The reduction in FPG and PPBG was significant (p -value < 0.001) within each group at each time interval. Maximum number of hypoglycemic episodes were noted for insulin (33) and pioglitazone group (26) respectively,with least in DPP-4inhibitors. Gastrointestinal (30.66%) and musculoskeletal (26.28%) ADRs were predominant. Dermatological side effects were more common in DPP-4 inhibitor group. **Discussion:** All the four add-on groups exhibited a significant reduction in blood glucose when used as dual or triple therapy. DPP-4 inhibitors are relatively better than other second-line agents in terms of efficacy and safety.

401

The content validity and inter-rater reliability of a medication discrepancy classification system.

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Introduction. Medication discrepancies are known to occur at transitions of care where patients often receive new medications or have changes made to their existing medications. Medication reconciliation is an important approach for identifying and resolving these discrepancies. We recently published a systematic review about how medication reconciliation has been conducted and how medication discrepancies have been classified. This review identified significant inconsistencies in reporting, measuring and classifying medication discrepancies and the absence of a well-designed tool to evaluate medication reconciliation outcomes [1].

Aims. The aims of this study are to develop a new taxonomy to classify medication discrepancies, for use by healthcare professionals across transitions of care and to assess the validity and reliability of this system amongst healthcare professionals.

Methods. The instrument was developed based on a systematic review of the literature to identify the existing methods of classification and availability of instruments to classify the medication discrepancies along with the experience of our research team. A group of experts will be asked to assess the content validity i.e representativeness and clarity of the instrument. The instrument will then be utilised by raters on fictitious cases at two times points, to test the inter-rater reliability. The content validity index for each element (I-CVI), (S-CVI) for the whole instrument, percentage of agreement and inter-rater agreement will be calculated.

Results. The study is in progress and results will be presented at the conference.

Discussion. This study will allow for the systematic evaluation of medication reconciliation services using a comprehensive and standardised taxonomy for medication discrepancies.

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402

Fasting and diabetes: optimising health outcomes for Ramadan observers: A literature review

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Introduction. Globally, and in Australia, diabetes has become a common chronic health condition. Diabetes is also quite prevalent in culturally and linguistically diverse pockets of the Australian population, including Muslims. There are over 50 million Muslims with diabetes worldwide. Diabetes management and medication use can be affected by religious practices such as fasting during Ramadan. During Ramadan, Muslims refrain from oral or intravenous substances from sunrise to sunset. This may lead to many potential health or medication-related risks for patients with diabetes who observe this religious practice.

Aims. This literature review aims to explore the effect of healthcare interventions or health care professionals' intentions to provide interventions to improve outcomes for diabetes patients fasting during Ramadan.

Methods. Using a scoping review approach, a comprehensive search was conducted. Databases searched systematically included PubMed, Medline, Embase and IPA. Studies published in English that described interventions or intentions to provide interventions regarding diabetes and Ramadan fasting were included.

Results. Fifteen published articles that met the inclusion criteria were retrieved and content analysed. Of those, ten intervention studies were regarding diabetes management education. Five studies described professional service intention, four of which were related to the role of pharmacists in diabetes management in Qatar, Australia and Egypt, and one French study related to general practitioners. The intervention studies had promising outcomes for diabetes management during Ramadan. Effect sizes for improvement in HbA1c post intervention were moderate and ranged between 0.13-0.66. Pharmacists appeared to be willing to provide services to help fasting patients achieve safe therapeutic outcomes. Service intention studies highlighted pharmacists' and GPs' need for training prior to providing services from a clinical as well as cultural competence perspective.

Conclusion. Interventions research in this area requires robustly designed and structured interventions that can be tested in different contexts. This literature review revealed many gaps regarding diabetes management in Ramadan. Health professionals are willing to provide services for fasting diabetes patient, but need up-skilling.

403

Impact of nutritional status on calcium channel blocker therapy outcome in elderly patients at two primary health care facilities in Bandung, Indonesia

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Introduction. Nutritional assessment of the patient is essential for improvement of comprehensive treatment plans, especially for elderly population with hypertension.

Aims. The aim of this study was to observe and evaluate the relationship between nutritional status and outcome of treatment in elderly patients with hypertension who used calcium channel blockers (CCB).

Methods. This research was a descriptive-observational study conducted concurrently and retrospectively at two primary health care facilities, the *Puter* and *Ibrahim Adjie* facilities in Bandung. Data collection was carried out by assessing medical records and interviewing patients. The relationship between nutritional status and therapy outcome was analyzed statistically using independent t-student. Possible adverse drug reactions (ADRs) of CCB were analyzed descriptively. In addition, educational brochures and counseling were given to the patients.

Results and discussions. Total samples were 257 patients dominated by women (69.65%), diagnosed with stage 2 hypertension (39.69%) and myalgia (31.52%) as the most common comorbid. There was a significant difference in reduction of systolic blood pressure between groups with different nutritional status ($p < 0.05$). The averages of decrease in systolic and diastolic pressures in the groups of "at risk of malnutrition" and "malnutrition" were higher than that in patients with normal nutrition group, leading to the possibility of drug toxicity condition. Suspected ADRs of CCB were higher in patients in the groups of "at risk of malnutrition" and "malnutrition" status group, with dizziness (46.69%) as the most frequent of ADR. Results of the present study suggest the necessity of monitoring the use of CCB, in particular in elderly patients who are at risk of malnutrition or malnourished.

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Delacorte RR, Moriguti JC, Matos FD, Pfrimer K, Marchinil JS, Ferriolli E (2004) Mini Nutritional Assessment Score and The Risk for Undernutrition in Free-Living Older Persons, *J Nutr Health Aging* 8(6): 531-4.

Dosh SA (2001) The Diagnosis Of Essential And Secondary Hypertension In Adults, *J Fam Pract*, 50: 707-712.



404

Integration of pharmacists in diabetes care in Nepal- challenges and opportunities

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Introduction. Community and hospital pharmacists can facilitate chronic disease management through health promotion and other pharmaceutical interventions.

Aims. To explore diabetes care related pharmacy services in Nepal from the perspectives of patients, doctors and pharmacy staff; and identify the challenges in delivering the services.

Methods. In-depth interviews were conducted with Nepalese patients (n=48) and healthcare professionals (n=17) using study developed interview protocols to investigate diabetes management in Nepal.

Results. Participating patients reported that the services they received from pharmacies were mostly limited to having their prescriptions dispensed with basic counselling on how and when to take the medications; specialised diabetes related services were not provided. Patients' viewed pharmacies as a business rather than a place to receive professional services. Most patients did not trust the information provided in a pharmacy. Participating doctors felt a lack of support from pharmacists in diabetes management. They were unsure of the quality of information provided to patients in pharmacies. Patients' attitudes to, and interest in, information influenced the level of counselling provided by pharmacists. While participating pharmacists accepted current service provision from pharmacies as insufficient, they stated that low salary, time constraints, and patients' distrust made it difficult to engage in effective patient care.

Discussion. The diabetes specific services offered by pharmacists in Nepal was reported to be limited. Therefore, there is scope for utilising and increasing the role of the staff in pharmacies in providing diabetes services in Nepal. A significant effort is however necessary to effectively integrate pharmacists in diabetes care. Pharmacists need to gain patients' trust, and doctors' recognition and appreciation of their skills and abilities, as a first step in effective integration of pharmacy in the overall diabetes management process.

405

Health literacy and the decision-making process to use complementary medicine products in pregnancy and lactation

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Introduction: Little is known about the decision-making processes pregnant and breastfeeding women undertake when choosing to use complementary medicine products (CMPs), nor how health literacy influences this.

Aims: This qualitative research aimed to investigate the self-reported health literacy needs of pregnant and lactating women using CMPs.

Methods: Pregnant and lactating women who were currently taking, or had taken CMPs in the previous 12 months, were eligible to participate. Participants' demographic details and health literacy levels were surveyed, before participation in audio-recorded semi-structured qualitative interviews or focus groups. Verbatim transcripts were thematically analysed. Questions explored choices to use CMPs, sources of CMPs information and information wanted and needed, and how easy the CMP information is to understand.

Results: A total of 21 pregnant and / or lactating women from rural Northern NSW, metropolitan Sydney and SE QLD participated. Twenty participants had adequate and 1 had limited functional health literacy levels. The participants' demographic profile matched what is already known about CM users in Australia. The decision-making process to use CMPs was shown to be quite complex and women accessed a variety of sources when choosing to use CMPs. Popular information sources included CM practitioners, midwives and integrative GPs, the Internet, and family and friends. The primary concerns expressed by participants included concerns about safety and the desire to receive information from trusted sources.

Conclusion: All health care professionals need to be aware that pregnant and lactating women incorporate the use of CMPs in their health care practices and undergo a complex decision-making processes when choosing to use CMPs that involves collating information from a variety of sources.



406

The WentWest Non-Dispensing Pharmacist Project: Integrating pharmacists in general practice.

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Introduction: Previous international studies have shown that the integration of a non-dispensing pharmacist in general practice has led to an improvement in health outcomes and a reduction of medication-related problems (MRPs). However, there have been very few studies conducted in an Australian setting.

The WentWest Non-Dispensing Pharmacist Project was commissioned by a Western Sydney Primary Health Network to examine the impact of integrating a non-dispensing pharmacist in general practice on both patient clinical outcomes and broader health goals. A research team from the Graduate School of Health, University of Technology Sydney has been engaged to conduct an outcome and process evaluation on the pilot study.

Aims: The aims of the evaluation are to establish if integrating a non-dispensing pharmacist into primary practice leads to a reduction in medication-related problems. The process evaluation will examine barriers and facilitators to the effective integration of the clinical pharmacist and make recommendations for improvements to the current model.

Methods: Currently, four pharmacists are being employed across twelve general practice sites in Western Sydney. The project commenced in March 2016 and is due to be completed by December 2016.

The pharmacist intervention involves recruiting identified patients, conducting a clinical consultation, and communicating recommendations in a three-way collaborative discussion between the pharmacist, patient and GP. Patients were included in the study if they met defined selection criteria including patients taking greater than five medications, patients with poorly controlled hypertension, asthma, COPD or diabetes, patients with a suspected adverse drug reaction, an inadequate response to therapy or patients who had recently been discharged from hospital. The pharmacist-patient consultation was a 30-60 minute session including a complete medication history, conducting a medication reconciliation, an adherence assessment, targeted chronic disease management where required and the detection and resolution of MRPs. The pharmacist recommendations were then discussed with the patient and GP and the results of the consultation were recorded. Patients were referred for follow up if they had identified adherence issues, had identified MRPs or required ongoing disease state management. The impact evaluation will examine the impact of the intervention on the detection and resolution of MRPs. The process evaluation will examine both qualitative data from semi-structured interviews with participating project pharmacists and GPs and changes in quantitative data over the course of the project timeframe.

Results: 299 participant patients in the first twelve weeks of the pilot phase of the study were selected using agreed criteria to target priority patient populations, with polypharmacy (i.e., use of more than 5 medicines) being the most frequent reason for recruitment (57%). Other frequent reasons for patient selection were the management of chronic disease (15%) and addressing issues with medication adherence (8%). The selected patients were taking an average of 9.6 ± 4.0 medications and had an average of 6.9 ± 2.6 medical conditions.

In the consultation, the pharmacists conducted medication reconciliation and review and this resulted in the detection of 349 medication record discrepancies, 85 adverse drug reactions and 78 drug interactions (drug/drug, drug/disease state and drug/food interactions).

The pharmacist/patient consultations resulted in 807 pharmacist recommendations. These recommendations included medications being de-prescribed, medication dose reductions, initiation of new medicines and medication dose increases.

Thematic analysis of qualitative data gathered from semi-structured interviews of four of the participating pharmacists and five participating general practitioners resulted in the identification of key barriers and facilitators to enable improvement of the model. These included the importance of communicating and defining the non-dispensing pharmacist role to practice staff, general practitioners and patients, the importance of providing training for the non-dispensing pharmacists in all aspects of the intervention including practice systems, clinical guidelines and data collection procedures and the importance of adequate funding and room availability.

Discussion: The preliminary results of the study support the premise that the integration of pharmacists in general practice leads to positive patient outcomes particularly in the area of the resolution of medication related problems. The qualitative data has enabled WentWest to refine and improve the current model and further data is currently being collected.



407

Got milk? Quality appraisal of consensus-based guidelines for lactation

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Introduction. Consensus-based clinical practice guidelines (CPGs) have been developed by the Hartmann Human Lactation Research Group to assist clinicians in the management of lactation problems. To improve methodological rigour, guideline developers sought to evaluate guideline quality using the AGREE II instrument. The AGREE II Instrument is a validated generic guideline appraisal tool consisting of 23 items ranked on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). Items are grouped into 6 quality domains with an additional 2 global assessment items.

Aim. To assess methodological quality of 103 consensus-based CPGs for lactation using the AGREE II instrument.

Methods. To reduce heterogeneity of responses between raters, each completed the online training program and practice exercise provided by the AGREE Collaboration. Each guideline was independently appraised 3 times by 3 different raters. Domain scores were calculated by summing the individual item scores and scaling the total as a percentage of the maximum possible score for that domain. A mean score for each domain was calculated after summing the scores for all 105 guidelines. In line with previous studies, scores >75% and <50% were considered to indicate high and poor quality respectively.

Results. Mean scores for domains 1-6 were 87%, 80%, 54%, 73%, 66% and 89% respectively. The lowest score was domain 3, which considers rigour of development, and further analysis of this domain's item scores showed 'systematic methods used to search for evidence', 'criteria for evidence selection clearly described' and 'strengths and limitations of evidence clearly described' consistently rated poorly (between 2 and 4 on the Likert scale). Examination of the 2 global assessment items revealed a mean overall guideline quality rank of 5.1 on the Likert scale, with raters indicating they would recommend 96% of the guidelines for use.

Discussion. This study showed that the lactation guidelines were rated as high quality in 3 of 6 domains with no domain rating poorly (below 50%). These results will be used to strengthen methodological rigour of guideline development prior to publication, so that users can have confidence in their quality.

408

Guidelines for guidelines

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Introduction. Over 100 consensus-based clinical practice guidelines (CPG) have been developed by the Hartmann Human Lactation Research Group with the aim to assist clinicians in the management of lactation problems. To improve the methodological rigour and transparency of development prior to publication, guideline developers wished to assess their quality.

Aim. To identify a suitable instrument to appraise the methodological quality of consensus-based CPGs for human lactation prior to publication.

