RESEARCH SYMPOSIUM 2017

To Equip, Enable & Enhance

CONTENTS

ACKNOWLEDGEMENTS

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Clinical Research Unit

Guests

Prof Lawrence Ho Khek-Yu, Group Director, Research Office, National University Health System
Prof Quek Swee Chye, Chairman, Medical Board, National University Hospital

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Dr Lim Beng Leong, Senior Consultant, Emergency Medicine
Ms Prema Balan, Deputy Director, Nursing (Education), Nursing Administration
Ms Goh Zhining, Principal Pharmacist, Pharmacy Administration
A/Prof Yap U Jin Adrian, Head and Senior Consultant, Dentistry

Clinical Research Committee

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Dr Darell Tupper-Carey, Anaesthesia
Dr Lim Beng Leong, Emergency Medicine
Dr Chuah Taik Pin, Jurong Community Hospital
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Dr Thomas Soo Kwok Seng, Health and Wellness
Dr Leslie Lam Choong Weng, Laboratory Medicine
Ms Prema Balan, Nursing (Education), Nursing Administration
Dr Cheryl Lau Chien-Li, General Surgery
Dr Chua Ai Ping, Respiratory Medicine
Dr Petrina Tan, Ophthalmology
Mr Charles Lew, Allied Health–Dietetics and Nutrition

Welcome Message from the Organising Chairman

Dr Euan Murugasu

Chairman, JurongHealth Campus Research Symposium 2017
Director, Otology and Senior Consultant, Department of ENT-Head and Neck Surgery,
Ng Teng Fong General Hospital

Dear distinguished guests, colleagues and friends,

Welcome to the JurongHealth Campus Research Symposium 2017 and to the Ng Teng Fong General Hospital (NTFGH).

For all academic/teaching hospitals, research forms one pillar of the foundation, along with clinical service and education. Together with the National University Hospital, we are now part of the National University Health System cluster and closely aligned with the National University of Singapore, tasked with teaching and training both undergraduate medical students and postgraduate residents. We are very excited about this merger, and soon, we will discuss how to facilitate the fostering of ties and enhance research capabilities; we have much to learn and share in the days ahead.

JurongHealth is a very young campus, having moved to NTFGH only two years ago. While much emphasis was placed on making a smooth and safe transition from Alexandra Health to the new campus, simultaneously during this period, the institution has developed a steady interest in education and research.

This year, the theme of our symposium is 'To Equip, Enable & Enhance'. We received a record number of 90 poster submissions from the Medical, Nursing and Allied Health categories, and we hope that this number will continue to grow as our people gain impetus and experience. From those submissions, we have selected eight posters for the Best Poster and Presentation Awards.

I would like to take this opportunity to thank the Clinical Research Committees (CRCs), the judges of the Best Poster and Presentation Awards, and the CRC Secretariat and members for their support these past few months in putting together this symposium. It gives us great pleasure to welcome you to the JurongHealth Campus Research Symposium 2017. We hope that you will avail yourselves of the opportunity to explore, network and learn as we work together to provide an increasingly seamless, quality care experience for our patients.

We wish you a very enjoyable and memorable experience.

Thank you.

Programme

Time	Topic	
	Venue: Auditorium	
0830–0900	**Registration and Breakfast**	
0900–0905	**Opening Address** **Dr Euan Murugasu** Organising Chairperson, Research Symposium 2017	
0905–0915	**The Brave Leap to NMRC: My Journey** **Dr Muhammad Rahizan Zainuldin** Assistant Professor, Health and Social Sciences, Singapore Institute of Technology	
0915–1000	**Panel Discussion: Strategic Research Collaborations between National University Hospital and JurongHealth Campus** Chair: **Dr Euan Murugasu** Invited Panellists: **Prof Lawrence Ho Khek-Yu**, Group Director, Research Office, National University Health System; **Dr Yang Kok Soong**, Director and Senior Consultant, Epidemiology Unit; **Mr Tan Hai Yang**, Deputy Director (Operations), JMC/Senior Assistant Director, Allied Health; **APN Clarice Wee Li Phing**, Advanced Practice Nurse, Nursing Clinical Services, Ng Teng Fong General Hospital	
1000–1015	**Break**	
	Excellence Room	**Auditorium**
1015–1100	**Understanding DSRB's Requirements for Your Ethics Application** **Ms Leong Yuanting** Lead Institutional Board Review Analyst, Office of Human Research Protection Programme, Research and Development Office, National Healthcare Group	**Cost-effectiveness Analysis in Health Services Research** **Dr Joanne Yoong** Director, Centre for Health Services and Policy Research, Saw Swee Hock School of Public Health, National University of Singapore
1100–1115	**Break**	
1115–1200	**Avoiding the Common Submission Errors in the NHG DSRB ROAM Application Form** **Ms Lim Boon Hwee** Assistant Manager, Research Education, Office of Human Research Protection Programme, Research and Development Office, National Healthcare Group	**Introduction to Mixed Methods Research and Applications to Clinical Practice** **Dr Gayatri Kembhavi** Research Fellow, Centre for Health Services and Policy Research, Saw Swee Hock School of Public Health, National University of Singapore

Programme

	Venue: Foyer	
1200–1300	Lunch Break Best Poster (Medical, Nursing and Allied Health) Presentations	
	Excellence Room	Auditorium
1300–1345	**A Busy Clinician's Approach to Appraising Meta-analyses** **Mr Charles Lew** Principal Dietitian, Dietetics and Nutrition, Ng Teng Fong General Hospital	**Healthcare Innovation From Research to Market with National Health Innovation Centre Funding** **Mr Naga K Modukuru** Business Development Manager, National Health Innovation Centre Singapore
1345–1400	Break	
1400–1445	**Increasing Your Publication Success: a Marketing Approach?** **A/Prof Adrian Yap** Head and Senior Consultant, Dentistry, Ng Teng Fong General Hospital	**Understanding and Protecting Intellectual Property** **Ms Farah Namazie** Namazie and Co.
1445–1450	Break	
	Venue: Auditorium	
1450–1525	**Presentation of Prizes and Tokens of Appreciation** **A/Prof Cheah Wei Keat** Chairman, Medical Board, Ng Teng Fong General Hospital	
1525–1530	**Closing Address** **Dr Euan Murugasu**	
1530	End	

Research Symposium Synopsis

The Research Symposium 2017, held on 5 October 2017, is JurongHealth Campus's annual symposium. It started in 2016 as a platform for us to facilitate research networking and learning as well as to recognise and celebrate commendable research efforts. The event was organised by the Clinical Research Unit in collaboration with the Medical, Nursing and Allied Health Divisions.

'To Equip, Enable and Enhance' was this year's Symposium theme. As we are a new hospital and research institute, it is important to adequately equip, enable and enhance our staff for the changes and challenges ahead.

"Strategic Research Collaborations between National University Hospital and JurongHealth Campus" was the key topic and discussed by the panel, which comprised Prof Ho Khek-Yu Lawrence, Group Director, Research Office, National University Health System, Dr Yang Kok Soong, Director and Senior Consultant, Epidemiology Unit, Ng Teng Fong General Hospital (NTFGH), Mr Tan Hai Yang, Deputy Director (Operations), Jurong Medical Centre and Senior Assistant Director, Allied Health, NTFGH, and APN Clarice Wee Li Phing, Advanced Practice Nurse, Nursing Clinical Services, NTFGH, and chaired by Dr Euan Murugasu, Organising Chairperson of the Research Symposium 2017.

Programmes of this year's Symposium focused on two tracks – Clinical Research and Health Services Research – and the list of topics included "Understanding DSRB's Requirements for Your Ethics Application", "A Busy Clinician's Approach to Appraising Meta-analyses", "Increasing Your Publication Success: a Marketing Approach?", "Cost-effectiveness Analysis in Health Services Research", "Introduction to Mixed Methods Research and Applications to Clinical Practice", "Healthcare Innovation from Research to Market with National Health Innovation Centre Funding" and "Understanding and Protecting Intellectual Property". Both external and internal speakers were invited to share their insights on these topics.

There was also a record number of 90 posters received from the Medical, Nursing and Allied Health Divisions this year. The works were displayed at the Poster Exhibition and the best eight posters were selected by the judges for presentations. Awards were given out to the top three research presentations by A/Prof Cheah Wei Keat, Chairman, Medical Board, NTFGH. We would like to thank the judges – Dr Lim Beng Leong, Ms Prema Balan, Ms Goh Zhining and A/Prof Yap U Jin Adrian – for their invaluable contributions to the Best Poster and Presentation Awards.

The ceremony was closed by Dr Euan Murugasu and tokens of appreciation were presented to the Organising Chairperson, panellists, speakers and judges for their contributions to our efforts of promoting a dynamic research environment in JurongHealth Campus.