Methods. A literature search of the electronic databases Embase and Medline from 1990 to May 2016 was performed followed by a secondary search of Google Scholar and OneSearch. Inclusion criteria required provision of information regarding instrument development, publication in English and applicability to both end users and guideline developers. Complexity of the appraisal instrument and provision of an overall assessment were also documented, but were not criteria for inclusion or exclusion. Duplicates were removed and articles were excluded if they were inaccessible or reviewed a superseded appraisal tool.

Results. A total of 43 articles were extracted from the original OVID search (23 from Embase and 14 from Medline). Duplicate removal and application of inclusion and exclusion criteria returned 4 articles. Three appraisal instruments, AGREE II, AGREE II GRS and iCAHE, were extracted from these articles. The AGREE II instrument is a complex tool that considers 23 key criteria grouped into 6 unique domains of guideline quality as well as an overall assessment. AGREE II GRS and iCAHE are rapid-appraisal instruments that consider 5 items with 2 overall assessment items and 14 items with no overall assessment respectively.

Discussion. This review identified several CPG appraisal tools. AGREE II GRS and iCAHE are condensed instruments designed for use when time and resources are limited. Implementation time is not a limitation for developers prior to publication. Thus, the comprehensive AGREE II instrument was determined to be the most suitable appraisal tool to assess methodological quality of consensus-based CPGs for human lactation.



409

An evaluation of Consumer Satisfaction and Experience with Pharmacist-Administered Influenza Vaccination Services in Western Australia

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Background. Pharmacist-administered vaccination services have been available in the United States of America, Canada, the United Kingdom, Portugal and New Zealand for several years. In December 2013, the Pharmacy Board of Australia announced that administration of vaccines was within the scope of practice of Australian pharmacists, following appropriate training. The following year, Western Australia legislation was introduced to allow pharmacist immunisers to administer the influenza vaccine to consumers 18 years and older.

Method. In 2015, 133 pharmacies in WA offered pharmacist-administered vaccinations. Of the 133 pharmacies, a representative sample of 10% (13) were invited to participate in this study. Consumers were given a questionnaire and asked to evaluate the service during the 15 minute observation period following the vaccination.

Results. A total of 434 questionnaires were completed and returned. The majority of consumers (99.5%) were satisfied with the professionalism of the pharmacist and 99.1% were satisfied with the skills of the pharmacist immuniser. Furthermore, 99.5% of participating consumers were satisfied with the service overall, and 97.2% advised they would receive a vaccination from a community pharmacist in the future.

Discussion. Consumer satisfaction with pharmacist-administered vaccinations was positive. Consumers found the service convenient, comfortable and professional. Further expansion of pharmacist-administered vaccination services to deliver a wider range of vaccines should be investigated in WA.

410

A preliminary investigation in the use of fingerprick vancomycin levels for therapeutic drug monitoring: Lessons that can be learned

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Introduction. In current practice, therapeutic drug monitoring (TDM) is used to monitor and maintain appropriate vancomycin concentrations. However, there are potential limitations with the traditional venepuncture method of TDM. The fingerprick method may provide a less invasive, more cost effective and patient friendly alternative. However, during this study we also encountered several problems that we feel are important to document.

Aims. To compare fingerprick versus peripheral blood sampling techniques in adults undergoing vancomycin therapy requiring TDM.

Methods. This study was conducted at The Alfred Hospital in Melbourne, Victoria, Australia, over an eight week period. Paired fingerprick and venous blood specimens were obtained from adult patients undergoing vancomycin therapy and analysed using the Chemiluminescent Microparticle ImmunoAssay (CMIA) technique.

Results. During the study period, 21 samples were obtained but only 8 were suitable for analysis. A significant correlation between fingerprick and peripheral levels was observed ($r^2 = 0.9245$). A Bland Altman analysis of the results showed a bias of +1.7 signifying a weak agreement of interchangeability.

Discussion. Although the Bland Altman analysis showed a recognisable difference between methods, the study sample size was too small to be conclusive. However lessons learned from this preliminary study included the use of medium or higher flow lancet to obtain better blood volumes, the use of hand warming prior to sampling and training for nurses performing specimen collection to enable the appropriate volume of blood to be collected. Further work is required to establish the validity of using fingerprick samples to determine vancomycin concentrations.



411

The Pharmacological Treatment of Comorbidities in People with Dementia: A Literature Review

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Introduction. People with dementia commonly live with multiple comorbidities.¹ They often struggle to reliably report symptoms relating to either medications or diseases, making it challenging to optimise medications.² Moreover, it is not clear if the presence of dementia alters what is considered to be optimal medication management.

Aims. To determine if health outcomes or quality of life are altered for people living with dementia and comorbidities treated with medication. The secondary aim was to assess medication usage patterns.

Methods. Inclusion criteria were: experimental and observational studies, participants diagnosed with dementia and at least one comorbidity, treated with medication, reported outcomes of medication usage, health or quality of life. Interventions or outcomes related specifically to the dementia were excluded. MedLine and Embase databases were searched from inception to March 2016 to find published articles. Three researchers screened the articles and then extracted data using a data extraction sheet. The data was synthesised narratively.

Results. Six studies met inclusion criteria with 25,559 participants (mean age 82.1 ± 2.4 years, 78% female). Four observational studies reported the use of one therapeutic class and one study reported use of two therapeutic classes. The experimental study compared bisphosphonate use with placebo in mid-stage dementia and found a reduced risk of non-vertebral fractures (OR=0.27, 95% CI 0.12-0.61) in the bisphosphonate group.³ Blood pressure, hypertension and cholesterol were managed to similar end-points for people without dementia, though effect on health outcomes were not reported for either group.⁴ Usage patterns of some medications (e.g. antihypertensives) may be affected across all dementia stages, but other medication usage changes were not observed until late stage dementia.^{4,5}

Discussion. Current medication management for comorbidities in dementia is limited. To date, information includes usage patterns and osteoporosis-related fractures. Information is not currently available on what medication management strategies may improve health outcomes or quality of life for patients with dementia.

1. Formiga F et al. (2009) *J Nutr Health Aging*. 13(5):423-7.

2. Bunn, F et al. (2014). *BMC Medicine*, 192.

Included paper citations available on request

412

A simple decision-making guide for assessment and referral of pharmacy clients with bowel symptoms

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Introduction. Considering the prevalence of bowel conditions in the community and the embarrassment in seeking medical assistance for these symptoms, there is a need for timely, private and efficient consultation about bowel symptoms in community pharmacies, to identify clients requiring medical investigation. A self-completed symptoms checklist, issued by pharmacy assistants and/or pharmacists to guide over-the-counter consultation, was proposed.

Aims. This study aimed to evaluate a validated bowel symptoms questionnaire for use by pharmacy clients and staff.

Methods. The questionnaire, named the Jodi Lee Test (JLT) in acknowledgement of the sponsoring foundation, comprised eight questions exploring symptoms suggestive of serious bowel disease and their duration. Validation against an established, longer instrument has been reported elsewhere (Sriram et al 2014). Staff of 21 community pharmacies in Perth participated in the trial. 'Usual practice' in the management of bowel symptoms was self-documented by staff for 12 weeks. Staff were trained in the research protocol, administration of the JLT and interpretation of client data, prior to the 20-week implementation phase. In both phases, the researcher elicited clients' self-reported uptake of referral recommendations and the resulting clinical diagnoses, where known.

Results. Eighty-four consultations were recorded pre-implementation, and 80 post-implementation. The JLT was associated with a significantly higher referral rate (38% vs 20%) and clients' uptake of referral recommendations (40% vs 6%). Clients referred using the JLT were also more likely to receive a definitive diagnosis. Feedback by staff indicated the template was simple to use and assisted their discussion of sensitive topics.

Discussion. The JLT provided a structured approach to the assessment and referral of clients with at-risk symptoms in community pharmacies. There is potential to produce similar instruments for other symptoms associated with embarrassment, to facilitate medical consultation.

Sriram D et al (2014) *J Eval Clin Pract* 78(6): article 119.



413

Compounding buccal delivery dosage forms: consideration of the dose accuracy of troches and ODTs

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Introduction. Troches and orally dissolving tablets (ODTs) are dosage forms that are compounded in pharmacies for buccal drug delivery. As part of a larger study into pilocarpine for treatment of xerostomia, compounded pilocarpine troches and ODTs were prepared and their drug content quantified as part of quality control testing.

Aims. To compound troches and ODTs containing 5 mg pilocarpine and to assess their accuracy and repeatability in terms of the dose that they contain.

Methods. Troches and ODTs were prepared using moulds and ingredients sourced from Medisca. Troches were compounded by mixing drug powder into a viscous liquid, pouring into troche moulds (30 troches per batch) and leaving to set. ODTs were prepared by mixing drug powder with other components in powder form, compressing into moulds (60 ODTs per batch) and heating at 110°C for 15 min. Pilocarpine was extracted from ODTs dissolved in phosphate buffer, and from troches dissolved in 70% ethanol with solid phase extraction and reconstitution in phosphate buffer. Pilocarpine was quantified using a validated HPLC-UV method at 214 nm for at least 9 troches and ODTs from each batch.

Results. The preparation of medicated troches and ODTs is a simple technique. However, the amount of the active ingredient in each batch can vary considerably. There was a direct but variable relationship between drug concentration and troche or ODT weight. Even with the intense focus on accuracy of weighing and mixing involved in this study, pilocarpine content of each individual troche or ODT was variable: 69% of the 36 troches tested (across 4 batches) and 100% of the 33 ODTs tested (across 3 batches) contained 5 ± 0.5 mg pilocarpine.

Discussion. It was easier to prepare ODTs that were accurate and consistent in their dose of pilocarpine than troches. Compounded products are rarely assessed for their active drug concentration, but in the absence of testing it is important to be aware of the potential for the delivered dose to vary from the intended dose.

414

Community pharmacists' perspectives towards clozapine provision for consumers with schizophrenia

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Introduction. Clozapine is a very effective antipsychotic medication indicated specifically for treatment-resistant schizophrenia, but its use is limited due to the risk of agranulocytosis and strict monitoring requirements. From July 2015, clozapine supply for maintenance therapy transitioned from hospital-only to community access. However, little is known to date regarding community pharmacists' attitudes regarding this change.

Aim. To explore community pharmacists' attitudes towards supplying clozapine for consumers with schizophrenia.

Methods. This cross-sectional study was carried out in two phases using a mixed method approach. An online survey was distributed to community pharmacists via ClopineCentral™, one of two mandatory monitoring systems available. Pharmacists' views towards clozapine supply and schizophrenia were explored via Likert-type and open response questions, whereas stigma towards consumers with schizophrenia was measured using the reliable and valid Social Distance Scale. Participants were then invited to participate in a semi-structured telephone interview to further discuss their thoughts and experiences in supplying clozapine.

Results. One hundred and thirty four completed surveys were returned, with a majority of females (57.5%) and pharmacists from New South Wales (54.5%). Most pharmacists indicate positive attitudes towards the adequacy of support received (74.1%), knowledge (86.6%), clinical skills (93.3%) and confidence (89.6%) in dispensing clozapine. A subsample of 13 pharmacists were interviewed. Most pharmacists perceived the ease of access to benefit consumers and financial gains to benefit pharmacists, while better patient-pharmacist relationship and the provision of holistic care were viewed as benefits to both. Administrative issues, particularly in obtaining valid blood test results, posed the most challenges, whereas support and training received facilitated service provision.

Discussion. Community pharmacists responded positively towards supplying clozapine for consumers with schizophrenia. Although the uptake of the supply service was not able to be assessed, various benefits and facilitators as identified by pharmacists supported the feasibility of this service. Nevertheless, challenges faced by community pharmacists prompt future research to explore other aspects of community clozapine supply, such as the views of prescribers or mental health teams.



415

We don't know what they don't know: knowledge of pain medication and pain management

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Introduction. Do the Australian public believe analgesic medicines can target specific sites of pain? In Australia, the makers of "Nurofen" (Reckitt Benckiser) were found to have misled consumers in advertising that the single ingredient (ibuprofen) could target specific sites of pain. These types of confusing messages add to existing concerns around the general public's baseline health literacy. This lack of understanding about medicines can compound the increasing misuse of over-the-counter analgesics. There is currently limited insight into the general public's knowledge and perceptions of pain medicine and pain management. So, what do they actually know?

Aims. This study aimed to investigate the Australian public's perceptions of pain management and pain medications.

Methods. A survey captured participants' demographic data and their perceptions of pain management and pain medication. Open-ended and Likert-scaled questions were employed and data was analysed using SPSS.

Results. A total of 226 participants completed the survey and misconceptions were present in all demographics of the respondents. Understanding of pain medicine and pain management varied depending upon age, gender, history of persistent pain and self-reported background in health. There was no clear demographic group that consistently answered questions correctly about pain medicine and pain management.

Discussion. Education tools for the general public and healthcare professionals will have a significant role in improving the understanding of pain medicine and pain management. This will ultimately lead to better outcomes for patients living with pain.

416

Pharmacists' role in supporting breastfeeding women in the community pharmacy setting: facilitators and barriers

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Introduction. Community pharmacists have frequent contact with breastfeeding women. Studies have shown that breastfeeding women are likely to seek advice from a pharmacist.^{1,2,3,4} This presents a unique opportunity for pharmacists to provide on-going support for women. Understanding facilitators and barriers in this context would facilitate care and support provided to breastfeeding women by community pharmacists.

Aims. This study aimed to investigate the factors facilitating or inhibiting pharmacists' role in achieving effective support for women, in particular their role in the provision of evidence-based advice regarding medication use during lactation.

Methods. This Western Australian study involved semi-structured interviews with 30 community pharmacists. Interviews were audio-recorded, then transcribed verbatim. Transcribed data were analysed and NVivo[®] Version 10.0 was used to aid organisation of qualitative data and quotations.

Results. Convenience, accessibility and affordability were recognised as major facilitators. Other facilitators were trust, professionalism and favourable pharmacist-client relationships, positive impacts on job opportunities, and public image of the profession. The key challenge identified was the lack of evidence-based information about medicines' efficacy and safety profiles in lactation, which impacted on pharmacists' ability to make informed recommendations. Examples of other barriers included time constraints, lack of financial compensation, gender issues, and pharmacy layout. Overall, participants' perceptions about their role in supporting breastfeeding women in the community pharmacy setting were favourable.