Best Poster and Presentation Awards

First Prize
Projecting demographic changes of regional populations in Singapore from 2017 to 2030
Yee Loong Low, Kok Soong Yang

Second Prize
The Subjective Global Assessment and Nutrition Risk in Critically ill score should both be used in the intensive care unit
Charles Chin Han Lew, Ka Po Cheung, Mary Foong-Fong Chong, Ai Ping Chua, Robert JL Fraser, Michelle Miller

Third Prize
Establishing the prevalence and perception of tinnitus among Singaporean elderly population in the western part of Singapore
Shermaine Png, Gary Lee, William Hal Martin, Jennifer Ellery Martin

Merit Prize
The prevalence of sleep breathing disorders, risk and awareness among adult participants in a community survey
Ai Ping Chua, CMJ Wong, Shaffinaz Abd Rahman, Han Tun Oo, Yin Maw Hsann

On-demand sedation colonoscopy: is it the way forward?
Vincent Wei Sheng Khor, Tian Fu Loh, Wei Chee Liew, Christopher HL Keh

Visceral adipose tissue measurement in patients undergoing total knee arthroplasty
Darell Tupper-Carey, Philip McGraw, Yew Ming Ho, Sok Chuan Tan, Han Tun Oo

The prevalence of lipohypertrophy and the associated risk factors in insulin-treated patients with diabetes mellitus
Sew Hong Jasmine Shew, Praveen Kaur Gosal Harbahjan Singh

Exploring patients' perception of patient-centred care: a descriptive qualitative study conducted in an acute public hospital in Singapore
Livia Yun Lim, Hoon Woon Audrey Chia, Piyanee Klainin-Yobas

CATEGORY: MEDICAL

Clinical audit of urinary catheter documentation in admitted patients

Tun SP[1], Thi Ha SM[1], Xue X[2], Li L[1], Chuang L[1]
[1]Medicine, [2]Nursing Training and Development, Ng Teng Fong General Hospital, Singapore

INTRODUCTION Urinary tract infection (UTI) remains the commonest nosocomial infection worldwide. Major guidelines recommend indications for urinary indwelling catheter (IDC) be documented at time of placement. This facilitates prompt evaluation for removal subsequently, thereby minimising inappropriate catheterisation and risks of UTI. We aimed to evaluate UTI prevention guideline compliance by reviewing the indications for IDC placement and frequency of proper documentation.
METHODS General ward patients with an IDC in place from 5 to 12 August 2016 were identified by chart review. Demographic and clinical data related to IDC placement was extracted.
RESULTS Among 46 patients with IDCs, documentation of urinary catheterisation indication was performed by doctors in 54.4% of patients (SD = 7.3%; 95% CI 39.7%–69.0%) and by nurses in 84.8% of patients (SD = 5.3%; 95% CI 74.2%–95.4%). Documentation by doctors was 30.4% less frequent than that by nurses (SD = 9.1%; 95% CI 12.3%–48.5%). Four patients had no indications documented. Only 22 patients had indications documented by both nurses and doctors, of which 19 (86.4%) matched. Indications most frequently documented by doctors were retention of urine (39.1%), strict intake-output monitoring (37.0%) and perioperative monitoring (4.4%).
CONCLUSION Documentation of indications for urinary catheterisation by doctors is not adequate despite major guidelines recommendations.

CATEGORY: MEDICAL

Outcomes and complications of total ankle arthroplasty among obese patients: a systematic review and meta-analysis

Sayampanathan AA[1], Cuttilan AN[1], Pearce CJ[2]
[1]Yong Loo Lin School of Medicine, National University of Singapore, [2]Orthopaedics, Ng Teng Fong General Hospital, Singapore

INTRODUCTION There has been an increased interest in total ankle arthroplasty (TAA) for the management of end-stage ankle arthritis. However, complication rates for TAA remain high. In this study, we aimed to review the outcomes and complications of obese patients who underwent TAA.
METHODS We searched MEDLINE, Scopus and Web of Science for 355 unique articles. We eventually included nine articles in our systematic review and meta-analysis based on our selection criteria. Data was analysed via Review Manager v 5.3, using Mantel-Haenszel statistics and random effect models.
RESULTS Obese patients had a 1.53-times higher odds of undergoing some form of revision of their TAA within a given period of time (95% CI 1.15–2.03, Z = 2.90, I^2 = 0; p = 0.00375). Obese patients also had a 2.04-times higher odds of sustaining infections (95% CI 1.47–2.85, Z = 4.21, I^2 = 42.4; p < 0.001). Our systematic review showed that obese patients were also more prone to deep vein thrombosis (DVT) (OR 8.03, 95% CI 2.95–21.9), venous thromboembolic complications (OR 3.57, 95% CI 2.04–6.24), wound complications (OR 3.07, 95% CI 0.255–5.89), local complications (OR 2.11, 95% CI 1.50–2.98), systemic complications (OR 3.44, 95% CI 2.66–4.46) and medical complications (OR 3.39, 95% CI 2.56–4.48).
CONCLUSION Obese patients are more prone to complications, such as revision of their TAA and infective complications. Individual studies have also identified DVT and thromboembolic complications, as well as wound, local, systemic and medical complications, as being higher among obese patients. We postulate that these findings are a result of the pro-inflammatory state in obese patients. Further studies should focus on providing pathophysiological explanations to the increased complication rates found in this review.

CATEGORY: MEDICAL

Are obstructive sleep apnoea and sleep bruxism linked?

Tan MW[1], Yap AU[1], Chua AP[2], Parot MVJ[3], Wong CMJ[4], Tan KB[5]
[1]Dentistry, [2]Respiratory Medicine, [3]Ng Teng Fong Sleep Laboratory, [4]Clinical Research Unit, Ng Teng Fong General Hospital, [5]Faculty of Dentistry, National University of Singapore, National University Health System, Singapore

INTRODUCTION The objective of this study was to examine the association between obstructive sleep apnoea (OSA) and sleep bruxism (SB) in adult subjects, in relation to occurrence, sleep macrostructure and respiratory parameters.

METHODS Polysomnographic data of 153 OSA subjects from Ng Teng Fong General Hospital Sleep Clinic was evaluated for SB, in accordance with the American Academy of Sleep Medicine 2016 SB Diagnostic Criteria. Demographic, sleep macrostructure and respiratory differences were analysed between OSA subjects with SB and those without SB using independent sample t-test and Mann-Whitney U test. Multivariate logistic regression analysis was further performed to determine the odds of OSA risk factors for SB.

RESULTS Of the 153 OSA subjects studied, 34.6% (95% CI 27.1–42.7) were diagnosed with SB. A significant association was found between the Apnoea-Hypopnoea Index and SB ($\chi^2 = 12.82$; $p = 0.002$); significantly more severe OSA subjects were diagnosed with SB ($\chi^2 = 12.14$; $p < 0.001$). Subjects with concomitant OSA and SB had significantly greater respiratory-effort-related arousals and oxygen desaturation index. The odds of experiencing SB increased by 5% for every increase in one event per hour of respiratory arousal index (OR 1.05, 95% CI 1.01–1.10; $p = 0.03$), but decreased by 11% for every increase in one event per hour of spontaneous arousal index (OR 0.89, 95% CI 0.81–0.97; $p = 0.01$) after controlling for age, gender and other sleep variables.

CONCLUSION Approximately one-third of adult OSA patients had concomitant SB. OSA subjects with SB demonstrated significantly greater sleep respiratory disturbances compared to those without SB.

CATEGORY: MEDICAL

Sleeping habits and sleep health literacy among senior citizens in the community: a cross-sectional survey study

Chua AP[1], Wong CMJ[2], Oo HT[2], Hsann YM[3]
[1]Respiratory Medicine, [2]Clinical Research Unit, [3]Epidemiology Unit, Ng Teng Fong General Hospital, Singapore

INTRODUCTION The National Sleep Foundation recommends 6–9 hours of sleep for an average adult. Sleep deprivation is prevalent and associated with adverse health impact. This may be due to the lack of awareness on adequate sleep duration. We surveyed the sleeping habits of a group of elderly participants and examined their sleep knowledge.

METHODS This is a descriptive cross-sectional study of 459 patients who participated in a large-scale health screening carnival organised by JurongHealth on 10 October 2015.

RESULTS Mean age was 55 (SD = 9) years. 63.0% were female, 86.5% were Chinese and 64.9% were employed. Nearly half (46.6%) of the participants reported sleeping < 6 hours on weekdays. Among them, 71.9% were actively employed. 40.0% of participants slept in on weekends. The majority reported a bedtime of between 10 pm and midnight, and wake time before 8 am (62.6% and 86.9%, respectively). Bed and wake times were earlier on weekdays. Higher proportions of employed participants napped on weekends compared to weekdays (56.0% vs. 30.6%). 10.7% of participants reported recommended adequate sleep as < 6 hours. Reported recommended sleep duration inversely correlated with participants' age.

CONCLUSION Sleep deprivation was prevalent among community-dwelling employed senior citizens. Catching-up sleep occurred on weekends via sleeping in or napping. The older the participants, the less recommended sleep they reported. More effort is needed to increase sleep health literacy among our actively employed senior citizens.

CATEGORY: MEDICAL

Sleep quality, sleep hygiene and the use of sleep aid among participants of a community health carnival

Chua AP[1], Wong CMJ[2], Oo HT[2], Hsann YM[3]
[1]Respiratory Medicine, [2]Clinical Research Unit, [3]Epidemiology Unit, Ng Teng Fong General Hospital, Singapore

INTRODUCTION Good-quality sleep is important for optimal daytime functioning. Bedtime activities may promote or disrupt the quality of our sleep. Various methods have been reportedly used in an attempt to improve and aid sleep. We examined the prevalence of perceived poor sleep quality among a group of healthy adults and explored the relationships between poor sleep quality, routine bedtime activities and the use sleep aids.

METHODS This is a cross-sectional study of 459 patients who participated in the 10-10 health event organised by JurongHealth in 2015.

RESULTS Mean age was 55 (SD = 9) years. 63.0% were female, 86.5% were Chinese and 84.3% were married. The majority (76.2%) had lower than tertiary education level and 35.1% were retirees, housewives or unemployed. Nearly half (44.4%) of the participants reported poor sleep quality. The vast majority (91.3%) performed one or more bedtime activities indicative of poor sleep hygiene practices. 28.0% of participants admitted to using some form of sleep aid in the past month to improve their sleep. On multivariate analysis, perceived poor sleep quality was significantly associated with sleep aid use (OR 3.0, 95% CI 2.0–4.5; p < 0.001) and potential sleep-disrupting bedtime activities (OR 2.3, 95% CI 1.1–4.6; p = 0.025), after adjusting for age, gender, marital status and employment status.

CONCLUSION Poor sleep quality and sleep hygiene were prevalent among participants of a community health carnival. Perceived poor sleep quality was associated with suboptimal sleep hygiene practices and sleep aid use. Outreach education programmes to raise awareness on good sleep hygiene practices are beneficial.

CATEGORY: MEDICAL

The impact of sleep on daytime functioning in the community

Chua AP[1], Wong CMJ[2], Oo HT[2], Hsann YM[3]
[1]Respiratory Medicine, [2]Clinical Research Unit, [3]Epidemiology Unit, Ng Teng Fong General Hospital, Singapore

INTRODUCTION Sufficient good-quality sleep is important for optimal daytime functioning. Inadequate sleep or poor-quality sleep can lead to daytime fatigue and adversely impact day activities. We studied the effects of sleep quantity and quality on perceived daytime sleepiness and impaired functioning.

METHODS This is a cross-sectional survey study of 459 patients who participated in a large-scale health screening carnival organised by JurongHealth on 10 October 2015.

RESULTS Mean age was 55 (SD = 9) years. 63.0% were female, 86.5% were Chinese and 84.3% were married. 76.2% of them had lower than tertiary education level and 35.1% were retirees, housewives or unemployed. Half (50.5%) of the patients reported at least one impaired awake activities. Nearly half (44.4%) reported poor sleep quality and 7.8% reported sleeping < 5 hours per day. 36.2% reported daytime fatigue and 13.1% had abnormal Epworth Sleepiness Scale score (score > 10). Multivariate analysis showed that impaired awake activities were significantly associated with poor sleep quality (OR 6.2, 95% CI 4.0–9.5; p < 0.001) and having < 5 hours of sleep per day (OR 2.5, 95% CI 1.1–5.9; p = 0.045), after adjusting for age, gender, marital status and employment status.

CONCLUSION Impaired daytime functioning was prevalent among healthy participants of a community health carnival and may be related to suboptimal sleep (quantity and quality).

CATEGORY: MEDICAL

The prevalence of sleep breathing disorders, risk and awareness among adult participants in a community survey

Chua AP[1], Wong CMJ[2], Shaffinaz AR[3], Oo HT[2], Hsann YM[4]
[1]Respiratory Medicine, [2]Clinical Research Unit, [3]Allied Health, [4]Epidemiology Unit, Ng Teng Fong General Hospital, Singapore

INTRODUCTION Obstructive sleep apnoea (OSA) is a highly prevalent chronic disease of public health significance. STOP and STOP-BANG are validated questionnaires that assess the clinical risk of OSA. We looked at the prevalence of snoring and clinical OSA risk scores as well as the level of awareness of this condition among healthy community-dwelling volunteers in a survey.

METHODS This is a cross-sectional study of 459 patients who participated in the 10-10 health event organised by JurongHealth in 2015.

RESULTS Mean age was 55 (SD = 9) years. 63.0% were female and 86.5% were Chinese. Mean body mass index (BMI) was 23.7 (SD ± 3.7). 23.7% of participants reported snoring during sleep, among whom, more than half were male. One-third of male participants reported snoring as compared to one-fifth of female participants. The adjusted prevalence rate ratio of snoring among males vs. females was 1.97 (95% CI 1.35–2.89; p < 0.001) and snoring prevalence increased by 9% for every 1 kg/m^2 increase in BMI (95% CI 1.04–1.15; p < 0.001). 19% of participants had STOP scores indicative of high OSA risk and 26.4% had STOP-BANG scores indicative of intermediate-to-high risk. When assessing awareness on OSA, more than 50% of the participants provided the wrong answers relating to definition, symptomatology, diagnosis modality and ill health effects of OSA.

CONCLUSION Snoring and increased OSA risk scores were prevalent among the study population. There was also knowledge deficit in this important condition in this community. More needs to be done to reach out to the community to increase detection and awareness of this important sleep breathing disorder.

CATEGORY: MEDICAL

Smile characteristics in the Asian population

Lee WZ[1], Wong LB[2], Yeo BKA[1]
[1]Restorative Dentistry, National Dental Centre Singapore, [2]Dentistry, Ng Teng Fong General Hospital, Singapore

INTRODUCTION This study aimed to determine the prevalence of various smile characteristics between two Asian populations in Singapore.

METHODS A cross-sectional study was conducted involving 86 Chinese and 44 Malay subjects aged 21 to 38 years old. Smiling photographs of subjects were taken and the following parameters were measured using Adobe Photoshop®: (a) anterior smile line; (b) posterior smile line; (c) interdental smile line; (d) gingival display; (e) most posterior extent of the aesthetic zone; (f) smile type; (g) smile arc; and (h) upper lip curvature.

RESULTS About two-thirds of the subjects have cuspid smile type (Chinese = 65.1%; Malay = 61.4%) and parallel smile arc (Chinese = 58.1%; Malay = 61.4%). Nearly half of the subjects have straight upper lip curvature (Chinese = 48.8%; Malay = 45.5%). 89.5% of the Chinese subjects and 72.7% of the Malay subjects have high interdental smile line. 96.5% of the Chinese subjects and 96.6% of the Malay subjects with low and medium anterior smile line displayed papilla. 52.3% of the Chinese subjects and 56.8% of the Malay subjects displayed the maxillary first molar as their most posterior extent of the aesthetic zone.

CONCLUSION The smile characteristics and gingival displays between the Chinese and Malay participants were similar. The majority of Chinese and Malays displayed papilla even in those with low and medium anterior smile lines, and in both groups, more than half have the aesthetic zone extended to the maxillary first molar.

CATEGORY: MEDICAL

Outcome of endovascular-first approach to limb salvage in a multiethnic Asian population

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[1]General Surgery, Vascular Surgery Division, Ng Teng Fong General Hospital, Singapore

INTRODUCTION An endovascular-first approach is increasingly being utilised worldwide for lower limb salvage. There is currently very little in the published literature regarding this approach and the burden of disease in a multiethnic group of patients from Asian countries.

METHODS All patients who presented to a single institution as an emergency with critical limb ischaemia and tissue loss, and underwent angioplasty were identified from the hospital database. Patient demographics and the anatomical distribution of disease were retrospectively analysed. The primary outcome was the number of lower limb arteries successfully revascularised and the 30-day amputation-free survival.

RESULTS 138 limbs from 108 patients (63% male) underwent angioplasty in 2016. The ethnic distribution of this population was 53% Chinese, 33% Malay and 14% Indian. 80% of patients were diabetic. Mean number of arteries affected was 3.8. The majority of patients had infrapopliteal disease, with the anterior (87%) and posterior (83%) tibial arteries being the most commonly affected. Iliac artery disease was seen in only 6.5% of limbs. Mean number of arteries revascularised at the primary operation was 2.9. The estimated 30-day amputation-free survival was 88%.

CONCLUSION Multiethnic Asian patients presenting with critical limb ischaemia and tissue loss have significant multilevel peripheral arterial disease, which can be safely and successfully managed with an endovascular-first approach. There exists an enormous burden of disease in these patients, requiring multiple vessel recanalisations to affect limb salvage. Despite this, there remains a significant risk of limb loss and mortality in such patients, primarily due to late presentation.

CATEGORY: MEDICAL

Fungal malignant otitis externa masquerading as external auditory canal cholesteatoma: an atypical presentation

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[1]ENT-Head and Neck Surgery, Ng Teng Fong General Hospital, Singapore

INTRODUCTION Early diagnosis and prompt treatment of malignant otitis externa (MOE) is crucial in preventing morbidity and mortality resulting from its complications. Atypical presentations of MOE, however, present a diagnostic challenge. We herein present a case of fungal MOE that presented both clinically and radiologically as an external auditory canal (EAC) cholesteatoma.

CASE PRESENTATION A diabetic woman presented to our service with otalgia and bloodstained ear discharge. Clinical examination showed an intact tympanic membrane with scalloping of the EAC, exposed bone and overlying fungal debris. Computed tomography showed bony erosions of the EAC extending into the mastoid bone, suggestive of EAC cholesteatoma. As the EAC cholesteatoma had fistulated into the mastoid, she underwent a modified radical mastoidectomy. Intraoperatively, the posterior EAC wall was removed *en bloc*, which revealed microscopic invasion of tissue and bone by *Aspergillus flavus*, hence clinching the diagnosis of fungal MOE. The patient's otalgia resolved after surgery and she responded well to postoperative adjunctive antifungal agents.