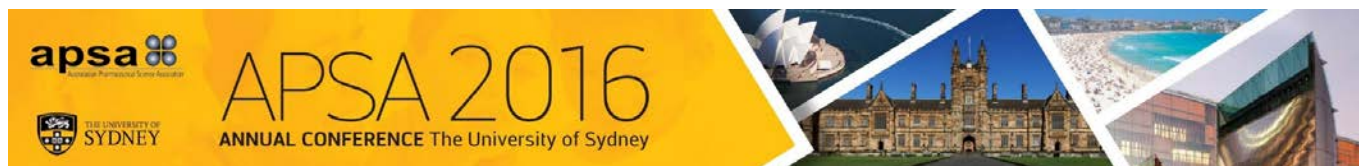
Discussion. The facilitators and positive attitudes of pharmacists reveal opportunities for role expansion. Nevertheless, the challenges highlighted areas of pharmacy practice which should be addressed and improved in order for pharmacists to provide better support to women and promote breastfeeding in the community.

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417

Evaluation of *Simple*[®]: an evidence based pharmacist diabetes intervention tool

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Introduction. Pharmacists' contributions towards improving clinical outcomes of Type 2 Diabetes patients are well documented. However, pharmacist strategies used to deliver diabetes care are inconsistent.

Aims. This research aimed to a) evaluate the application of key elements in a previously developed structured diabetes intervention tool, *Simple*[®] and b) explore the impact of targeted training on pharmacists' knowledge and ability to deliver consistent evidence based diabetes care.

Methods. Two one hour online and three face-to-face workshops were conducted to train 12 pharmacists from Australia and Malaysia on diabetes management using *Simple*[®]. Pharmacists' knowledge on diabetes management was assessed pre- and post-training. In addition, they were required to use *Simple*[®] in their daily practices for one month. Subsequent feedback was obtained through semi-structured interviews.

Results. Pharmacists were from community settings with an average of 5.7 years working experience and < 3 years providing diabetes management services. None was a credentialed diabetes educator. Results showed significantly (P=0.002) improved test scores pre- and post-training. Interview analysis revealed facilitating factors namely organised medication reviews, improved knowledge, improved record keeping, improved competence to detect problems in uncontrolled diabetes patients and increased focus on achieving diabetes management targets. Barriers were insufficient information on medication related problems and lack of accessibility to patients' laboratory data.

Discussion. *Simple*[®] targeted training improved pharmacists' knowledge on diabetes management and supported its use as a structured consistent method to deliver evidence-based diabetes care for Type 2 Diabetes patients.

418

Codeine in primary care: improving the use of opioid therapy for pain

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Introduction Codeine is the prescribed opioid analgesic, comprising 65.6% of all opioids used by Australians, with a full 55.8% of codeine packs being pharmacist prescribed. Codeine has previously been considered to have its action by its hepatic CYP2D6 conversion to morphine. Codeine is known to induce radically variable responses in patients, a model for the prediction of which is conspicuously absent in so ubiquitous a drug.

Aim To characterise the current literature regarding the mechanism of action, pharmacogenomics, and disposition of codeine in the body.

Methods A literature search was performed with selection for papers which present novel findings or reviews of the literature on aspect of codeine. These papers were subjected to analysis and a full review was synthesised addressing all the major issues of codeine presented by the literature.

Results Significant variation appears in the body of literature regarding codeine. The commonly cited morphine-dependent route is now contentious; however, this fact has been only rarely considered, and remains absent from much reference material or late reviews. There are a multitude of alternate mechanistic routes which are not known by the majority of clinicians. The majority of pharmacogenomic research has been performed on CYP2D6, which represents only a portion of the enzymatic and genetic involvement of codeine; further, the site of metabolism is discussed, with the introduction of non-hepatic metabolism to active moieties.

Significance This the first to the entirety of currently understood routes of action, metabolic pathways, and endpoints of the opioid in Australia, and significant up the established wisdom. This might lay the groundwork for the synthesis of a model for prediction of response to codeine in the naïve patient, and highlights the lack of understanding which lies behind what most would consider a well-characterised medicine.



419

Development and validation of the Dementia-specific Medication review Electronic Decision Support System (D-MEDSS®)

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Introduction. People with dementia are prescribed more medications compared to people without dementia, and are particularly vulnerable to the adverse effects of high-risk medications (i.e. anticholinergics, antipsychotics and benzodiazepines). Management of high-risk medications for people with dementia can be challenging for healthcare practitioners, patients and their carers.

Aim. To develop and validate a computerised clinical decision support system (CCDSS) that incorporates pharmacological and clinical tools to aid person-centred medication management in dementia.

Methods. We are developing the Dementia-specific Medication review Electronic Decision Support System (D-MEDSS®). This study consists of two phases. A) Development: The D-MEDSS will be designed to produce information reports for healthcare practitioners, patients and their carers, and will incorporate three tools: 1) The Drug Burden Index (DBI), a measure of cumulative exposure to anticholinergic and sedative medications that is associated with functional impairment in older adults; 2) The Patients' Attitudes Towards Deprescribing (PATD) questionnaire that explores patients attitudes to deprescribing medications; and 3) a management tool for goals of care for dementia. B) Validation: Focus groups and one-on-one interviews with general practitioners, pharmacists and people living with dementia and their carers will test the D-MEDSS and information reports for usability and provide perspectives on implementation of the D-MEDSS reports in practice. The System Usability Scale and descriptive statistics will be used to summarise the validation phase. The focus groups and one-on-one interviews will be audio recorded, transcribed verbatim and qualitatively analysed to derive conceptual domains.

Discussion. The validated D-MEDSS will reliably identify anticholinergic and sedative medications, incorporate patient's attitudes to deprescribing, and list the patient's goals of care to aid management of high-risk medications for people with dementia and their carers.

420

Factors affecting adherence – a new methodology systematic review using Leximancer™

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Introduction. Adherence is the major factor in determining improved health outcomes from medicines in the long term. Systematic reviews often target one factor or condition to reduce the workload of reading and analysing hundreds of articles. Leximancer™ can reduce this workload by providing a textual analysis of a larger number of articles to provide a high level review of key concepts which can then be interpreted by the researcher.

Aims. To use Leximancer™ software to analyse adherence papers found using a systematic search protocol.

Methods. Medline, EMBASE, CINAHL, and PubMed were systematically searched for all articles on adherence, concordance and compliance was conducted. All references were downloaded to EndNoteX7. Titles not including the 3 key terms above and not related to medication were excluded. Full text was obtained for as many articles as possible through QUT Library with other records excluded. All full-text articles were added to a Leximancer™ project and the data cloud produced. Part words included in the analysis were removed as were word artefacts resulting from standard formats (eg "Table") and singular/plural versions of the same word were combined.

Results. A total of 1197 were included in the analysis. "Adherence" was more closely associated with "treatment", "clinical", "impact" and "care". "Interestingly, "compliance" was separated from "adherence" and was more closely associated with "data", "analysis" and "variables". "Risk" was closely associated with "mental" (near "health") and also "HIV", but not closely related to (in order of closest to furthest) "depression", "cancer" "asthma", "hypertension", "heart" (failure). "Mental" (health) was also closely associated with "risk" and "social" (next to "support") and also "quality" (next to "life").

Discussion. Many expected relationships were found in the data cloud. Leximancer™ provided a method to rapidly analyse a large number of full-text documents. Whilst it cannot replace a thorough and carefully analysed systematic review, it can be used to provide a high level overview of the literature and to generate ideas to develop specific targeted systematic reviews using the traditional manual methodology. Specific investigation of the individual disease states identified using the tagging facility will be explored separately based on this analysis.



421

What are the responsibilities of pharmacists selling complementary medicine? : A systematic review

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Introduction. There is high consumer demand for complementary medicines in Australia. Consumers use complementary medicines to improve general health or to manage specific health conditions. Many consumers prefer to purchase complementary medicines from pharmacy. The widespread sale of complementary medicines in pharmacy coupled with the limited evidence of effectiveness for many complementary medicines, raises important ethical and professional questions. What are a pharmacist's responsibilities when selling complementary medicine?

Aim. Identify and summarise research that seeks to understand or determine a pharmacist's responsibilities when selling complementary medicines.

Methods. Embase, PubMed, Cinahl, PsycINFO and Philosopher's index databases were searched for English articles published between 1995-2015. The search terms used were *complementary medicine, pharmacy, pharmacist, pharmacists and pharmacy practice*. Empirical studies discussing pharmacist's practices or perceptions, consumer's expectations and normative studies discussing ethical perspectives or proposing ethical frameworks related to pharmacist's responsibilities in selling complementary medicines were included in the review.

Results. Twenty six studies met the inclusion criteria. The literature discussing pharmacist's responsibilities towards selling complementary medicines mainly consisted of empirical studies. The included studies consisted of 8 qualitative, 15 quantitative, 1 mixed method, 1 systematic review and 1 normative study. Pharmacists and consumers identified the pharmacist's role as providing information and counselling to consumers and ensuring safe use of complementary medicines. No ethical framework is explicitly discussed in the empirical research papers, however many appear to implicitly adopt principlism as the ethical framework. The ethical perspectives of selling complementary medicines are mainly described in terms of professional and ethical conflicts faced by pharmacists, especially the conflict between their business and health professional role.

Conclusion. There is a lack of explicit normative advice regarding pharmacist's responsibilities when selling complementary medicines. Progress can be made by providing practical ethical guidance for pharmacists regarding their specific responsibilities towards complementary medicines.

422

Pharmacist perceptions and attitudes toward dispensing HIV medicines in the community

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Introduction. A priority of the Seventh National HIV strategy 2014–2017 was to reduce new infections and increase uptake of treatment. As part of this, community pharmacies in Australia were allowed to dispense prescriptions for HIV medicines written after 1 July 2015 under the Pharmaceutical Benefits Scheme section 100 (s100) Highly Specialised Drugs Program. This gave patients more flexibility when accessing their medicines, as prior to this, these medicines were only available from public hospital pharmacies.

Aims. The aim of the study was to investigate community pharmacist perceptions and attitudes toward supplying HIV s100 antiretroviral medicines, and providing advice and support to patients taking these medicines.

Methods. A purposive sample of community pharmacists around Australia were invited to participate in an online survey that collected demographic information, and pharmacist perceptions and attitudes toward counselling and dispensing HIV s100 antiretroviral medicines.

Results. The majority of the pharmacists had not received requests for dispensing HIV antiretroviral medicines. They were generally comfortable speaking to patients about HIV medicines, but identified more knowledge would lead to more confidence when talking to patients. Cost and sourcing of the high cost medicines were identified as one of the barriers to dispensing and supplying s100 medicines. Nevertheless, most respondents were of the view that pharmacists play an important role in helping make these medicines more easily accessible for patients.

Discussion. Targeted education would allow more confidence when dispensing these medicines. Community pharmacists have an important role to play in helping to increase access to HIV medicines for ongoing treatment. They could potentially also help patients more easily access medicines in other situations e.g. post-exposure prophylaxis following the initial hospital or clinic visits.



423

Community pharmacist perceptions and attitudes toward dispensing Hepatitis B and C medicines

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Introduction. Patients with prescriptions written after 1 July 2015 have been able to access their Hepatitis B medicines from their community pharmacist under the Pharmaceutical Benefits Scheme (PBS) section 100 (s100) Highly Specialised Drugs Program. Earlier in 2016, a range of new Hepatitis C medicines was included in the Pharmaceutical Benefits Scheme (PBS) under both the general schedule, and the s100 (Private) Highly Specialised Drugs Program, allowing patients to obtain these medicines from community pharmacies. These changes provide patients more flexibility in accessing their medicines as prior to this, patients could only obtain some of these medicines from public hospital pharmacies; or they were not subsidised on the PBS, meaning the cost of the medicines prohibited many patients from accessing these medicine.

Aims. The aim of the study was to investigate community pharmacist perceptions and attitudes toward dispensing Hepatitis B or C medicines and looking after patients living with hepatitis.

Methods. A purposive sample of community pharmacists around Australia was invited to participate in an online survey. The survey collected demographic information, along with pharmacist perceptions and attitudes toward dispensing and providing information on Hepatitis B or C medicines.

Results. Many pharmacists had not received requests for dispensing Hepatitis B or C medicines. The cost and sourcing of the high cost medicines, especially the newly listed Hepatitis C medicines was identified as a barrier to dispensing and supplying these medicines. Most respondents were of the view that pharmacists play an important role in helping make these medicines more easily accessible for patients, but identified that lack of knowledge contributed to a lack of confidence when counselling and dispensing these medicines.

Discussion. Community pharmacists are play an important role in improving the access and use of these medicines. Structures to facilitate logistics around acquiring these new high cost medicines, and targeted education or training would allow pharmacists more confidence when supplying these medicines.

424

A systematic review of healthcare workers' opinions and experiences of administering medicines to people with swallowing difficulties in aged-care facilities

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Introduction. Swallowing difficulties can affect up to two-thirds of aged-care residents and is associated with increased risk of medication administration errors such as unsuitable tablet crushing or capsule opening. These practices can put patients at risk of drug toxicity sub-therapeutic doses or even death. However, little is understood about the underlying reasons leading to these sub-optimal medication administration practices among healthcare workers (e.g. nurses or carers). Addressing the existing challenges will be helpful to find strategies to prevent these medication administration errors.

Aims. To conduct a qualitative systematic review on healthcare workers' experiences and opinions about barriers and facilitators of administering medicines to aged-care residents with swallowing difficulties.

Methods. A thorough search in PubMed, CINAHL, EMBASE, Scopus, Mednar and ProQuest dissertations databases was conducted. Inclusion criteria were qualitative studies reported in English investigating opinions and experiences of healthcare workers who administer medications in aged-care facilities (ACFs). The review considered studies that focused on qualitative data including designs such as phenomenology, grounded theory, and action research.

Results. An initial search in the databases identified 747 articles. Articles that did not meet the inclusion criteria were excluded. Some of the common barriers are knowledge gap, time constraints, cost and unavailability of alternative pharmaceutical formulations. Improving information flow among healthcare professionals and providing pharmaceutical references specialised in medication dosage form modification were some of the possible facilitators that may require further investigation.

Discussion. The identified barriers and facilitators describe a framework of practice which could benefit from the design of a pharmacy intervention in medication management for residents in ACFs. Whilst further research is needed for an effective design, the pharmacy intervention should focus on promoting communication and education in a cost-effective manner that optimises the care of residents in ACFs.



425

The effectiveness of components of swallowing assessments for identifying people with swallowing difficulties: a systematic review for quantitative evidence

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Introduction. Clinical bedside assessments (CBA) are often used first-line for diagnosing swallowing difficulties. CBAs are a variety of tools e.g. questionnaires, checklists, swallow tasks, and portable devices with each containing a series of components that help assess an individual's ability to swallow. However, the effectiveness of the components in these tools have not been synthesised systematically in the literature.

Aims. To conduct a systematic review to identify and evaluate the effectiveness of components of CBAs in screening and identifying people who are experiencing or are at risk of developing swallowing difficulties.