CONCLUSION Early MOE can mimic the presentation of EAC cholesteatoma. Therefore, the clinician needs to be cognisant of MOE as a key differential in an immunocompromised patient. This forethought impacts surgical planning and subsequent need for antimicrobials or antifungals for complete eradication of infection. Deep surgical biopsies that show adequate bone and soft tissue interface are essential to establishing the diagnosis in atypical MOE presentations as demonstrated in our case.

CATEGORY: MEDICAL

Sleep symptoms among participants of a sleep screening programme: a descriptive study

Lye P[1], Kee J[1], Chua AP[2]
[1]Yong Loo Lin School of Medicine, National University of Singapore, [2]Respiratory Medicine, Ng Teng Fong General Hospital, Singapore

INTRODUCTION We aimed to study the prevalence of sleep-related problems among healthy volunteering participants of a community sleep screening programme and explore associated demographic characteristics.

METHODS This is a descriptive cross-sectional survey study among 152 participants. We collected sociodemographic data, voluntary self-reported sleep problems, and screening questions on snoring and napping habits.

RESULTS Mean age of the participants was 60 (SD = 15) years. 111 (73.0%) of the participants were female and 124 (81.6%) were Chinese. 70 (46.1%) of participants reported at least one sleep problem. Of these, the proportions of participants who self-reported difficulty falling asleep, frequent awakening during sleep and waking up feeling unrefreshed were 35.7%, 17.1% and 14.3%, respectively. 32.9% of participants were screened positive for snoring symptom; only 12.0% of these participants voluntarily reported it as a major sleep problem. Participants who were screened positive for snoring were older than those who were screened negative (65 ± 15 years vs. 58 ± 15 years; $p = 0.0084$). 51.3% of the participants routinely napped; mean nap length was 30 (SD $\pm$ 50) minutes. Participants who reported unrefreshing sleep and napping were older (unrefreshing sleep vs. refreshing sleep = 72 ± 12 years vs. 60 ± 15 years; $p = 0.015$; napping vs. non-napping = 63 ± 16 years vs. 57 ± 14 years; $p = 0.012$). 51.2% of the male participants were screened positive for snoring compared to 26.1% of female participants ($p = 0.003$).

CONCLUSION The prevalence of voluntarily self-reported sleep problems was high among the healthy participants in this study. The most prevalent sleep problems were sleep initiation insomnia, interrupted sleep, unrefreshing sleep and snoring. Non-restorative sleep and napping were prevalent among older participants. Snoring was more prevalent among older male participants, albeit grossly unreported. Future sleep awareness and screening programmes need to be tailored to each of these at-risk groups.

CATEGORY: MEDICAL

Breast and colorectal cancers incidence projections in Singapore up to year 2030

Wong CMJ[1], Chan CLJL[2], Yang KS[2]
[1]Clinical Research Unit, [2]Epidemiology Unit, Ng Teng Fong General Hospital, Singapore

INTRODUCTION In Singapore, breast and colorectal cancers remain the top cancers among females and males, respectively, over the recent years. Projections of the national burden of these cancers are important in planning for healthcare resources on cancer screening and treatment. We present projections of cancer incidence up to year 2030 in Singapore using a sensitivity analysis.

METHODS We considered three scenarios in our sensitivity analysis: the best-case scenario presumes that the current age-specific incidence rates among the high-risk group of Singaporeans are reduced by 30%; the likely scenario hypothesises that the rates remain the same till 2030; and the worst-case scenario considers an increase of the rates by 30%. For each scenario, we estimated the percentage change in the number of new cancer cases in Singapore.

RESULTS By 2030, the best-case scenario estimated a 10% increase in the number of new breast cancer cases and a 40% increase in the new colorectal cancer cases from the current numbers. While the likely scenario estimated about 50% increase and doubling of the current new breast and colorectal cancer cases, respectively, the worst-case scenario showed approximately 80% increase and 2.6-times increase of the current new breast and colorectal cancer cases, respectively, by 2030.

CONCLUSION Our projections on the incidence of breast and colorectal cancers by 2030 will inevitably add pressure to the current healthcare resources. Thus, there is a need for gradual expansion of oncology and cancer screening services to meet the growing demand.

Perihepatic space in patients with pericholecystic fluid: a revisit in the new millennium

Teh HS[1], Teh QR[2]

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INTRODUCTION Perihepatic space is thought to be part of the intraperitoneal compartment. We reviewed patients who had pericholecystic fluid on imaging and the distribution of this fluid.

METHODS In this retrospective study, we searched the institutional radiology database to identify patients who had pericholecystic fluid on computed tomography from 2016 to 2017, yielding approximately 24 patients. The extent of fluid and compartment affected were documented and analysed.

RESULTS We observed these fluids to be contained around the gallbladder, between the liver and gallbladder, tracked along the inferior and lateral perihepatic space, and into the retroperitoneal lateroconal fascia. These observations were outlined by iodinated contrast in a few patients. None of the patients had free spillage of fluid into the peritoneal cavity.

CONCLUSION Our observations suggest an extraperitoneal perihepatic space not previously described in the literature. This finding has potential clinical application and impact on patient care, such as in patients with acute cholecystitis.

Comparing condition-specific average length of stay and patient volume per bed in Ng Teng Fong General Hospital against other public hospitals in Singapore

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INTRODUCTION Condition-specific average length of stay (ALOS) and inpatient volume measure hospital resource utilisation of each patient and the workload in the hospital for particular conditions. This study aimed to compare the condition-specific ALOS and inpatient volume of Ng Teng Fong General Hospital (NTFGH) against other public hospitals in Singapore to shed light on the differences in patients' conditions seen in different hospitals.

METHODS Data published by the Singapore Ministry of Health on common conditions seen at public hospitals in 2016 was used for analysis. Specialised conditions seen only in specific hospitals were excluded along with conditions with an LOS of one day, yielding 51 remaining conditions. Condition-specific ALOSes were computed and stratified by hospital. For brevity, only the top 12 conditions with the longest and shortest ALOSes were further analysed. Workloads for each condition were normalised by bed capacity for comparison across different hospitals. Comparisons were also made for conditions with ALOSes > 5 days or < 2 days.

RESULTS 24.3% of NTFGH's inpatients had conditions associated with shorter ALOS (< 2 days). These conditions also yielded the highest workload per bed as compared to other hospitals. Conversely, NTFGH had the smallest proportion (14.6%) of inpatients with conditions associated with longer ALOS (> 5 days). Most condition-specific ALOSes were found to be lower in NTFGH compared to other hospitals.

CONCLUSION Condition-specific ALOSes at NTFGH are mostly shorter or comparable to other hospitals. NTFGH's patient profile consists of a large volume and proportion of inpatients with conditions associated with shorter ALOSes, suggesting that cases presented to NTFGH might be simpler.

CATEGORY: MEDICAL

Sociodemographic characteristics and obstructive sleep apnoea severity: a five-year descriptive trend analysis

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INTRODUCTION In recent years, there has been an increase in educational activities designed to raise awareness of obstructive sleep apnoea (OSA) at both the national and institutional levels. We compared two cohorts of OSA patients to explore the possible effects of these activities.

METHODS Sociodemographic and polysomnographic data was retrieved and compared between 247 and 661 OSA patients presenting at the sleep clinic in Ng Teng Fong General Hospital in 2016–2017 and 2012–2015, respectively.

RESULTS Mean ages were similar in both cohorts (45 ± 15 years vs. 47 ± 15 years). There was a higher prevalence of mild-moderate OSA cases in the current cohort compared to the earlier cohort (47.0% vs. 33.8%). Among patients ≥ 65 years old, there were higher proportions with severe OSA when compared to younger patients in both cohorts (current cohort = 62.5% vs. 52.0%; earlier cohort = 75.0% vs. 65.1%). Males remained preponderant to the condition in both cohorts (75.7% vs. 72.8%); so were Chinese (71.7% vs. 68.8%) and Malay (13.0% vs. 16.5%) participants. There were increased trends of mild-moderate OSA cases among both genders (male = 45.0% vs. 33.0%; female = 53.3% vs. 35.6%). An increased proportion of severe OSA cases was observed among the Malays in the current cohort (84.4% vs. 77.1%). In contrast, reduced proportions of severe OSA were seen among the Chinese (47.5% vs. 63.1%) and Indians (53.9% vs. 67.2%).

CONCLUSION Middle-aged Chinese males remain the most prevalent sociodemographic profile type of OSA patients presenting to the sleep clinic. There is a shift toward higher proportion of patients presenting with mild-moderate OSA severity. This may reflect the success of outreach educational efforts. The trend toward increased prevalence of severe OSA among the Malays warrants further investigation.

CATEGORY: MEDICAL

Inter-rater reliability of a community health promotion scoring system

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INTRODUCTION A community health promotion scoring system was developed and piloted in eight residential zones in Singapore to promote healthy living and active ageing, and prevent chronic diseases, such as diabetes mellitus, heart diseases, stroke and anxiety disorders. The objective of this study was to evaluate the reliability of this composite scoring system.

METHODS Weighted Kappa was used to evaluate the inter-rater reliability of all 44 elements of the scoring system. The assessment was done for eight residential zones in the western region of Singapore using two independent raters for each zone. The strength of agreement was determined using Landis and Koch's classification method: (1) slight (≤ 0.20); (2) fair (0.21–0.40); (3) moderate (0.41–0.60); (4) substantial (0.61–0.80); and (5) almost perfect (0.81–1.00).

RESULTS A high degree of agreement (almost perfect/perfect) was seen between both raters for the majority (n = 42; 95.5%) of the elements, except for elements in the assessment of community support and resourcing for health.

CONCLUSION The community health promotion scoring system demonstrated a high degree of reliability and yielded similar scores for the same residential zone even if used by independent raters.

CATEGORY: MEDICAL

Visceral adipose tissue measurement in patients undergoing total knee arthroplasty

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INTRODUCTION Excessive visceral fat deposition, which can be measured using DEXA scanning, is known to be an important factor in the aetiology of metabolic syndrome (MS). Osteoarthritis (OA) is the commonest knee pathology leading to knee replacement surgery and this condition is strongly associated with MS. The link between OA-related knee replacement surgery and MS may be due to the increased loading forces placed on the knee joint due to obesity or circulating inflammatory mediators triggered by visceral adipose tissue (VAT), which precipitate inflammatory changes in the knee joint leading to OA.

METHODS This was a descriptive study of 26 patients in Ng Teng Fong General Hospital between February 2016 and July 2017. The International Diabetes Federation Consensus Worldwide Definition was used to classify patients with MS and obesity was defined by the Asian body mass index. We used t-test to compare the means of MS and non-MS patients.

RESULTS Mean age was 64.5 years. 65% of the patients were female, 81% were Chinese and 73% were obese or overweight (BMI > 23). MS was demonstrated in 38% of patients. VAT measured 'high' (> 160 cm³) in 42%, 'increased' (100–160 cm³) in 25% and 'normal' (< 100 cm³) in 33% of patients. The overall mean VAT was 142.2 (SD = 65.8) cm³. Mean VAT for MS and non-MS was 184.8 (SD = 64.0) cm³ and 116.6 (SD = 53.8) cm³, respectively; the difference was significant (p = 0.0104).

CONCLUSION More than one-third of our patient population who underwent total knee replacement surgery had MS and the majority of them was or obese. We observed significantly higher mean VAT measurements in MS patients than in non-MS patients; in both groups, the mean VAT measurements were above the normal values.

CATEGORY: MEDICAL

Projecting demographic changes of regional populations in Singapore from 2017 to 2030

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INTRODUCTION Singapore's public healthcare system is grouped into three healthcare clusters (i.e. National Healthcare Group [NHG], Singapore Health Services [SHS] and National University Health System [NUHS]), with each managing the population living in demarcated geographical areas. National concerns were raised on the stress that an ageing population would bring to the healthcare system. To inform planning of health initiatives, we projected the regional population for year 2017 to 2030 and visualised demographic shifts in age groups and gender.

METHODS National age- and gender-specific resident population size, and death and birth rates from 2007 to 2016 were obtained from the Singapore Department of Statistics. Weighted average was used to combine death rates to obtain them in five-year-interval age groups. Missing values were imputed using linear interpolation. Projections for birth and death rates were made using three-year moving average and used for regional population projections from 2017 to 2030. Projections were made separately for each region.

RESULTS Regional population varies for the three healthcare clusters, with NHG having the largest population, followed by SHS and NUHS. Projections showed an ageing population, with proportion of the elderly (≥ 65 years old) increasing from 13.1% to 22.6%, 11.5% to 21.3% and 12.1% to 20.9% from 2017 to 2030 in the NHG, NUHS and SHS clusters, respectively. Projections also showed an increase of 0.9% to 1.4% in the proportion of males in the regional populations.

CONCLUSION The regional population profile could be used for disease projections, better planning and effective allocation of resources to various healthcare initiatives targeting different segments of the population.

CATEGORY: MEDICAL

A review of in-hospital cardiac arrests: have we done better? Can we?

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INTRODUCTION This study aimed to determine: (a) the demographics of patients with in-hospital cardiorespiratory arrest; and (b) if it is possible to expediently identify and treat patients before they experience a Code Blue activation (CBA).

METHODS We collected data of all CBA patients in July 2015 from chart reviews and pre-existing Utstein template Code Blue forms. These included patient demographics, admitting diagnosis, patient location at time of CBA, vitals at one hour and six hours prior to CBA with corresponding responses of healthcare staff, rhythm at CBA and interventions performed, and in-hospital mortality.

RESULTS Mean age of CBA patients was 67 years. Out of 154 patients, 86 (56%) were male. Mortality increased with age (20% in patients aged < 50 years vs. 67% in those > 80 years) and with patients in pulseless electrical activity/asystole (10% vs. 80% for peri-arrest and 83% for ventricular tachycardia/ventricular fibrillation), consistent with international data. 61% had abnormal vitals six hours prior to CBA, with 30% having critically abnormal vitals. These figures rose to 95% one hour prior to CBA, with 5% showing critically abnormal vitals. 50% of these episodes were escalated to doctors and 33% were reviewed in-person. In most (59%) cases, nurses were the first responders. Most (63%) CBAs were by doctors. After initiating our early warning score and escalation criteria (JETS) in July 2016, year-on-year survival increased from 14% to 19% for arrests and 42% to 80% for peri-arrests.

CONCLUSION Early pickup and intervention in CBA patients is possible. Poor outcomes can be mitigated by early identification. Identification of first responders suggests that helping nurses overcome barriers in calling for help can improve overall mortality, which was also made possible after initiation of our early warning score and escalation criteria.

CATEGORY: MEDICAL

A sensitivity analysis of the future burden of stroke

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INTRODUCTION Stroke is one of the top causes of burden of disease in Singapore, in spite of a decreasing trend in its incidence and mortality rates over the last decade. The objective of this study is to conduct a sensitivity analysis of stroke incidence in the year 2030 to allow for better planning of resources and interventions at the regional health system level.

METHODS Based on the current age-standardised incidence rates (ASIR), the sensitivity analysis was conducted for three scenarios. While the best- and worst-case scenarios consider a 10% ASIR reduction and increase, respectively, the likely scenario presumes that the ASIR will remain the same in 2030.

RESULTS Based on the current ASIR, the number of new cases per year in the western region of Singapore is estimated to be 1,709. If there is a 10% reduction in ASIR, the number of new cases will remain the same in the year 2030. However, if ASIR remain the same or increase by 10%, there will be an 11% (1,899) and 22% (2,089) increase, respectively, in the number of new cases in the year 2030.

CONCLUSION The incidence of stroke cases will likely reduce in the future owing to the appropriate management of chronic disease risk factors. However, in the recent years, an increase in stroke incidence is seen in the younger age group, probably due to increasing risk factors, such as obesity and diabetes mellitus.

CATEGORY: MEDICAL

Measuring fragmentation of care in Ng Teng Fong General Hospital's specialist outpatient clinics

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INTRODUCTION Patients seeking specialist care in multiple specialty disciplines suggests that care might potentially be fragmented and poorly coordinated in the specialist outpatient clinics (SOC). The aim of this study was to measure the extent of care fragmentation in Ng Teng Fong General Hospital (NTFGH)'s SOC and identify associated factors.

METHODS A cross-sectional study was conducted using data from 40,333 unique SOC patients with at least two attendances in 2016. A fragmentation of care index (FCI) was computed for each patient to measure the extent of care fragmentation ($0 \leq FCI \leq 1$, 1: most fragmentation). Log-linear regression with stepwise selection was used to model the association between FCI and the following factors: age; gender; race; and most frequently visited specialty (MFVS), controlling for the number of specialties seen by each patient. MFVS was defined for patients with a dominant specialty (i.e. undefined if a patient has equal number of visits to multiple specialties).

RESULTS 36% of patients had fragmented care, i.e. FCI > 0. The model selected included age, gender and MFVS. FCI was positively associated with age and larger among females. The top three specialties with the largest FCIs were haematology, endocrinology and anaesthesiology, and the bottom three specialties with the smallest FCIs were medical oncology, radiation oncology and ophthalmology.

CONCLUSION Our study suggests a presence of care fragmentation in NTFGH's SOC and that the extent of fragmentation is associated with age, gender and MFVS. More attention could be given to coordinate care across specialties prone to care fragmentation.

CATEGORY: MEDICAL

Laryngeal ossification and its impact on the management of ingested foreign bodies

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INTRODUCTION The aim of this study was to analyse the extent laryngeal ossification affected the identification of foreign bodies on soft-tissue neck radiographs and its impact on the management of foreign bodies in the throat.

METHODS All patients presenting to the emergency department with a history suggestive of a foreign body in the throat were included in this retrospective study.

RESULTS A total of 193 patients were enrolled into this study. 67 (34.7%) patients were identified to have a foreign body in the throat. In total, 60 (31.1%) patients had successful removal of their ingested foreign body. Foreign bodies were identified on X-ray in 12 (6.2%) patients. The site of foreign body in these patients included the palatine tonsil (n = 2), base of tongue (n = 3), vallecula (n = 1), post-cricoid region (n = 1) and oesophagus (n = 5). Various shadows, including laryngeal calcification, osteophytes and radiological artefact, were reported as potential foreign bodies in 19 (9.8%) patients. In 5 (2.6%) patients, false-positive shadows were reported as foreign bodies when the actual foreign body was removed from a different site.

CONCLUSION Ossified cricoid superior border is the most common entity reported as foreign body and this is more likely to happen in the age group of 20–40 years.