Methods. A systematic search for CBAs for swallowing difficulties was conducted in PubMed, Embase, CINAHL, PsycINFO and Scopus. Studies in English that used CBAs as the index test, and gold standards as the reference test e.g. videofluoroscopy or fibreoptic endoscopy were considered for inclusion. Publications that evaluated CBAs that were written in languages other than English were excluded from this analysis.

Results. The initial search of the databases returned 16,685 articles. A total of 13,036 articles were excluded after a screen of titles and abstracts, and 100 papers remained after the full-text was examined. Preliminary results showed that screening components such as bolus swallowing tests, measurement of oxygen saturation, acoustical analysis, and voluntary cough tests presented with high sensitivity and specificity in predicting swallowing difficulties.

Discussion. These findings suggest that the identified screening components seem important in identifying swallowing difficulties and the associated complications e.g. aspiration. Detection of aspiration remains as the main aim for the majority of tools, but its identification in CBAs is still complex. Future research could focus on exploring new approaches that utilise these identified screening components to easily and more accurately identify people who are experiencing or are at risk of having difficulty with swallowing.

426

Patient satisfaction with information and adherence to topical corticosteroids

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Introduction. Adherence to topical corticosteroids (TCS) among patients treated by dermatologists is suboptimal.¹ Satisfaction with Information about Medicines Scale (SIMS) evaluates patient's level of satisfaction with medicine information and greater satisfaction level is associated with higher reported adherence.² However, SIMS has not yet been applied to study patient's satisfaction with information specifically about TCS.

Aims. (1) To develop SIMS items to assess satisfaction level with information about TCS; (2) Test the hypothesis that dissatisfaction with TCS-related information would be associated with higher concern beliefs and lower self-reported medication adherence.

Methods. A cross-sectional survey was piloted by recruiting respondents through community pharmacies. Inclusion criteria included those who had used TCS, whether prescribed by doctors or supplied by pharmacist, within the previous one month. SIMS, Medication Adherence Report Scale (MARS), and Beliefs about Medicines Questionnaire (BMQ) were adapted to context. Statistical analyses were performed using SPSS v23.

Results. The surveys were completed by 32 respondents. The measurement scales showed good internal consistency, with Cronbach's alpha values ranging between 0.60 and 0.90. Reported adherence to TCS was lower than previous research.¹ Respondents were more satisfied with information about the actions and usage of TCS than issues dealing with side effects.

Discussion. Ongoing data collection is underway in order to test the hypotheses and further characterise satisfaction with information about TCS. Preliminary findings show that adherence to TCS and satisfaction with TCS-related information are overall low. Healthcare professionals, such as pharmacists, have a role in providing more explicit counselling about TCS and enhance patient's self-efficacy to apply TCS.

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427

Efficacy of statins in obese asthmatics

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Introduction: Obese asthmatics are resistant to asthma controller drugs as proinflammatory environment blunts the efficacy of treatment. Statins, the lipid lowering agents, have anti-inflammatory effects and can be used in obese asthmatics.

Aims. The aim of this study was to evaluate the effect of statins on obese asthmatics.

Methods. It was a retrospective cohort study on patients with asthma. The patients who received statins in addition to antiasthma medications for at least one year was the exposed group and those who did not receive statins was the unexposed group. The clinical characteristics including peak expiratory flow rate (PEFR), absolute eosinophil count (AEC), absolute neutrophil count (ANC), total leucocyte count (TLC) and frequency of acute exacerbations were recorded at baseline (time of statin initiation) and at 6 months and one year post statin initiation. Repeated measures ANOVA was used to find the difference between two groups at different time points.

Results. A total of 330 patients were included and of these 42 were obese. 18 of the obese patients were on statins and 24 were not on statins and were analysed. PEFR, AEC, ANC, TLC showed a significant increase ($P < 0.001$) at 1-year post statin treatment in exposed group. Also acute exacerbations reduced significantly ($p < 0.001$) in exposed group at one year as compared to unexposed group.

Discussion. Statins as an add on therapy can be beneficial in obese asthmatics. Long term use shows beneficial effects in terms of decreasing the inflammatory markers and improving lung functions.

428

Medication Safety Information for Lactating Women: A Systematic Review

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Introduction. Some breastfeeding women may require medication for acute or chronic health conditions. This medication may be a prescription, over-the-counter (OTC) or complementary and alternate (CAM) medicines. The need for medication can become a barrier to breastfeeding if appropriate management is not applied. Medication safety information during lactation varies with some medications having extensive safety profiles and others having limited or no recorded safety information. In addition to this the available safety information and related management guidelines can be conflicting.

Aims. To explore the literature published on medication safety during lactation from both the health professional and breastfeeding women's perspective.

Methods. A literature review was conducted using PRISMA guidelines applied to PubMed, Scopus and Google Scholar databases. Medication safety resources and published guidelines for medication management during lactation were collated.

Results. This review revealed 60 articles investigating aspects of medication use that could become a barrier to breastfeeding. These articles outlined numerous resources available that discuss medication safety during breastfeeding and lactation; these resources were both freely available and subscription services. Twenty one guidelines were identified with the most commonly suggested guideline being to 'pump and dump' breast milk for brief drug exposures.

Discussion. There is a paucity of research data that identifies how to minimize the need for medication as a barrier for breastfeeding. This can make seeking or providing advice about medication use while breastfeeding complicated and as a result can lead to unnecessary cessation of breastfeeding.



429

A comparative analysis of cancer drugs pricing

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Introduction. Cancer drugs are a substantial burden on healthcare systems because of their high acquisition cost.

Aims. This study aims to compare and analyse the cancer drug retail prices across countries in the South-East Asian, Western Pacific and Eastern Mediterranean regions.

Methods. The price data of the ten included countries in Asia was retrieved from official pricing authorities or the respective Ministry of Health websites. Drug retail prices across countries in the South-East Asian, Western Pacific and Eastern Mediterranean Regions were used in this study. Price data was presented in national currencies and converted to United States Dollar (\$) using PPP (purchasing power parity). A total of 26 formulations were included in this study.

Results. The final number of the included formulations was 26. Using PPP-adjusted mean unit prices, six formulations (23.08% of the samples) had a mean unit price below \$100.00, and nine formulations had a mean unit price between \$100.00 and \$500.00. Eight formulations had a mean unit price higher than \$1000.00, of which the mean unit price of one formulation (canazitaxel) was more than \$5000.00 (\$11832.93/tab).

Discussion. There was a direct relationship between income category of the countries and their mean unit price; lower income countries had lower mean unit prices. The average PPP-adjusted unit prices for countries based on their income level were as follows: low income countries \$708.75, low middle income countries \$919.39, high middle income countries \$1150.63, and high income countries \$1148.19. These discrepancies indicate that greater price transparency can help procurement officials to make better choices. This information provides an evidence base for policymakers to decide whether further policy measures related to drug prices are needed.

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430

Evidence-based Therapy of Neuropathic Pain in a Paraplegic Type-2 Diabetic patient undergoing End-Colostomy: Global Year against Neuropathic Pain 2015

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Introduction: Neuropathic pain is difficult to manage especially in patients presenting with several co-morbidities leading to enormous financial and social burden on society. Due to challenges faced in selection of evidence-based therapy of neuropathic pain, The International Association for Study of Pain (IASP) declared year 2015 as 'Global Year against Neuropathic Pain'.

Aim: Apply appropriate pharmacotherapy for neuropathic pain in a 39 year old Caucasian female patient with spinal cord injury with several co-morbid clinical challenges.

Methods: The patient was admitted for planned end-colostomy to manage her personal hygiene. The co-morbid challenges included traumatic paraplegia, poorly controlled type-2 diabetes, lower limb deep vein thrombosis & pulmonary embolism, hypopituitarism secondary to Rathke's cyst, gastro-oesophageal reflux disease, obstructive sleep apnoea, neurogenic overactive bladder, chronic left hip dislocation, pressure- induced sacral ulcer, obesity, hypercholesterolemia and depression. Pharmacotherapy for neuropathic pain comprised step-wise introduction and response-guided dose-escalation of amitriptyline, pregablin, tramadol and duloxetine. The co-morbidities were managed with baclofen, temazepam, oxybutynin, frusemide, metformin, insulin, atorvastatin, cholecalciferol, lactulose, Movicol, & Coloxyl-Senna.

Results and Discussion: This patient's neuropathic pain was successfully managed with judicious selection and combination of medications without need for strong opioids as they may not be suitable for her in the long term and can cause dependence and side effects such as constipation leading to complications with functioning of stoma appliance.

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431

A change reaction? Patient safety risks of a hybrid system for allergy documentation

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Introduction. Correct documentation of known allergies or adverse drug reactions (ADR) should be available at the point of care. The introduction of electronic medical records (eMR) has commenced in the health service, but medication documentation will not be paperless until 2018.

Aims. To investigate discrepancies in the documentation of known medication allergies and ADRs between the National Inpatient Medication Chart (NIMC), medication management plan (MMP) and eMR.

Methods. A cross-sectional analysis of inpatients from a total of 16 wards at a tertiary referral hospital was undertaken. Data collected included completeness of NIMC allergy/ADR documentation including signing, dating and printing name, and the use of ADR stickers. Additionally, documentation of allergies/ADR including drug name, severity, type and time of reaction between NIMC and eMR was captured. Data was analysed using descriptive statistics (Microsoft Excel).

Results. From 236 patients, 121 (51.3%) were found to have at least one known allergy/ADR on NIMC and 129 (54.7%) on eMR. Allergies/ADRs were documented on 99.6% of NIMCs, 89.0% of eMRs and 96.8% of MMPs. The allergy/ADR documentation on NIMC was fully signed, name printed and dated in 91.9% of patients. Full compliance with ADR alert sticker on NIMC was 9.1%. On average, reaction severity and time of reaction was documented for more patients on eMR than the NIMC (30.7% vs 8.2%) whilst drug reaction and type of reaction was documented for more patients on the NIMC than eMR (39.9% vs 35.5%). A total of 118 discrepancies between NIMC and eMR documentation were identified. These discrepancies were characterised as a difference in NKDA status, number of allergies and completeness of documentation.

Discussion. The discovery of a large number of discrepancies between paper and electronic records suggests a potential patient safety issue. Further analysis of discrepancies is required to develop processes to improve consistency of documentation.

432

Exploring accredited pharmacists' work processes during Home Medicines Reviews

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Introduction. The Home Medicines Review (HMR) Programme in Australia aims to enhance quality use of medicines and improve patient health via collaboration between accredited pharmacists (APs) and general practitioners (GPs). Little is known about APs' perspectives of work processes during the various stages of HMRs.

Aims. The aim of this project is to evaluate APs' perspectives of HMR work processes e.g. time spent on HMRs, use of technology, and adverse drug reaction (ADR) reporting.

Methods. An online national survey was distributed to APs via three key professional pharmacist organisations. The survey explored APs' opinions relating to the three key stages of HMR processes: (a) pre-interview i.e. preparation prior to the patient interview, (b) home interview, and (c) post-interview i.e. HMR report preparation and provision.

Results. Most survey respondents were female, graduated in 2000-2009, and were from community pharmacy background. They were accredited for 11-15 years, had conducted 100-499 HMRs and were not integrated into GP clinics. They spent an average of 0-30 minutes pre-interview, 45-60 minutes during the home interview, and 1-2 hours post-interview. The majority did not use a laptop for information gathering during the home interview, and did not use devices/technology to educate patients and provide information. Most APs asked the patient to sign the Privacy Notification Form at the end of the home interview. A minority of APs have reported an ADR detected from a home interview to the health authorities or drug sponsor. Most APs spent 1-2 hours around HMR report preparation and on average, HMR reports were 2 pages in length.

Discussion. Deeper insight into APs' work processes will improve quality use of medicines in patients. Additionally, this valuable gain in knowledge around pharmacy practice issues, and health care workforce issues linked with patient home visits can inform future potential funding models. In taking a team-based approach, the perspectives of other health professionals regarding HMR work processes e.g. GPs could also be explored.



433

Expressing emotions related to chronic disease states in open Facebook groups

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Introduction: The use of Facebook for health purposes is escalating and many people are utilizing this social media platform to express their emotions related to their diseases.

Aims: This study explored how disease-specific Facebook (FB) group members expressed emotions in relation to their chronic diseases on open FB group pages.

Methods: A total of 83 open Facebook groups were identified using the keywords "chronic disease states + Australia"; and 9 groups which met the inclusion criteria (patient support FB groups which had published a latest post in January 2015) were selected and their contents over a 2 week period, analysed.

Results: The selected FB groups covered 5 chronic disease states; type 1 diabetes (n=2), cancer (n=3), chronic pain (n=1), asthma/COPD (n=1), and mental disorders (n=2). From 238 threads of posts, 118 quotes showing emotions were identified. Quotes containing positive emotions (n=69) outnumbered the negative ones (n=49). Group members expressed positive emotions in connection with encouragement and optimism in managing the chronic diseases. Conversely, the negative emotions were found to reveal anger, sadness, and hopelessness in the chronic disease battle. The group members expressed feelings mostly in relation to their current disease states, long-term therapies, and changed diet and lifestyle.

Discussion: Positive and negative emotions were spontaneously expressed by the members of the FB groups. They were probably associated with the emotional status of group members and their needs, as impacted by their experience with a chronic disease. Understanding subjective factors, such as emotions, of people with chronic diseases (and their caregivers) expressed on FB groups can assist healthcare providers to better understand patients' needs. These factors may positively impact service delivery, counselling, educational materials, and strategies to support chronic disease management.

434

Medications affecting alertness: beliefs and perceptions of consumers

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Introduction: Consumption of alertness impairing medications can have serious consequences while performing activities demanding psychomotor vigilance. A better understanding of how patients perceive the risks of using medications that affect their alertness would help to design communication tools for patients to ensure the safe use of such medications.

Aims: This study aimed to explore beliefs about medications and the risk perceptions of consumers using medications that cause impaired alertness.

Methods: This study involved a point of purchase survey of patients using medications that affect alertness. Participants were recruited from randomly selected pharmacies in New South Wales (NSW). Survey items included questions about patient's perceptions of the riskiness of key daily activities such as driving after consuming alertness impairing medications as well as their beliefs about the medications. Data obtained from the patients was entered into the SPSS package and descriptively explored.

Results: Ninety-six patients taking alertness impairing medications were recruited. The mean age of the participants was 44.5 years and 51.6% were female. While nearly 22% of the respondents expressed concern (strongly agreed) about long-term consequences of their medications, 10.6% were worried about becoming dependent on the medications. About 11.8% and 29.2% of the participants perceived that driving a motor vehicle and handling machinery respectively within 3-4 hours of taking their medications are not risky at all.