CATEGORY: MEDICAL

A single tertiary centre's 18-month experience of subtotal arytenoidectomy for bilateral vocal fold immobility

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INTRODUCTION In this study, we aimed to share our experience of subtotal laser arytenoidectomy (according to Remacle) for bilateral vocal fold immobility in an adult tertiary hospital in Singapore.

METHODS This was a retrospective case series of five adult patients (four female, one male) aged 57–82 years, who over the last 18 months, underwent surgery for bilateral vocal fold immobility by the same senior surgeon. The diagnosis varied from previous stroke, thyroid surgery and idiopathic causes.

RESULTS Four out of five patients were successfully decannulated and of those still alive, have not had any further stridor on follow-up. Unfortunately, among the four patients, one developed intra-abdominal sepsis after insertion of a percutaneous gastrostomy tube and died a fortnight after decannulation. The three remaining patients continued to eat and drink normally. One patient failed decannulation due to poor swallow and aspiration along with development of a 3-cm tracheal stenosis suprastomally to her tracheostomy.

CONCLUSION Bilateral vocal fold immobility is a challenging condition that can present both subacutely or as an airway emergency. Treatment for this condition often results in a surgical airway (tracheostomy), but in centres with adequate experience, the patient may be given other options, such as temporary and permanent lateralisation procedures using sutures and lasers (e.g. cordotomy, cordectomy, arytenoidectomy). Debate surrounds the best technique to be used and in which cases of immobility. Our small series has provided us with some experience on the challenges ear, neck and throat surgeons face when dealing with this condition.

CATEGORY: MEDICAL

On-demand sedation colonoscopy: is it the way forward?

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INTRODUCTION Sedation and analgesia are routinely administered for colonoscopy. We analysed the outcome of patients who underwent colonoscopy with and without sedation. Caecal intubation time, pain score and post-colonoscopy recovery time between the two groups were compared.

METHODS Prospectively collected clinical data from August 2015 to June 2017 was analysed. A total of 130 patients underwent on-demand sedation. We compared these results with another 130 patients who underwent colonoscopy with sedation and analgesia. All the patients underwent colonoscopy by a single colonoscopist. Patients who had oesophagogastroduodenoscopy with colonoscopy at the same setting and inpatient colonoscopy were excluded from the study.

RESULTS Out of 130 patients who initially chose to have on-demand sedation, two eventually required sedation to finish the procedure and therefore were excluded from the study. Mean age of both groups is similar (sedated patients: 58 years vs. unsedated patients: 57 years). Unsedated patients showed a significantly shorter recovery time compared with sedated patients (43.20 min vs. 76.64 min; $p < 0.05$). There were no significant differences in pain score (sedated patients: 0.19 vs. unsedated patients: 0.16) or caecal intubation time (sedated patients: 12.87 min vs. unsedated patients: 12.67 min).

CONCLUSION On-demand sedation colonoscopy is feasible in selected patients, with the advantages of reducing recovery time and no risks of side effects from sedative agents and opioids.

CATEGORY: MEDICAL

Survey on healthcare workers' perception of awareness, skills and attitudes toward clinical quality and patient safety

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INTRODUCTION Healthcare institutions have made efforts to communicate the importance of clinical quality and patient safety (CQPS). However, there has been a lack of studies evaluating healthcare workers' (HCWs) understanding of CQPS. The aim of this study was to evaluate HCWs' perception of their awareness, skills and attitudes toward CQPS.

METHODS A survey was conducted among doctors, nurses and allied health workers over a period of two months in 2017. The survey investigated their attitudes toward CQPS, effects of communication tools and factors promoting or hindering the effectiveness of these tools. Responses were measured using a five-point Likert scale. Data was analysed using descriptive statistics.

RESULTS 600 forms were distributed and we received a response rate of 90.2%. 85.6% of respondents agreed that CQPS is relevant to their work and 74.9% were motivated to apply knowledge of CQPS at work. However, 68.2% reported insufficient training and 59.7% were unsure how the organisation manages unsafe practices. Among nurses, 70.1% agreed that their supervisors use CQPS communication tools during briefings and 67.2% agreed that their supervisors make concessions for them to attend CQPS events. However, this was not evident in the medical and allied health professions; only 55.1% of medical professionals and 62.1% of allied health workers perceived their supervisor and senior management as committed to CQPS.

CONCLUSION HCWs generally see the importance of CQPS and its relevance to their work. However, there must be greater emphasis on training and communication efforts. Increased visibility in supervisors and senior management support is vital in pushing the CQPS agenda.

CATEGORY: MEDICAL

A retrospective analysis of immature granulocyte fraction, a potential biomarker for early sepsis, in predicting bacteraemia in Ng Teng Fong General Hospital inpatients

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INTRODUCTION Immature granulocyte fraction (IG%) is a novel biomarker with growing international interest as an early predictor for sepsis. IG% is a component of full blood count (FBC) and collected early in the course of admission. It represents a rapid and 'free' biomarker, and is useful for making clinical decisions. We established an IG% test performance in our local context via a retrospective analysis of Ng Teng Fong General Hospital patient data.

METHODS Patients who admitted at the accident and emergency (A&E) department in September 2016, January 2017 and May 2017, and received FBC testing (n = 10,116) were included for analysis. Data on FBC, blood culture, use of intravenous (IV) antibiotics and outcome endpoints was collected. Only blood culture taken up to 12 hours after IV antibiotics initiation was included, and IG% taken within 24 hours after these cultures were taken were also included. Statistical analysis was done using Microsoft Excel.

RESULTS Overall, 40% of inpatients received IV antibiotics. In the Department of Medicine (65% of admitted patients), 37% received IV antibiotics, 76% of whom started receiving at the A&E Department, and 63% receive < 48 hours total IV antibiotic therapy, which is less than the minimum recommended duration. The prevalence of true-positive blood culture was 9%. The area under the curve for IG% performance was 0.6843. At an IG% threshold of 0.6%, sensitivity, specificity, and negative predictive values were 55%, 68% and 94%, respectively. These performances were also compared to those of white blood cell (WBC) and procalcitonin.

CONCLUSION IG%, in our local context, performed better than WBC, but was not as specific as procalcitonin, in ruling out bacteraemia/sepsis. At an IG% threshold of 0.6%, 66% of patients who received blood culture were predicted to test below threshold, translating to a potential reduction in IV antibiotic usage (e.g. avoid initiation, earlier de-escalation/cessation) in 15% of patients who received IV antibiotics. This impacts antibiotic stewardship, patient outcomes and healthcare cost containment.

3D volumetric analysis in endoscopically harvested buccal fat pad flap: a cadaveric study

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INTRODUCTION The buccal fat pad (BFP) flap that is harvested endoscopically can aid in the reconstruction of selected skull base defects. The volume of available buccal fat may not be consistent in every case. We aimed to determine if the volume of buccal fat calculated preoperatively would correspond to the length and width of the flap intraoperatively.

METHODS We conducted a cadaveric study of five heads (i.e. ten sides). Fresh frozen cadaver heads with high-definition computed tomography (CT) imaging were evaluated using the OsiriX software to calculate the volume of the buccal fat on both sides. The BFP flap was then harvested endoscopically and measurements were taken for length and width of maximum reach.

RESULTS The volume of the BFP ranged from 6.93 cm^3 to 11.98 cm^3. In all but one head, there was no statistically significant difference in the volume of the BFP flap between the right and left sides. On endoscopic dissection of the BFP flap, the range of the maximum length of the flap was 3.3–5.8 cm. The width ranged from 0.7 cm to 2.0 cm. There was a positive correlation between the calculated volume of the BFP flap based on CT imaging and the dissected length and width of the flap (Pearson correlation, r = 0.83 and r = 0.80, respectively). In addition, we demonstrated a dissected BFP flap length of at least 5.0 cm in all cases except for one, despite variances in the volume of BFP measured.

CONCLUSION Preoperative calculation of the CT-based volume of the BFP flap is a good predictor and correlates positively with the intraoperative maximum reach of the flap for both length and width. Where the volume may be lower in some instances, the BFP flap would still have adequate reach to provide coverage for the lower and midclival region in most cases.

An evaluation of medication errors after a closed-loop system implementation

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INTRODUCTION A closed-loop system is a multicomponent intervention encompassing all important aspects of medication management: prescribing; dispensing; and administration. A detailed study of the processes and interplay of related factors would help guide organisations in their efforts in medication safety. Error-reporting databases are cost-effective alternatives to chart reviews and direct observations in studying medication errors. The study objective was to evaluate the medication errors that occur after a closed-loop system implementation.

METHODS The study site is an acute hospital that implemented a closed-loop medication system in all the wards. Medication errors reported in the hospital's database 6–12 months after system implementation were analysed.

RESULTS During the study period, 1,004,573 medication orders were placed. The medication error rate reported was 4.4 per 100,000 medication orders. Rates of prescription, dispensing and administration errors reported were 1.4, 0.4 and 2.0 per 100,000 medication orders, respectively. 60% of the errors reported were true errors that resulted in minimal or no harm to the patient, while the other 40% of the errors reported were near-misses.

CONLCUSION Medication errors related to human factors could still occur after a closed-loop system implementation. Error-reporting databases help to identify the workflow components of medication management that are vulnerable to human errors. By establishing a baseline for medication error rate, these databases could guide organisational quality improvement initiatives to promote medication safety.