Discussion: There was concern among patients about the side effects of their medications. However, risk perception about driving a car or operating machinery shortly after taking alertness impaired medications was low for some patients. Given the serious consequences of undertaking activities that need motor coordination whilst on these types of medications, development of a risk communication tool can be beneficial for identifying patients with low-risk perception as well as facilitating effective communication to improve risk perception.



435

A study of modification to first line antiretroviral therapy in treatment naive, HIV positive patients in a tertiary care hospital

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Introduction. The durability of first line antiretroviral therapy (ART) is important in developing countries as the number of regimens available is limited.

Aims. To study the time to first modification, type and predictors of modification of first line antiretroviral therapy following its initiation in HIV positive patients in a private tertiary care hospital in south India.

Methods. A retrospective study of the case files of adult HIV positive patients started on first line antiretroviral therapy between January 2012 and September 2014 was conducted. Statistical methods included Chi-square test and binomial logistic regression for identification of predictors for change in regimen.

Results. Of the 202 patients initiated on first line ART, 54 (26.73%) had modification of therapy which ranged from drug substitution to switch in regimen. The reasons were adverse drug reactions 43(79.62%), treatment failure 5(9.25%), comorbidities 3(5.55%) and physician decision 3(5.55%) to improve compliance with single tablet of tenofovir based regimens. The median time to modification was 173 (152.25, 293.50) days. Adverse drug reactions and non-tenofovir based regimens were significantly associated with change in regimen ($X^2 = 47$, $p < 0.001$ and $X^2 = 12$, $p = 0.001$), respectively. Age, gender, baseline hemoglobin, weight and CD4 values were not significantly associated with change in ART.

Discussion. Factors that can influence the duration of initial antiretroviral regimen should be identified so as to attempt to modify these factors with a view to achieve better durability of first line therapy.

Abah IO et al (2015) J Int Assoc Provid AIDS Care 14(4):348-54

436

The use of herbal medicines during breastfeeding in an Australian population

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Introduction. A large proportion of Australian women report using herbal medicines. Despite this increasing popularity, the prevalence and safety of herbal medicine use in breastfeeding women is inadequately researched. Studies to date have focused primarily on use of conventional medicines during lactation or herbal medicine use in the general population.

Aims. To investigate the utilization of herbal medicines and information-seeking behaviours during breastfeeding in Australia.

Methods. This study was conducted using a self-administered online questionnaire. Participants were recruited by advertising at various pharmacies, naturopath clinics, health food stores and online platforms, such as Facebook mothers groups. Participants were 18 years or older, currently breastfeeding or had breastfed in the past 12 months and utilized herbal medicines. Statistical analysis was performed using the Qualtrics software to provide descriptive statistics.

Results. A total of 118 questionnaires from eligible participants were analysed. Of these women, 81% used at least one herbal medicine during breastfeeding. Herbal mixes were most commonly used by 48% of women with Fenugreek (18%) and Echinacea (14%) the most frequently reported individual herbs. Nearly half (45%) of the respondents perceived herbal medicines to be safer than conventional medicines whilst 80% had previously refused or avoided conventional drug treatment due to concerns regarding the safety of their breastfed infant. Naturopaths (32%) were the most frequently consulted for safety information and information from general practitioners (22%) was reported as being the most difficult to understand.

Discussion. Herbal medicines use is common among breastfeeding women although evidence based safety information is often lacking. This study highlights that breastfeeding women have limited knowledge on the risks or benefits of these plant derived products. Improvements of current information sources should be made, to empower breastfeeding women in making informed choices, with regards to herbal medicine use.



437

Medication information needs on discharge in a rehabilitation ward- A patients' perspective

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Introduction. Avoidable medication-related cost to Australia's health care system can be reduced by effective communication between health professionals and patients. A step in the medications management cycle involves understanding patients' and carers' medication information needs at discharge from hospital.

Aims. To explore patients' discharge medication information needs and whether their needs were met in a rural hospital setting.

Methods. Patients in a rehabilitation ward were interviewed pre-discharge to determine their individual medication needs, this was followed by a telephone interview 3-7 days post discharge to explore if these needs were met. Interviews were semi-structured, following an interview guide and were audio-taped and transcribed verbatim to allow for thematic analysis of data.

Results & Discussion. 21 semi-structured interviews were conducted involving 13 participants (13 pre-discharge and 8 post-discharge). Pre-discharge patients mostly wanted to know the indication for the medication prescribed and the side effect profile. There were varied responses as to how they wanted to receive their medication information. The requirement for medication information that was either verbal, written or both appeared to depend on the patients' perception of their cognitive ability. The majority of patients did not have a preference of brands and identified generic brands as "the cheaper brand". Disempowerment of patients own medication management as a consequence of the hospital setting was found with patients not knowing what medication they were taking or why. Post-discharge patients claimed to be satisfied that they had received adequate information on discharge. These patients had access to a written discharge medication summary sheet once home which aided in the management of their medications. However, a few patients had confusion around medication self-management once home from the hospital. Therefore consideration of the individual patient needs involvement of patients with their own medication management to empower patients prior to discharge may help reduce confusion experienced at this care transition point.

438

Assessing community pharmacists knowledge of popular herbal/nutrient weight-loss medications

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Introduction. Australian pharmacists are obligated to ensure they provide the best available information to consumers for complementary medicines with regards to evidence for efficacy, drug interactions and risks of harm including potential side effects.

Aim. Assess community pharmacists' knowledge regarding evidence for efficacy, drug interactions and potential side effects for popular herbal/nutrient weight-loss complementary medicines (WLCMs).

Methods. A knowledge-based questionnaire was developed relating to three popular WLCMs – garcinia, green tea and chromium. Community pharmacists from a randomly selected sample of 214 pharmacies located in the Greater Brisbane region, Queensland, Australia were invited to complete the online questionnaire.

Results. In total, 99 pharmacists completed the survey. Only 10% of respondents selected the appropriate effectiveness ratings for green tea, while 40% selecting the appropriate response for garcinia and chromium. A mismatch was observed between what pharmacists recognised as adverse effects and interactions for the three common WLCMs compared to published findings, with a bias towards nervous system (i.e. insomnia and headache), gastrointestinal side effects and interactions with warfarin.

Discussion. Our results suggest that the majority of pharmacists in this study were unable to identify the appropriate effectiveness rating, adverse drug effects or drug interactions for three commonly sold/recommended WLCMs. These findings support local and international studies, highlighting pharmacists have limited knowledge not only of popular complementary medicines (e.g. glucosamine, black cohosh and *Ginkgo biloba*), but also extends to commonly used/sold WLCMs.



439

Pharmacists' perceptions of career opportunities in Australia

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Introduction: Anecdotal reports of an oversupply of pharmacy graduates are a growing concern for Australian pharmacists. However, limited data exists regarding pharmacists' employment experiences and perceptions of current career opportunities in Australia.

Aim: To understand Australian pharmacists' and pharmacy interns' employment experiences by exploring their satisfaction and perspective of current employment opportunities.

Method: An electronic survey was distributed to pharmacists and pharmacy interns across Australia between March to July 2016. National professional organisations for pharmacists assisted with distribution of the survey. Follow-up interviews were conducted to further explore survey findings.

Results: A total of 306 individuals completed the survey (83% pharmacist; 17% interns). A majority of pharmacists and interns reported high satisfaction with current employment and professional practice opportunities; however, there is a misalignment between their rated satisfaction and perspective of future employment prospects. Key themes that emerged included personal networks for employment, salary and location, and concerns for the future of the profession.

Discussion: This study provided valuable insight to the Australian Pharmacist workforce, by improving our understanding of pharmacists' employment experiences and perspectives. Further exploration of themes identified in this study is required to better inform the future of pharmacy professional practice and employment.

440

The association between frailty and medicine use over time

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Introduction. Frailty and medicine-related problems are common among the older population and have been associated with an increased risk of adverse outcomes. Frailty assessment has been identified as an important effort in improving the safe use of medicines in older people.

Aims. To examine whether there was a difference in frailty scores over time with the changes in medicine use.

Methods. Frailty scores and medicine use information were assessed from the Australian Longitudinal Study of Ageing (ALSA), data at baseline (wave 1) and at wave 3 were used. Frailty scores were assessed at both waves using a modified version of the Frailty Index. Medicine use was categorised into continued or stopped by comparing use at wave 3 to use at wave 1. A t-test was used to compare the mean changes in frailty scores between the two groups, with a p-value of <0.05 considered to be significant.

Results. Data from 1679 participants were included in the analysis. Participants who stopped any preventive medicines were found to have a higher increase in mean frailty scores changes than those who continued using them (p=0.01). Stopping beta blockers or potassium-sparing diuretics was associated with a greater increase in frailty score than continuing these medicines.

Discussion. There was a difference in frailty scores over time with the changes in the use of certain medicines, however, further study is needed to assess whether the increase in frailty scores was due to medicine cessation or whether the cessation of the medicine was due to frailty progression.

441

Preparation, solid state characterization of etravirine co-crystals with improved solubility

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Introduction. Preparation of binary cocrystals of Etravirine (ETR) by using Tartaric Acid (TAR) as a conformer was the main focus of this study. Etravirine is a Class IV drug having low solubility and low permeability, as per the BCS classification system. Principle behind cocrystal formation is hydrogen bonding between C=O and N-H group of Etravirine and COOH groups of tartaric acid, which is varified by FTIR, XRD and DSC results.

Aim. To prepare cocrystals of etravirine with tartaric acid with inproved solubility.

Methods. Cocrystals were prepared by slow evaporation technique. A mixture of total 500mg of ETR: TAR was weighed in molar ratios of 1:1 (371.72mg of ETR and 128.27mg of TAR). Saturated solution of Etravirine was prepared in Acetone: Methanol (50:50) mixture in which tartaric acid is dissolved by sonication and then this solution was stirred using a magnetic stirrer until the solvent got evaporated. Shimadzu FTIR – 8300 system (Kyoto, Japan) was used to acquire the FTIR spectra of the cocrystals prepared. Shimadzu (TA – 60WS) thermal analyzer was used to achieve DSC measurements. Rigakuminiflex 600 X-ray diffractometer (Rigaku Co., Tokyo, Japan) was used to obtain the X-ray powder diffraction pattern. Shake flask method was used to determine the equilibrium dynamic solubility of pure, physical mixture and cocrystals of ETR. USP buffer (pH 6.8) containing 1% of Tween 80 was used as the medium. The pure, physical mixture and the optimized cocrystal of ETR were accurately weighed sufficient to maintain the sink condition and were filled in hard gelatine capsules (size 4). Electrolab- Tablet Dissolution tester using basket apparatus at a rotational speed of 50 rpm and USP phosphate buffer (900 mL, pH = 6.8, 37 °C) + 1% Tween80 as a dissolution media was used to carry out dissolution. Shimadzu LC-10 series chromatographic system (Shimadzu Corporation, Kyoto, Japan) was used to perform the analysis. The system contained a controller unit(SCL-10A VP), a degasser unit(DGU-20A5), a quaternary gradient pump(LC-20AD), a refrigerated autosampler(SIL20AC HT) and a PDA detector(SPD-M10AVP). An Hypersil BDS C₁₈ (150mm ×4.6 mm ×5 μm) column was used for separation with mobile phase comprising of a mixture of acetonitrile and phosphate buffer (20mM, containing 2.72 g of potassium dihydrogen phosphate and pH adjusted to 3.2 with 85% orthophosphoric acid) in the ratio 60:40 v/v. The flow rate was 1.0mL/min and column temperature was set to 30°C. The detection was carried out at304 nm for ETR.

Results and discussions. The cocrystals were subjected to various solid state characterization like FTIR, DSC and PXRD and the results confirmed the formation of cocrystals. The C=O stretching vibration (1741cm⁻¹) in tartaric acid was disappeared in the cocrystal and the peak broadening of primary amine indicates hydrogen bond formation. The difference in the melting point of cocrystals when compared to pure Etravirine (265 °C) indicates interaction between the drug and the cofomer which proves that first ordered transformation i.e. melting endotherm has disappeared. The difference in 2θ values of pure drug and cocrystals indicates the interaction between the drug and the cofomer. Dynamic solubility and dissolution studies were also conducted by shake flask method and USP apparatus one respectively and 3.6 fold increase in the dynamic solubility were observed shown in figure 1 and *in-vitro* dissolution study shows four fold increase in the solubility for the ETR: TAR (1:1) cocrystals. shown in figure 2. The ETR: TAR (1:1) cocrystals shows improved solubility and dissolution as compared to the pure drug which was clearly showed by solid state characterization and dissolution studies

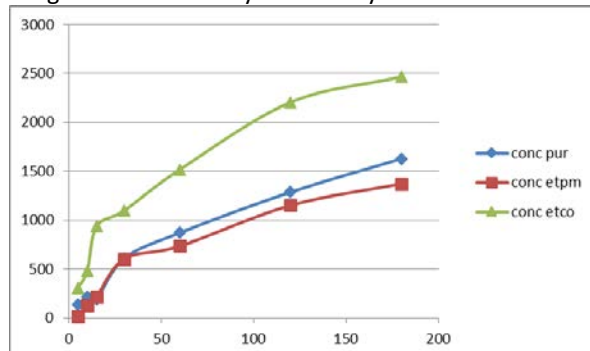


Figure 1: Dynamic solubility data of ETR: TAR (1:1) Figure 2: Dissolution study data of ETR: TAR (1:1)

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443

Development and Validation of an LC-MS/MS Bioanalytical Method for Quantification of Dexmedetomidine in Samples of Human Plasma

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Introduction. Dexmedetomidine (DEX) is a selective central α_2 -agonist used as a sedative and anxiolytic in the ICU.

Aims. To develop and validate an LC-MS/MS method to measure DEX in the plasma samples collected from patients on extracorporeal membrane oxygenation (ECMO).

Methods. Aliquots of 0.1% formic acid (FA) in water (100 μ l) containing DEX-d4 as the internal standard (10 ng/mL) were added to samples of human plasma (50 μ l) and 0.1% FA in water (50 μ l). Samples were mixed and loaded on HLB solid phase extraction cartridges (Waters) which were pre-conditioned with methanol (1 mL) and 0.1% FA in water (1 mL). Cartridges were washed with 30% methanol in water (1 mL), followed by elution with the mixture of 5% isopropanol, 10% acetonitrile and 85% methanol in glass tubes contained 20 μ l of 0.5% bovine serum albumin. Eluents were evaporated under the steam of nitrogen at room temperature and were reconstituted in 20% acetonitrile in 0.1% FA in water (200 μ l) and transferred to the silanized glass vials from which 5 μ l were injected onto a X-Terra[®] C18 150 x 2.1 mm, 5 μ m analytical column with a 7.5 min run time and the mobile phase comprising 0.1% FA in water and acetonitrile. The MRM transitions were 201.1 \rightarrow 95.0 and 204.9 \rightarrow 99.0 for DEX and the DEX-d4, respectively.

Results. The method showed acceptable within-run and between-run precision and accuracy (>85%) for quality control (QC) samples (n=6, at three different days). DEX was stable in QCs after three cycles of freeze and thaw, 5 h at room temperature, and at least 112 days in freezer at -20 $^{\circ}$ C. The recovery was 86% and the method was linear over the range of 0.5-20 ng/mL. Matrix effect was tested using spiking low and high concentrations of DEX in plasma samples from 6 individuals (precision > 96%).

Discussion. Small sample volume required for the analysis, using a stable isotope as the internal standard, and minimising adsorption to glass and plastic tubes are the main advantages of our fully validated bioanalytical method.

444

The function of M26V ρ 1 GABA_C mutant receptor

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Introduction. GABA_C receptors are ligand-gated ion channels found in distinct areas of the CNS¹ and implicated in the pathophysiological of many disorders. A family-based association analyses identified an alcohol dependence associated mutation correspond to GABA_C ρ 1 M20V.² The effect of this mutation on GABA_C ρ 1 receptor function is as yet unknown.

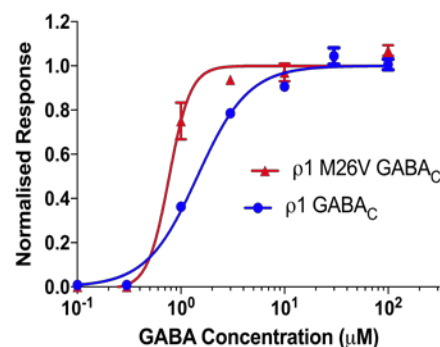
Aims. To study the effect of GAB in the presence and absence of ethanol at WT and M26V GABA_C receptors expressed in xenopus oocytes.

Methods. A single point mutation was introduced using site-directed mutagenesis. The effect of the mutation was evaluated using 2-electrode voltage clamp methods on recombinant WT and M26V ρ 1 GABA receptors expressed in Xenopus oocytes.

Results. On WT ρ 1 GABA_C receptors ethanol inhibited the GABA response. The M26V mutation did not alter the efficacy of GABA, however the Hill slope increased significantly from 1.8 to 4.7 (p<0.001), with a decrease in EC₅₀ from WT 1.4 μ M to M26V 0.77 μ M (p<0.001).

Discussion. Interestingly, alcohol inhibits the GABA response at GABA_C receptors, compared to GABA_A and GABA_B receptors where alcohol enhances the GABA response. Current studies are investigating the effect of alcohol on the GABA response at M26V. Although the efficacy of GABA was not affected by the M26V mutation, the increase in Hill slope suggests increased cooperativity between the receptor and GABA.

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445

Nanostructured lipidic carriers of diflunisal for treatment of rheumatoid arthritis: Systematic optimization, characterization and therapeutic efficacy evaluation

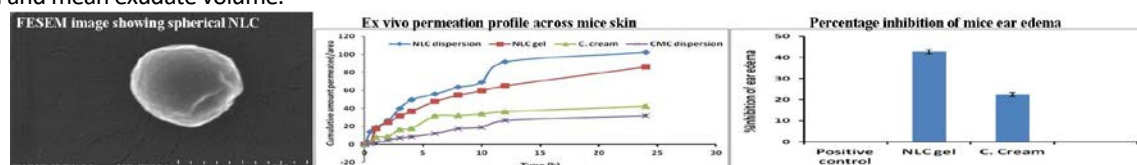
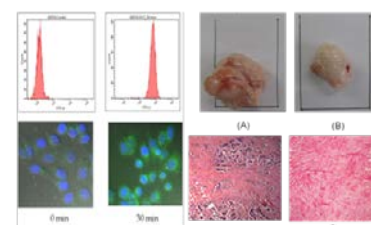
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Introduction. Diflunisal (DIF) is a non steroidal anti-inflammatory drug with high potency and used orally for the management of rheumatoid arthritis, osteoarthritis¹. Oral administration leads to severe gastrointestinal side effects.

Aims. The aim of the present study was systematic optimization using Quality by design approach, characterization and therapeutic efficacy evaluation of nanostructured lipidic carriers (NLCs) of DIF.

Methods. NLCs were prepared by hot microemulsion method. Taguchi L8 orthogonal array and face-centered cubic design were used to prepared formulation batches. *In vitro* characterization and *ex vivo* permeation studies were done. Therapeutic efficacy was evaluated using mice ear edema and mice air pouch model.

Results. The developed NLCs were spherical as depicted by TEM and FESEM with average particle size of 168.7 nm; PDI 0.272. The entrapment efficiency was 85.45 ± 2.124 %. The cumulative amount permeated per unit area of skin from NLC dispersion was $102.441 \mu\text{g}/\text{cm}^2$. The skin penetration was demonstrated by Confocal Laser Scanning Microscopic study. The results of mice ear edema and air pouch model depicted significantly better efficacy in terms of edema inhibition, reduction in infiltration of leukocytes, granuloma formation and mean exudate volume.



Discussion. The improved efficacy of DIF from NLC gel is due to high drug loading in nano-sized particles leading to improved permeation across the skin.

¹Sallam MA, Motawaa AM, Mortada SM. A modern approach for controlled transdermal delivery of diflunisal: optimization and *in vivo* evaluation. *Drug Development and Industrial Pharmacy*, 2013; 39(4): 600–610

446

Systematic development of Type IV self-nanoemulsifying drug delivery systems of Mangiferin: Cellular uptake studies and mechanistic pathways on resistant cells

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Introduction. Mangiferin, naturally occurring glycosylxanthone has gained rapid importance as an antioxidant by reducing free radical species and inhibiting cancer cells by inducing apoptosis. It exhibits low oral bioavailability (<12%), ostensibly owing to its poor aqueous solubility, extensive hepatic first-pass metabolism and P-gp efflux.

Aim. The current studies entail the Formulation by Design-based development of Type IV self nanoemulsifying drug delivery systems (SNEDDS) of mangiferin for enhancing its oral bioavailability.

Methods. Preformulation studies were carried out employing equilibrium solubility and pseudoternary phase titration studies in various surfactants, and/or co-surfactants followed by factor screening studies. Cremophor & Labrafil M2125 (i.e., surfactant) and PEG, (i.e., cosolvent) were selected as the CMAs for Type IV SNEDDS. QbD-based optimization of the SNEDDS was carried out by employing I-optimal mixture design, evaluating their COAs like globule size, emulsification efficiency, drug release in 15 min and percent permeated in 45 min.

Results. The optimized formulation was selected using numerical optimization desirability function exhibiting miniscule globule size (<100 nm), excellent emulsification time (<1 minute), rapid drug release (>80% within 15 min) and enhanced intestinal permeability (>85% in 45 min). Figure illustrates the *in vitro* cell line data on MDA-MB-231 cells at varying time points. Further, the uptake studies through flow cytometry analysis and confocal microscopy construed the superior uptake potential for the prepared formulations. The figure also shows *in vivo* tumor efficacy and histopathology slides.

Discussion: It was revealed that Type IV SNEDDS followed clathrin mediated pathways. *In situ* perfusion and *in vivo* pharmacokinetic studies performed in Wistar rats revealed remarkable improvement ($p < 0.001$) in the extent of oral bioavailability for Type IV-SNEDDS (i.e., 7-folds) vis-à-vis pure drug.

447

Long circulation of quantum dot loaded PLGA-nanoparticles surface modified with poloxamer

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Introduction. Main drawback of drug loaded nanoparticles delivery by intravenous administration is rapidly eliminated in the bloodstream due to opsonisation by reticuloendothelial system (RES). Hydrophilic modification on the surface nanoparticles is considered essential to overcome the problems. **Aim.** To design long circulating polylactic glycolic acid nanoparticles (NP) loading quantum dot as a sensor by modifying the nanostructure with poloxamer. **Methods.** PLGA-poloxamer nanoparticles were prepared by nanoprecipitation method. Poloxamer concentrations used were 3, 5 and 10%. Characterization, pharmacokinetics and biodistribution study in mice of nanoparticles were performed. **Results.** Particles had a size of around 90-150 nm with encapsulation efficiency more than 90%. Blood concentration of the use 5% poloxamer (NP5%) and 10% (NP10%) were 15.15 and 10.35%ID/mL, respectively after 12 h administration. Those were higher than that of control of approximately 5.85%ID/mL. The higher poloxamer, the higher AUC value and the lower clearance. Moreover, accumulation of the NP5% and NP10% in RES organ such as liver and spleen was significantly decreased comparing to that of control. **Discussion.** Insertion of particularly 5% and 10% poloxamer to the surface of PLGA-nanoparticles provided steric barrier so that it has long circulating in blood with low accumulation in RES organ.

448

Thermo- and magneto-sensitive drug delivery carriers for the treatment of lung cancer

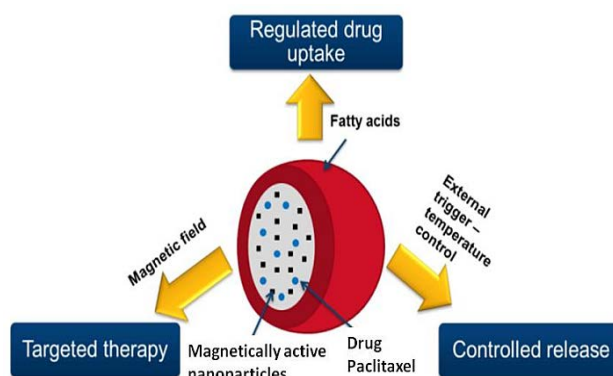
Katarzyna Reczyńska^{1,2}, Elżbieta Pamuła¹, Wojciech Chrzanowski². AGH University of Science and Technology Faculty of Materials Science and Ceramics¹, Kraków, PL; University of Sydney, Faculty of Pharmacy², Sydney, AU

Introduction. The ability to use external stimulus to localize and then trigger drug release is a major challenge in the development of advanced drug delivery systems (DDS).

Aims. The main objective was to develop stimuli-responsive inhalable fatty acid-based microparticles (MPs) that will enhance the efficacy of lung cancer treatment. The idea of DDS is shown in Figure.

Methods. MPs containing 1-5% magnetic nanoparticles were produced by oil-in-water emulsification from lauric acid (LAU), myristic acid (MYR) and mixture of MYR and palmitic acid (MYR:PAL, 60:40) and characterised by DLS, DSC, SEM, AFM. The influence of MPs on A459 human lung carcinoma cells was evaluated up to 8 h by resazurin viability test, live/dead and DAPI/phalloidin staining.

Results and Discussion. MPs were spherical and their size was in the range of 1-6 μm , i.e. suitable for inhalation. Melting temperatures of MPs made of LAU, MYR and MYR:PAL were 45, 54 and 48°C, respectively, showing that it is possible to adapt their melting and thus release of encapsulated drug to hyperthermia conditions. MPs were easily phagocytosed by the cells and were not cytotoxic for the doses lower than 0.25 mg/ml. Mobility tests showed that it is possible to target the MPs by external magnetic field. To sum up, developed MPs had suitable properties for inhalation, localized accumulation and triggered drug release using external magnetic field.



This study was supported by National Science Center, Poland (No 2014/14/M/ST5/00649).



449

Extraction methodologies and phytochemical analysis of Australian *Pittosporum angustifolium*

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Pittosporum angustifolium Linn also known in the literature as *P. phillyraeoides* and has been widely used in Aboriginal medicinal practice wherein it is known as “gumby-gumby”. The medicinal uses for the plant render it of significant interest. The *P. angustifolium* species was reinstated by Cayzer et al. (2000) and its identification was confirmed on the basis of both phylogenetic and morphological analyses. *P. phillyraeoides* and *P. angustifolium* are also differentiated on their history of collection and geographical distribution.

Aims. The aim of the current study is to examine extraction methodologies on a number of different *P. angustifolium* samples and to perform qualitative phytochemical analysis on extracts to determine the extent and range of any chemical variation.

Methods Leaf samples of *P. angustifolium* from Queensland and South Australia were provided by Dale Chapman (Five Kungkas). Juice and decoction extracts were prepared and phytochemical tests were performed.

Results and Discussion- Juice and decoction extract yields were different between the three cultivars examined. Less variation was observed in the decoction extracts yields when compared to the leaf juice yields. Phytochemical analysis revealed clear differences in juice and decoction for both tannins and saponins.

Reference

Cayzer LW, Crisp MD, Telford RH. Revision of *Pittosporum* (Pittosporaceae) in Australia. *Aust Syst Bot.* 2000;13:845-902.

Acknowledgement: The contribution and assistance of Dale Chapman (Five Kungkas) is gratefully acknowledged

450

Bioanalytical method development and validation of Aminophylline in rat plasma using RP-HPLC – An application to preclinical pharmacokinetics

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Introduction. Aminophylline is a methylxanthine derivative belonging to the class bronchodilator. From the literature survey, reported methods reveals the solid phase extraction and liquid liquid extraction which is highly variable, time consuming, costly and laborious analysis.

Aims. To develop a simple, highly sensitive, precise and accurate high-performance liquid chromatography method for the quantification of Aminophylline in rat plasma samples.

Methods. Reverse Phase high-performance liquid chromatography method.

Results. Selectivity: Aminophylline and the internal standard were well separated from the co-eluted components and there was no interference from the endogenous material at the retention time of analyte and the internal standard. The LLOQ measurable with acceptable accuracy and precision for the analyte was 0.5 µg/mL.

Linearity: The developed and validated method is linear over the range of 0.5-40.0 µg/mL. The coefficient of determination was found to be greater than 0.9967, indicating the linearity of this method.

Accuracy and precision: The accuracy and precision values for intra and inter day studies at low, medium and high quality control samples concentrations of aminophylline in the plasma were within the acceptable limits

Extraction recovery: The method produced consistent extraction recovery at all 3 QC levels. The mean extraction recovery of aminophylline was 93.57 ± 1.28% while that of internal standard was 90.70 ± 1.30%. **Stability:** The results show that aminophylline is stable in rat plasma under the studied stability conditions and that it is also stable for about 30 days when stored at -80°C.

Pharmacokinetic studies: The method was successfully applied to the quantitative estimation of aminophylline rat plasma following its oral administration to rats.