Understanding the variation in hospital inpatient bill sizes among public hospitals in Singapore

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INTRODUCTION Multiple tiers of subvention are in place to ensure that healthcare is kept affordable in Singapore. Nevertheless, hospital bill sizes vary depending on admitting conditions, ward class and hospitals. This study explored the differences in the factors and identify those that influence inpatient bill sizes among hospitals in Singapore.

METHODS Hospital bill size data published by the local Ministry of Health for Changi General Hospital, Khoo Teck Puat Hospital, Ng Teng Fong General Hospital (NTFGH), National University Hospital, Singapore General Hospital (SGH) and Tan Tock Seng Hospital for 2016 was used for the analysis. Data fields made available are: admitted conditions; hospital; ward class; patient volume; average length of stay (ALOS); and 25th and 75th percentiles of the patient bill size. The IQR for bill size was used as a measure for variation in bill sizes for a given condition. A log-linear model was fitted to model the relationship of patient bill size and its IQR against all other data fields.

RESULTS Comparing hospitals with the largest and smallest 75th-percentile bill size, the bill size at SGH was 1.48 times that of NTFGH. The IQR of bill size was also largest for SGH and smallest for NTFGH, with a difference of 1.55 times. Heart-related conditions, and hip and knee replacement surgeries were conditions associated with the largest bill sizes.

CONCLUSION Bill size varied for different hospitals for the same admitting condition, volume, ward class and ALOS, with a variation of more than 34% between the hospitals with the largest and smallest bill size. The variation in bill sizes for a given condition also suggests that there is room for achieving greater consistency in value delivered across hospitals.

Rising trends in acute respiratory infections

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INTRODUCTION Acute respiratory infections (ARI) are regularly monitored to detect possible outbreaks or emerging infections. This study aimed to evaluate seasonal trends of ARI cases presented at Ng Teng Fong General Hospital's (NTFGH) emergency department (ED).

METHODS Weekly aggregated data of the number of ARI cases seen at NTFGH's ED between July 2015 and June 2017 was used for analysis. Comparisons of weekly ARI cases across similar quarters of a year were made to control for seasonal differences observed at different timepoints of the year. Wilcoxon signed-rank test was used to test for statistical differences.

RESULTS Rising numbers of weekly ARI cases were observed over time across quarters. Comparisons of weekly ARI cases across similar quarters of different years showed statistically significant increase in Q2 and Q3, while no significant difference was observed in Q1 and Q4. Boxplots of the results also highlighted positive outliers in Q1 in both 2016 and 2017.

CONCLUSION Preliminary analysis indicated signs of rising numbers of ARI cases from 2015 to 2017. A large variance in weekly ARI cases observed in Q1 reflects surges corresponding with seasonal peaks of the flu season typically observed around the start of the year. Positive rates of increase in ARI cases were observed between Q4 of 2016 to Q1 of 2017, not previously observed in the duration from Q4 of 2015 to Q1 of 2016. This causes concerns for possible rises in the future. Further data collection over longer periods may be required to establish such a relationship.

CATEGORY: MEDICAL

Care-seeker emergency department visitation profile in the first six months after the opening of Ng Teng Fong General Hospital

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INTRODUCTION Concerns have been raised that the introduction of new healthcare resources might lead to an over-utilisation by patients – an economics concept known as supply-induced demand. We studied the utilisation of less urgent patients who visited Ng Teng Fong General Hospital's (NTFGH) emergency department (ED) in its opening months to investigate the possibility of this phenomenon. We focused to find out differences in visitation profile between patients who are new to public hospitals' ED and existing patients.

METHODS NTFGH's ED attendance data for less urgent patients – triaged as minor (P3) and non-emergency (P4) patients – within six months since its opening (i.e. 30 June–31 December 2015) was collected. The data was matched with the Ministry of Health's database to identify new patients with no records of ED visits to any public hospitals in the last ten years. Statistical analysis was done to compare proportions of multiple visits between new and existing patients. Differences in the discharge disposition of repeat visits were also compared for the two groups of patients.

RESULTS Differences in the proportion of multiple visits between new and existing patients were found to be statistically significant (11% vs. 20%; $p < 0.05$). Approximately 50% of repeat visits in both groups were discharged home from the ED.

CONCLUSION Although our finding that a larger proportion of new patients had single visits to the ED as compared to existing patients might be an indication of an initial supply-induced demand, the proportion of patients with repeat visits who were discharged home was similar in both groups, which suggests that supply-induced demand was not sustained.

CATEGORY: MEDICAL

A simple device to maintain patency of earlobes holes after lobule surgery

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INTRODUCTION After earlobe surgery, many patients wish to keep their earlobe-piercing holes, but it is a consequence of wound healing that the holes close. We described a simple and reliable method to keep the earlobe hole patent using a single intravenous cannula.

METHODS A temporary stent device is fashioned out of a large bore intravenous cannula. This is inserted into the existing earlobe hole and secured by means of its flared ends. It is left *in situ* for one week as wound healing takes place. Subjective feedback from patients and patency of the earlobe hole are our outcome measures.

RESULTS This device is well tolerated by our patients and cosmetically acceptable. It is effective in maintaining patency of the earlobe hole and reliably stays in position for the required duration. It is lightweight, comfortable and interferes minimally with wound healing. The only material required is the intravenous cannula, which is inexpensive, inert, sterile and readily available. The technique for fashioning the device is easy to learn.

CONCLUSION The earlobe device is a simple, cost-effective and safe technique, with good results in maintaining patency of earlobe-piercing holes.

CATEGORY: MEDICAL

The heart-shaped flap for reconstruction of ear lobule defects

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INTRODUCTION Local flaps are often required for the reconstruction of ear lobule defects after excision of lesions, such as keloids. Traditional flaps, such as bi-lobed and rhomboid flaps, result in donor site defects. The unique pliability of the lobule allows for the design of a new rotational flap that causes no donor site defect and minimises morbidity.

METHODS Capitalising on the features of the lobule skin and shape, we designed a novel heart-shaped rotational flap, with an arc of rotation < 45°, which allows for the donor skin to fill up both the primary defect and donor site defect while minimising tension and preserving the shape of the lobule. We have performed this flap on four patients to date.

RESULTS The flap is effective in reconstructing lobule defects. Flap survival rate is 100%. Patient satisfaction is high and aesthetic outcomes are excellent.

CONCLUSION We described the design and execution of a novel heart-shaped flap, which is robust and simple to fashion, and circumvented the issue of donor site morbidity, which is a common drawback of traditional rotation flaps. It can be employed in areas with pliable skin and subcutaneous tissue, and is particularly suited for the ear lobule.

CATEGORY: MEDICAL

Resveratrol, a red wine antioxidant, reduces cardiac arrhythmia in heart failure: a case series

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INTRODUCTION Resveratrol, a red wine antioxidant, has shown benefits in reducing ventricular arrhythmias in translational studies. As resveratrol is currently an approved health supplement, we aimed to explore the effectiveness of resveratrol in reducing cardiac arrhythmias in patients with heart failure.

METHODS Our study is a National Healthcare Group-approved trial. We prospectively evaluated six patients treated with resveratrol in the cardiology specialist outpatient clinic in Ng Teng Fong General Hospital between 2016 and 2017. Inclusion criteria were left ventricular ejection fraction < 70% and diagnosed with cardiac arrhythmia in stable condition. Patients were given a moderate dose of oral resveratrol at 500 mg daily in addition to the standard medical therapy. Patients were followed-up every eight weeks, up to 24 weeks. Clinical examination and Holter monitoring (24-hour ambulatory electrocardiography) were performed on every visit to look into the incidence of atrial and ventrical arrhythmias. Transthoracic echocardiography and B-Type natriuretic peptide (BNP) test were also performed at 24 weeks.

RESULTS Mean age of our patients was 61 years and 80% were female. In two patients among the six who were administered oral resveratrol, supraventricular ectopics at 24 weeks were reduced by 2% and 7%, respectively. In two other cases, ventricular ectopics at eight weeks were reduced by 4% and 9%, respectively, but no reduction in ventricular ectopics was observed at 24 weeks. In two patients, BNP was high (144 pg/mL and 1,925 pg/mL, respectively) at 24 weeks. Renal and liver functions were stable in all patients. At 24 weeks, all patients were asymptomatic for palpitation and breathlessness.

CONCLUSION A randomised prospective trial is warranted to explore more on the effectiveness of resveratrol in reducing cardiac arrhythmias in a population of patients with heart failure.

CATEGORY: NURSING

A review of the time spent on administering nasogastric tube bolus feeding

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INTRODUCTION Poor conscious level, feeding problems, swallowing difficulties and aspiration are commonly associated with patients with neurological conditions. Nasogastric tube (NGT) is recommended as a safe mode of supplying nutrition in such patients. In Ng Teng Fong General Hospital's Ward B12, there is an average of 15 patients who require tube-feeding and are scheduled for approximately five feeds per day. Currently, nurses collectively spend about 27 hours per day administering NGT bolus feeding. This study aimed to reduce nurses' time spent on administering bolus feeding by 50% within three months.

METHODS In this project, we utilised the plan-do-check-action (PDCA) methodology to facilitate the process of change via an audit, feedback and re-audit cycle as a strategy to change clinical practice.