Discussion. Preclinical studies require a rapid and sensitive method for estimating the drug concentration in the rat plasma. The method described in our article includes a simple protein precipitation extraction technique with ultraviolet detection for quantification. The present method is simple and robust for fast high-throughput sample analysis with less analysis cost for analyzing aminophylline in biological samples. In this proposed method, no interfering peaks were observed at the elution times of aminophylline and the internal standard. The method also had sufficient selectivity, specificity, precision and accuracy over the concentration range of 0.5 - 40.0 µg/mL. An isocratic separation technique was used underlining the simplicity of the presented method.

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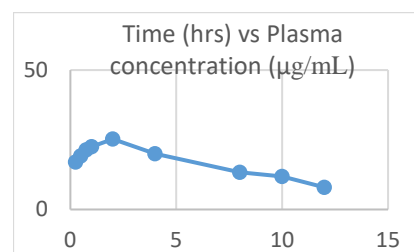


Figure 1:



451

Gliclazide-Ciprofloxacin Interactions in Rats: Mechanism Study of P-glycoprotein Role Using Quinidine

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Introduction. Patients type II Diabetes Mellitus along with complication of urinary tract infection are usually treated by a combination of gliclazide and ciprofloxacin. Our previous study showed that gliclazide caused inhibition of ciprofloxacin's elimination. It was assumed that the interaction involving *P-glycoprotein* (P-gp). **Aim.** To study the role of P-gp in the interaction between gliclazide and ciprofloxacin using quinidine, a widely accepted P-gp inhibitor. **Methods.** Rats were divided into 4 groups given gliclazide or ciprofloxacin, with or without quinidine. Plasma samples were analyzed by HPLC. **Results.** Quinidine caused a significant change ($p < 0.05$) in ciprofloxacin PK, a decrease in β (0.24 ± 0.03 to $0.07 \pm 0.01 \text{ h}^{-1}$) and clearance (16.67 ± 3.89 to $9.44 \pm 1.51 \text{ l/kg/h}$), respectively. In contrast, no significant impact of quinidine on gliclazide PK. **Discussion.** P-gp in kidney plays a role in drug efflux into the urine. A study in transfected cells showed uncertain results whether ciprofloxacin is a P-gp substrate. These findings showed that inhibition of P-gp caused a decrease in ciprofloxacin elimination. While this study did not show that gliclazide was a P-gp substrate, gliclazide inhibition on ciprofloxacin elimination suggested gliclazide as an inhibitor of P-gp and/or other transporter(s) that might involve in ciprofloxacin elimination.

Park MS et al (2011) Arch Drug Info 4:1–9

452

Effect of storage on release from delayed release sodium diclofenac tablets

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Introduction. Delayed release (enteric-coated) tablets of sodium diclofenac are intended to release drug only once in the small intestine. *In vitro* testing involves an acid first stage (representing the stomach) and then a buffer stage (pH 6.8 phosphate buffer). Storage at different temperature and humidity may lead to coating failure, either in the acid stage or in the buffer stage.

Aims. To determine whether storage conditions influence release from two brands of delayed release sodium diclofenac (50 mg) tablets.

Methods. Tablets from two brands were stored (unpacked) for 14 days at 5, 40 and 60°C and for 28 days at 25°C in 75% RH and 100% RH. Release from 3 tablets stored under each condition was monitored using the USP delayed release tablet testing procedure with extra samples taken during the buffer stage. Diclofenac content was determined by UV spectroscopy.

Results. No tablets (from either Brand in the different temperatures and humidities) showed coating rupture in the acid stage. In the buffer stage there were only small Brand differences found except when stored at 100% RH at 25°C. Usually tablets met USP requirements for release in the buffer stage (no less than 75% released in 45 minutes). However, one Brand released only an average of 8% diclofenac in 45 minutes after storage at 100% RH. The tablets swelled up but the coating did not rupture.

Discussion. This limited storage experiment was carried out as an undergraduate Elective project. Further study for different time periods should be determined and the mechanism, by which release from one Brand in pH 6.8 buffer has been much reduced by storage at high humidity, should be investigated.

453

Effect of humidity on release from carbamazepine tablets

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Introduction. Dissolution of carbamazepine (CBZ) tablets has been reported to be reduced after exposure to moisture, thereby leading to clinical failure. This reduction in dissolution was linked with the conversion of CBZ to the dihydrate (lower solubility), together with significant reduction in available surface area for dissolution as fine CBZ particles were converted to CBZ DH whiskers. Subsequently, some CBZ tablets were packed in individual blisters to reduce the risk of exposure to moisture.

Aims. To determine whether exposure to humidity influences the dissolution rate of 200 mg CBZ tablets of one brand.

Methods. CBZ tablets were stored at 30°C for 25 days. Some were stored in original blister strips while others were removed from strips and exposed to 100 % RH in airtight containers. Weight change at the end of the storage period was determined and dissolution in 1% sodium dodecyl sulphate medium according to the USP procedure was determined, with samples taken at 15, 30, 45 and 60 min. CBZ content was analysed by UV spectroscopy.

Results. The tablets stored exposed to moisture showed some increase in weight, due to moisture uptake, but no visible changes to the exposed tablets were noted. Dissolution of the exposed tablets was slightly reduced, compared to the controls, but this was not found to be statistically significant. All tablets met USP dissolution requirements.

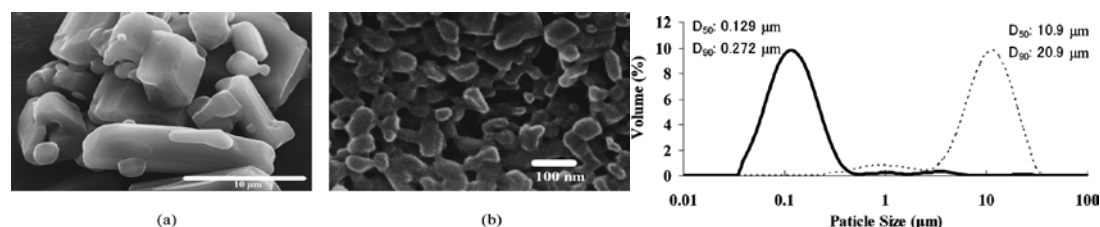
Discussion. This limited storage experiment (at 30°C) was carried out as an undergraduate Elective project. Further investigation at different temperatures could be undertaken. The resistance of the tested brand to dissolution changes resulting from humidity exposure at 30°C would suggest there is little risk of clinical failure of this brand of CBZ tablets stored outside their blister packs. However, testing of other brands should be undertaken.

454

Nanosizing of Poorly Water Soluble Compounds Using Rotation/Revolution Mixer

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In this study, nanoparticles of various poorly water soluble compounds were prepared by wet milling that was carried out using a rotation/revolution mixer and zirconia balls. To be compared with Beads mill, rotation/revolution mixer has superior in very quick process (5 min) and needs very few amounts of zirconia balls (2.4 g) for pulverizing drugs to nanometer range. Phenytoin, indomethacin, nifedipine, danazol, and naproxen were selected as the standard poorly water soluble compounds. Various parameters of the rotation/revolution mixer were studied to decide the optimal pulverization conditions for the production of nanoparticles of the abovementioned compounds. The rotation/revolution speed, shape of the mixing vessel, amount of zirconia balls, and volume of the vehicle (methylcellulose solution) mainly affected the pulverization of the compounds. Using the mixer, phenytoin could be pulverized to nanoparticles within a few minutes. The particle size was confirmed by using a scanning electron microscope and a particle size analyzer. The crystallinity of the pulverized phenytoin particles was confirmed by X-ray diffractometry (XRD) and differential scanning calorimetry (DSC). It was observed that the pulverized phenytoin particles retained their crystallinity, and amorphous phenytoin was not detected. Particles of other poorly water soluble compounds were also reduced to the nanometer range by using this method.



455

Simulating the response of liposomes exposed to ultrasound using the finite element method (FEM)

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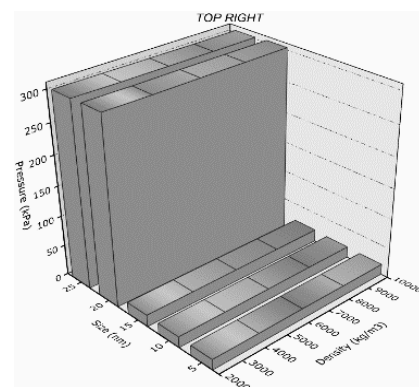
Introduction: Inclusion of particles in liposomes may increase the sensitivity of those liposomes to external triggers such as ultrasound (US) for drug delivery [1, 2]. Based on the linear elastic properties of the materials, FEM can simulate the behaviour of liposomes on expose to US and so may be used for screening purposes.

Aims: To use 2-dimensional FEM to simulate the mechanical interactions between a single liposome containing a single particle and an US wave.

Methods: Simulations were performed on a laptop using PZFlex (Weidinger Associates Inc, California USA). The interaction between a US cycle (1.1 MHz, 1.2 MPa) with a liposome (200 nm diameter) containing an encapsulated particle (density, diameter and position were varied) within a 300 × 300 nm water box was simulated.

Results: The closer the particle was to the liposome wall, the greater the pressure observed across the wall on exposure to US. Particle diameter had a greater influence that its density on this pressure (Fig).

Discussion: FEM is an *in silico* method to screen behaviours of delivery systems on exposure to triggers (e.g. US) which cause mechanical perturbations which may stimulate drug release. It predicts pressure of 300 kPa across the liposomal wall on exposure to US and when a particle is located near the wall. Such pressure may lead to drug release from the liposome since pressures >100 kPa, have been shown, *in vitro* to rupture lipid bilayers [3-5].



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456

Unlocking mechanisms implicated in drug-induced bizarre idiosyncratic behaviours: Learning from people and molecules

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Introduction. Zolpidem, an imidazopyridine hypnotic, which acts on GABA-A receptors has been associated with the development of a number of disturbing neuropsychiatric adverse drug reactions (ADRs) including parasomnias, amnesia and hallucinations. Although other non-hypnotic medications are also implicated in the induction of such adverse events; the mechanism behind these ADRs remains elusive and have been postulated to arise from off-target receptor or pathway activation. Such off-target promiscuous receptor or pathway activation may arise from structural similarities collectively shared amongst agents associated with these ADRs.

Aims. Using a novel multidisciplinary approach, we aim to investigate relationships between these rare idiosyncratic ADRs (parasomnia, movement-based parasomnia, non-movement based parasomnia, amnesia and hallucination) by identifying similarities in the chemical structure amongst drugs that share these reactions.

Methods. Retrospective disproportionality analysis of pharmacovigilance data obtained from the Food and Drug Administration Adverse Event Reporting System (FAERS) revealed drug-event associations (DEAs) for drugs associated with the following ADRs; amnesia, hallucination, parasomnia, movement-related parasomnia and non-movement related parasomnia. Drugs identified subsequently served as probe molecules in an *in silico* pharmacophore determination using Schrodinger's Phase program to elucidate possible structural similarities.

Results. Pharmacophore hypotheses generated were shared among large proportions of the investigated active drug structures that possess DEA signals for amnesia, hallucinations and parasomnias. In particular, a 5-point pharmacophore hypothesis comprising of two hydrogen acceptors, one hydrophobic group, one positive group and one aromatic ring was returned for drugs associated with movement-based parasomnias.

Discussion. These shared structural features or motifs may enable diverse drugs to participate in a pharmacological reaction with a mutual target receptor or pathway. By combining human population pharmacovigilance data with *in silico* computational techniques, insights into mechanisms underlying idiosyncratic reactions or toxicities can be elucidated.



457

South Asian ancestry: Implications for global drug development

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Introduction. The population of South Asia is ethnically diverse and contains a populace that lives in different environments with unique cultures and genetic profiles. Consequently, extrinsic and intrinsic factors which could influence drug response, and therefore the results of global clinical studies, differ between the populations in South Asia and the West. At present, information on the profile of these factors in clinical trial participants of South Asian ancestry relative to subjects of European ancestry is limited.

Aim. To investigate and compare demographic factors between clinical trial participants of South Asian ancestry in South Asia and European ancestry in the West.

Methods. Key demographic data were extracted for South Asians (N=2961) and Europeans (N=25221) with non-communicable diseases (NCD) from 24 GSK clinical studies, and for South Asian (N=173) and European (N=162) healthy subjects from 13 Phase 1 studies. Glomerular filtration rate (eGFR, mL/min/1.73m²) was estimated in an NCD subgroup (South Asian: n=1842, European: n=9360) using the body surface area-normalised Cockcroft-Gault (BSA-CG), MDRD, CKD-EPI and either one of two South Asian-specific equations [1, 2]. Male NCD, female NCD and healthy subjects were evaluated separately and the eGFR and demographic data were reported as mean (SD).

Results. Body weight (65.8(13.0) vs. 88.5(17.4) kg), height (165(7) vs. 174(7) cm) and body mass index (24.1(4.3) vs. 29.3(5.2) kg/m²) were lower in South Asian than European males with NCD. The eGFR was higher in South Asian than European males with NCD (BSA-CG: 79.4(23.3) vs. 75.8(20.4); MDRD: 80.3(22.1) vs. 71.1(15.9); CKD-EPI: 83.0(19.5) vs. 73.4(16.5)). South Asian-specific equations showed higher (Srinivas: 88.5(5.7)) and lower (Jessani: 74.1(18.3)) eGFR for South Asian males with NCD in comparison to the three other equations. Similar trends were observed for the South Asian vs. European female subjects with NCD and in the healthy subjects.

Discussion. Clinical trial participants of South Asian and European ancestry have exhibited differences in demographics and eGFR which could influence disease severity classification and clinical trial eligibility. Therefore, subjects of South Asian ancestry should be considered as a distinct population in drug development programs.

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458

A review of the effects of central nervous system active drugs on sleep spindles and sleep-related memory consolidation

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Introduction. Sleep spindles are oscillatory events that are observed in an electroencephalogram during non-rapid eye movement sleep with a characteristic frequency of 9-15Hz. Spindles have a key role in memory processing. Spindle deficits are associated with memory impairment and it is known that some drugs can enhance or dampen spindle formation, and therefore, these drugs may indirectly affect memory processing.

Aims. This review aimed to integrate studies that provide insight into the feasibility of manipulating sleep spindles and sleep-related memory using psychoactive drug classes. The important drug classes of interest focused on in this review included 1) hypnotic and sedatives, 2) antipsychotics and 3) antiepileptic drugs.

Methods. Given the heterogeneity of the research designs involved in this area of research, the review employed a scoping method. Searches were conducted using keywords and MeSH terms in Pubmed, Medline, Embase, Scopus and the Web of Science databases, which were screened up till the 7th of April 2016. Data extraction, tabulation and review of studies by a panel of experts followed the search.

Results. The search yielded 951 articles, however, only 24 articles were finally reviewed following stringent inclusion and exclusion criteria. Standardised methodological approaches in spindle activity quantification were not evident in the literature. In this review, zolpidem had the most therapeutic potential with preliminary evidence (n=2 studies) showing the feasibility of enhancing declarative memory through boosting sleep spindle activity. Most benzodiazepines and other Z-drugs may also enhance sleep spindle activity unlike other drug classes reviewed. However, how these spindle enhancements translate into improved sleep-dependent memory remains unclear.

Discussion. Standardised methods of spindle characterisation and robust controlled trials are needed to confirm the memory improvement potential of pharmacological agents, however preliminary data shows promise.



459

Pharmacy Perspectives of pharmacy students, pharmacy academics and practicing pharmacists on inter-professional education and collaborative practice: a comprehensive systematic review

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Introduction. Healthcare is provided by a large number of different healthcare professionals including pharmacists who are key element in the collaborative working process. Although pharmacists are an integral member of the healthcare team, yet their perspective towards interprofessional education and collaborative practice is largely unknown.

Aims. The aim of this systematic review is to examine the perspectives, attitudes, views and experiences of pharmacy students, pharmacy academics and practicing pharmacists towards interprofessional education and collaborative practice through quantitative and qualitative evidence.

Methods. Systematic review. Four electronic databases were searched for articles published in English between 2000 – 2015.

Results. Twenty-nine articles were identified meeting the inclusion/exclusion criteria from the first initial search of 8512 articles.

Discussion. Overall, the findings suggest that pharmacy students, practicing pharmacists and faculty valued interprofessional education and collaborative practice and had positive attitudes towards it. Four themes have been identified from this review: inconsistency in reporting IPE research, professional image of the pharmacist, lack of longitudinal follow-up and lack of interprofessional educational research on faculty. These findings will provide an opportunity to stakeholders and policy makers to develop and implement IPE activities that are meaningful, comprehensive and unique. Sustained effort are required not just in undergraduate curricula but also in healthcare settings to improve and promote an interprofessional culture at individual and organisational level.

460

Perceptions of Pre-Diabetic, Obese and Overweight Patients on Complementary Medicine, Dietary Supplements to Promote Weight Loss: Results from a Phone Survey

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Introduction. Dietary supplements remain an area fraught with controversy, particularly amongst their largest consumer set: obese and overweight patient populations.

Aims. Determine the perceptions of complementary medicine, dietary supplements that promote weight loss by pre-diabetic, obese and overweight patients.

Methods. A swath of 127 pre-diabetic patients that were recruited to a nationally administered clinical trial on complementary medicine were interviewed with a survey via telephone. The survey featured items requesting information about the referral pathway into the clinical trial, as well as their individual perceptions on dietary supplements that promote weight loss. Respondents were asked to rate their perceptions about the weight loss trial using a Likert Scale, and all results were then quantified via SAS.

Results. Statistically significant results were found with the overwhelming majority of patients approving of the use of dietary supplements more than other, more invasive appetite suppressant medications and bariatric surgery techniques.

Discussion. Given the high cost of prescription-only weight loss medication and the high risks associated with bariatric surgery, it is not surprising that patients prefer natural and complementary medicine alternatives. The findings from this study are directly applicable to further work in academia, in pharmaceuticals, and in the complementary medicine industry, in that the consumers of weight loss programs and supplements have indicated that they strongly prefer natural and herbal remedies over alternatives such as surgery or prescription medication. Further research could investigate whether there are demographic factors that influence the finding, and expand the study to a greater geographic range for further investigation.



461

Pharmacist Tutors: Development and delivery of a training program

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Introduction. Pharmacist tutors have increasingly been involved in teaching into pharmacy programs at universities, playing a pivotal role in bridging the gap between theory and practice. However, the training and support of these staff, referred to in pharmacy as tutors, has often been neglected.

Aims. To develop and deliver a training program for pharmacist tutors involved in pharmacy student education at James Cook University (JCU).

Methods. In the development of the tutor training program, consideration was given to the results of a study conducted by Pharmacy at JCU which investigated the training needs of pharmacist tutors, but also took into account the opinions of students and academic staff. In addition, the general university policy requirements for sessional staff as well as JCU specific requirements were considered.

Results. The resulting training program, which combined the general JCU sessional staff induction with a pharmacy specific program, consisted of a face-to-face session, which was supplemented by a tutor information manual and an online tutor community support website. In addition to the general induction conducted by the JCU Department of Teaching and Learning Development, the pharmacy specific component included an overview of the JCU Pharmacy program, followed by an outline of the specific areas for tutor involvement, which included extemporaneous dispensing, clinical dispensing and clinical counselling. An activity on the topic of assessment and marking was also included as this has been highlighted as a problem area for tutors. To conclude, tutors were provided with information regarding sessional staff facilities and support. Opportunities for social interaction with other tutors and staff were provided during the course of the program to encourage integration of tutors into the teaching team.

Discussion. This pharmacy specific tutor training program has been developed to address the training and support needs of new and existing pharmacist tutors, with the ultimate aim of optimising student education. It is anticipated that feedback from this program may assist in further improving and refining future tutor training programs for the benefit of the students and the profession of pharmacy.

462

Public perceptions on dikir farmasi: A qualitative exploratory study

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Introduction. Dikir Farmasi (DF) is an edutainment programme that combines the elements of dikir barat (a type of traditional folk song rhythm) and traditional sketches which are popular in the state of Kelantan, Malaysia.

Aims. We aimed to seek the opinion of the general public regarding the quality and impact of DF as a health promotion tool in Malaysia and compiled their thoughts and suggestions to identify areas in need of improvement so that this health promotion tool can be used to its full potential in the future.

Methods. Data was collected through semi-structured interviews with the general public as individuals (face-to-face) and in focus groups. Participants were divided into three focus groups based on their age: two focus groups of adults and one focus group of high school students. Interviews were conducted with each focus group and then with each of the individual participants. Interviews were conducted in the Malay language. Each interview lasted approximately 40-60 minutes. Ethical approval was obtained from Ministry of Health Malaysia. All respondents provided a written consent for participation. After analysis, the codes were sorted into categories, which were then grouped into themes. Thematic content analysis was performed on the data.

Results. The themes identified from the interviews were: 1) The dialectal and linguistic terms used in DF; 2) The content of DF; 3) The audiovisual features of DF; 4) The stumbling block of DF; and 5) Weaknesses and recommendations of DF.

Discussion. The respondents are optimistic about the feasibility of DF to be utilized in the future. The study identified both positive and negative views on DF. Certain weaknesses of DF have been raised and the health authorities could utilize this information for an improvement; significant effort must be made to improve the publicity and dissemination of DF to ensure that it reaches the target population, so it is used to its optimum potential.



463

Folk songs for health education: Implementation and qualitative evaluation

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Introduction. Dikir Farmasi is a new edutainment effort to expand and intensify the dissemination of information about the regulation of legitimate use of drugs and cosmetics. The Dikir Farmasi initiative may offer a useful template on health promotion using folk song that needs to be explored consistently in other cultures worldwide. No documented literature has been reported about the conduct and organization of this public educational campaign.

Aims. We conducted this qualitative study to explore the opinions of Pharmacy Enforcement Division staff on Dikir Farmasi program. The outcome of this study, for the first time, will reveal the perspectives of the organisers of a large scale health campaign. The study will provide an in-depth understanding of the organisers' attitudes and behaviours with regards to public health campaigns in general and Dikir Farmasi in particular.

Methods. A qualitative study using semi-structured interviews, which were audio recorded, transcribed. Thematic analysis was performed to identify the themes and sub-themes from the transcripts of the interviews.

Results. In total nine pharmacy officers from Kelantan Pharmacy Enforcement Division participated in semi-structured interviews. According to the officers, Dikir Farmasi-related activities are time-consuming and disrupt their core duties. Despite Dikir Farmasi being the innovation of the Kelantan Pharmacy Enforcement Division, the officers lacked appreciation towards the contents of Dikir Farmasi. They did not display great interest and enthusiasm in implementing Dikir Farmasi program. The officers also discussed the shortcomings of Dikir Farmasi, namely the language barrier, the entertainment elements distracting the audience from obtaining the actual messages of Dikir Farmasi, the lack of awareness about Dikir Farmasi despite its presence for years, and the lack of research that reviews the impact and cost-effectiveness of Dikir Farmasi.

Discussion. Generally, the pharmacy officers were not very optimistic towards using edutainment to disseminate health information. The shortcomings of Dikir Farmasi have been identified from the interviews and efforts should be made to tackle them and improve Dikir Farmasi.

464

Teaching approaches in Pharmacy courses: an observational study.

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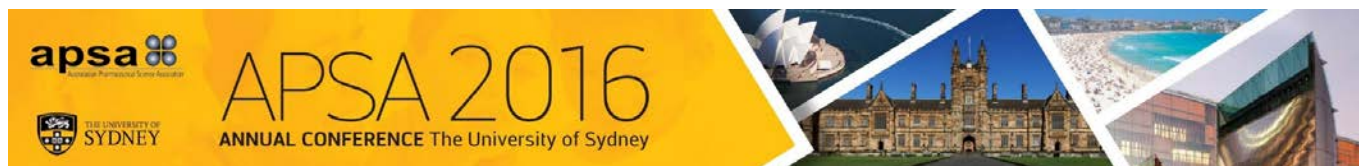
Introduction. Universities across the world have shifted their teaching approaches in Health tertiary education in response to health professions having even a stronger focus on patient-centred care. This change demands higher order attributes for our graduates. In pharmacy curriculum, the trends have moved towards programs that embed integrated learning in a collaborative student-led environments within a framework of professional competences. This contemporary environment is mostly supported by pedagogical principles of Connectivism and Social Constructivism in contrast to the Behaviourism, Cognitivism and Humanism that was predominant in more traditional programs. However, the implementation of an effective transition towards contemporary curricula has not been explored, and it requires a through assessment of the pedagogical principles supporting the delivery of teaching activities in traditional and contemporary programs. This investigation may provide those academics involved in curriculum design with a "roadmap" that facilitates that transition into contemporary courses.

Aim. To describe the teaching approaches utilised by pharmacy academics in a traditional and a contemporary pharmacy curriculum.

Methods. A mixed methods cross-sectional design was used for the generation of data. Academics from the Discipline of Pharmacy in the School of Clinical Sciences were invited to participate in an observational study to identify the teaching approaches used during their teaching activities. A checklist with the five most common pedagogical theories was used to generate the quantitative data, and field notes were taken for the qualitative data.

Results. The results of this study will identify the pedagogical theories that support traditional and contemporary pharmacy curricula.

Discussion. The study can help providing a starting point for current and future analysis of pharmacy undergraduate education. In addition, it can help the pharmacy curricula to better meet the needs demands of the pharmacy profession. This research can also be useful for other Health disciplines in the transition to contemporary curricula.



465

Development of integrated modules within the revised BPharm curriculum at the University of Auckland: Dermatology as an example.

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Introduction. One of the goals of the recent review of the Auckland BPharm curriculum was to achieve a high degree of integration of subject content and assessment. This has been achieved by replacing individual courses in, for example, pharmacology, medicinal chemistry and pharmacotherapeutics, with 'integrated' systems- or population-based modules, for example, Dermatology, Oncology, and Care of the Elderly.

Aims. The development and implementation of the integrated module Dermatology is described.

Methods. The Dermatology module is the first integrated module that students encounter in the revised BPharm curriculum. It is one of five modules that comprise the 60-point, Semester 2 course PHARMACY 213. It was chosen as it provides a good model for integration featuring an emphasis on applied pharmaceutical sciences as well as clinical considerations. Students are on day-release experiential learning placements during this semester, so it also provides early context to their learning, especially in community pharmacy settings. During the four weeks of the module, students are provided with multidisciplinary lectures and workshops that cover all aspects of skin conditions and their treatment. Much of the work is case-based and students present their care-plans to experts, in this case a consultant dermatologist. Horizontal integration with Clinical and Professional Skills occurs with relevant activities, for example, dispensing dermatology medicines, or providing dermatology primary health care.

Results. The Dermatology module was offered for the first time in Semester 2, 2016. There was a two-hour Exit Test comprising multiple-choice and short-answer questions. The mean mark for the Exit Test was 79%. The module was evaluated using the standard University student evaluation tool and the response to the statement 'Overall, I am satisfied with the quality of this module' was 100% Agree + Strongly Agree.

Discussion. The first offering of an integrated module within the revised BPharm curriculum was successful in terms of student achievement and evaluation. A number of templates and processes which are applicable to future modules have been developed, and valuable lessons on how to operate this model of learning have been obtained.

466

Does admission performance from a Health Science programme predict performance as a pharmacy student?

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Introduction. The School of Pharmacy at the University of Otago mainly selects candidates to enter the second year of the BPharm programme on the basis of their academic performance in a prescriptive Health Sciences First Year (HSFY). UMAT and interviews are not used. This paper reports on the relationship between academic performance in the HSFY and academic performance in each of the three subsequent years of the BPharm programme.

Aims. The primary aim of this study was to investigate associations between academic performance in the prescribed HSFY (year 1) and academic performance in years 2, 3 and 4 of the University of Otago BPharm programme. A secondary aim was to determine whether demographic characteristics of students were predictors of academic performance in the years of the BPharm programme.

Methods. A retrospective longitudinal dataset was created containing the academic records of 548 students admitted into the second year of the BPharm in the years 2008-2012 based on their performance in the HSFY. Multivariate linear regression models were used to investigate relationships between grade weighted averages from years 2, 3 and 4, with the following covariates: HSFY average, sex, age, ethnicity, citizenship and high school qualification. Significance was reported at $p < 0.05\%$. The study was approved by the University of Otago Ethics Committee.

Results. This study found low student attrition rates (3.4%) and high on-time completion rates (91.9%). Regression models all showed significance for predicting year 2, year 3 and year 4 grade weighted averages with 56%, 42% and 37% of the variance in grade weighted averages respectively being accounted for by the predictor variables. HSFY admission grades, sex, ethnic status and high school qualification were significant predictor variables within each model. Age group and citizenship status did not contribute significantly to any of the models.

Discussion. Admission entry grade from HSFY was a predictor for year 2, 3 and 4 academic performance however achievement throughout the BPharm programme was not uniform across sex, ethnicities or high school qualification. Support measures for groups identified at particular stages of the programme can be considered.