RESULTS The clinical practice change has resulted in a reduction of nurses' time spent on administering NGT bolus feeding from 27.5 hours to 15 hours per day. The pre- and post-implementation survey conducted among 45 nurses showed that all nurses agreed with the time-saving benefit. 43 nurses agreed that the use of feeding pump for bolus feed is feasible. The three- and six-month post-implementation audit results showed 100% compliance among the nurses in using the feeding pump and bag.

CONCLUSION This project showed that using feeding pump for NGT bolus feeding is feasible and saves nurses' time. This study also showed the feasibility of conducting a quality improvement project using the PDCA methodology in the clinical setting.

CATEGORY: NURSING

The effectiveness of a nursing foundation programme on newly recruited registered nurses' knowledge, skills and confidence level at Ng Teng Fong General Hospital

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INTRODUCTION This study aimed to evaluate the impact of the nursing foundation programme (FP) in providing knowledge and skills, and in the self-reported confidence level of newly recruited registered nurses (RNs) at Ng Teng Fong General Hospital.

METHODS This is a prospective interventional study using a theory test and a self-reported confidence scale to evaluate the impact of the course at three timepoints: first day of FP (i.e. baseline); last day of FP (i.e. during) and 14 weeks after FP (i.e. after). The study was conducted from May to September 2016 on 115 newly recruited RNs. The test and self-reported confidence scale were based on the ten most essential skills taught in FP.

RESULTS Baseline knowledge scores were similar across departments (p > 0.05). Generally, an improvement in knowledge scores was observed from baseline to 'during' and 'after' timepoints. Improvement trends across the three timepoints were statistically significant (p < 0.001). Confidence ratings increased after six weeks of theory/demonstration training. However, the ratings dropped after the assessment period, although the RNs retained improvement over the baseline ratings. Confidence levels in performing the core skills increased over time as the RNs practised the skills almost every day, except for intravenous medication skills in the non-applied department and this may be due to little opportunity to perform the skills.

CONCLUSION Our findings provide objective data to review future FP programmes. Consideration should be given to the duration of future programmes, to enable RNs to return to their respective work environments earlier and be inducted clinically. This will encourage good bedside clinical practice and help to achieve better clinical outcomes for patients.

P2 centralised triage in the emergency department

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INTRODUCTION Allocation of ambulance cases was alternated at the screening point of the emergency department (ED) at Ng Teng Fong General Hospital (NTFGH). The ED P2 clinical area was divided into Teams A and B. Besides following up with new alternated ambulance cases, Team A also attended to un-triaged new cases from the P3 ambulatory area and down-triaged cases from the P1 critical area. On the other hand, Team B only attended to up-triaged cases from the P3 ambulatory area and new alternated ambulance cases. This workflow led to uneven distribution of workload between the teams as assigned nurses were unable to triage and attend to new ambulance cases promptly during times of patient surge. This led to patients' prolonged consultation waiting time and nurses being at risk of missing potential emergency cases. Hence, the P2 workgroup, comprising three leaders, seven staff nurses and two administrative staff, was set up to look at streamlining workflow so as to improve patient care. Fishbone analysis showed that the three main factors causing prolonged waiting times were mistriage due to delayed or omitted point-of-care testing (POCT), the innate ED environment and the increase in nurses' workload. Thus, we initiated the P2 centralised triage (PCT) and aimed to reduce consultation waiting time for P2 cases by 20% within four months.

METHODS In this initiative, PCT nurses' role was to solely receive all new cases (from the ambulance point and P3 ambulatory area), and perform triage and other necessary POCTs for these cases promptly. Two cubicles in the P2 clinical area were designated for the PCT work process. Allocation of new P2 cases was carried out by the PCT nurses using an alternating method in the form of a flip chart placed between the PCT cubicles. Assigned nurses on both teams would thus be focused on the nursing care of the patients allocated to them without interruption. We conducted a pilot study in July 2016 and subsequently carried out the four-month trial. During this trial period, the new workflow initiatives were tested to see if they could reduce consultation waiting time in the ED. We measured the time durations from arrival to triage and from arrival to consultation.

RESULTS Our study showed favourable results. In the 95th percentile, there was an improvement of 50.9% in the duration from arrival to triage during the night shift and an improvement of 43.0% during the afternoon shift. There was an improvement of 31.5% in the duration from arrival to consultation during the night shift and an improvement of 28.3% during the afternoon.

CONCLUSION We have thus adopted the PCT workflow to help manage the nursing workload especially in times of patient surge. With this improvement in place, work confusions, conflicts and overload are markedly minimised. New cases not triaged are now rarely. In the initial stages, one of our challenges was resistance to change. We educated the clinical ground staff about the PCT and its benefits, and welcomed staff participation by getting them involved in the feedback sessions. To complete the project in four months, the administrative staff helped to manage the transition via a project planner. We learnt about the importance of patient-centredness through the enhancement and improvement of patient care, and ensured that patients felt comfortable and cared for once they arrived in the ED. Teamwork is of utmost importance as it promotes and contributes to mutual respect, and incorporates excellence when healthcare professionals work with one another. We also learnt to embrace openness, continuously brainstorm for ideas, and maintain an open mind and be receptive to changes. We are continuously involved in post-implementation works to brainstorm for ideas to further enhance patient management in the ED. We hope to be able to explore other areas for improvement in the workflow to improve both patient and staff satisfactions.

CATEGORY: NURSING

Exploring nurses' perceptions of nurse-physician communication in a general acute healthcare setting in Singapore: a mixed-methods descriptive study

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INTRODUCTION This study aimed to explore nurses' perceptions of nurse-physician communication and the barriers faced. It aimed to describe nurses' recommendations for improving nurse-physician communication.

METHODS A concurrent parallel mixed-methods design was used. Registered nurses of general wards in an acute hospital in Singapore were invited to participate in an online questionnaire and a focus group discussion. Quantitative data was analysed using descriptive statistics and Spearman's rho. Qualitative data was analysed using thematic analysis.

RESULTS There were 162 completed questionnaires (response rate = 28%). Moderate scores (presented as mean [SD]) were achieved for communication subscales: openness (3.15 [0.68]); accuracy (2.50 [0.56]); understanding (3.19 [0.55]); and timeliness (3.50 [0.57]), with higher mean scores indicating better perceptions. Most nurses indicated 'neutral' (n = 75, 46%) or 'satisfied' (n = 59, 36%) in communication satisfaction. Communication satisfaction was positively correlated with openness, understanding and timeliness (p < 0.01). Two focus group discussions with a total of six nurses were conducted. Themes relating to relationship and communication emerged. Participants' perceptions of nurse-physician communication included having a collaborative relationship, knowledge of roles, common goals, openness, mutual understanding and accuracy. Barriers participants faced in communication included those associated with relationships and attitudes, perceived insufficiency of knowledge and experience, differences in goals, and challenges relating to openness of communication, language and timeliness of communication. Recommendations to improve communication involved education, direct contact, rapport-building and organisational support.

CONCLUSION Despite moderate communication subscales scores, nurses desired to foster collaborative relationships with physicians for patients' benefit. Individual and organisational efforts are needed to improve nurse-physician communication.

CATEGORY: NURSING

A pilot implementation of a modified emergency department fall risk screening tool: a quality improvement project

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INTRODUCTION There is an increasing number of patient falls in the emergency department (ED); from April to June 2016, there were six incidents recorded at the ED of Ng Teng Fong General Hospital. The local Ministry of Health Standards and Accreditation Resource Unit audit has also highlighted that there is no fall screening tool in the ED. The screening tool used in the inpatient setting was deemed as inadequate in identifying high fall-risk patients in the ED. A fishbone analysis helped us to identify the root causes, grouped into three broad areas: human; environment; and process. The goal of this project was to implement a fall risk screening tool to be used in the ED and we aimed to reduce the number of falls by 70% over a period of three months.

METHODS We adopted and modified existing screening tools, namely the Morse Fall Scale, Hendrich II Fall Risk Model, Conley Scale and Memorial ED Fall Risk Assessment Tool, and those used in the EDs of six local restructured hospitals. Our tool made a particular reference to the Memorial ED Fall Risk Assessment Tool in view of its similar context to ours. A modified fall risk screening tool comprising two components – patient observation and scoring, and the implementation of interventions – was developed. Fall preventive measures that are commonly used in the hospital were incorporated in the tool to remind nurses to select and document the appropriate fall preventive measures. Fall risk wrist tags and signage were also used as visual aids to promote communication among healthcare workers. A period of six months was given to design and implement the initiative. A Gantt chart was implemented to guide and illustrate the progress of the project. The project was presented to the hospital's falls safety subcommittee. Information was disseminated to the ED nurses through daily roll calls to prepare them for the three-month trial. During the trial, nurses were encouraged to use the tool on all patients except collapsed patients who did not revive. A comparative study was also done concurrently using the inpatient fall risk assessment tool as recommended by the subcommittee. In the final phase, written and verbal feedbacks for evaluation were obtained from the staff during roll calls. The results were presented to the subcommittee and the final modifications were made based on the recommendations from the various stakeholders.

RESULTS The number of falls was tabulated and the results showed an 83% reduction in the number of falls, with one near-miss recorded. **CONCLUSION** The modified ED fall risk screening tool has demonstrated to be helpful in identifying high fall-risk patients in an acute setting. It has reduced the number of patient falls and improved patient safety. During the project, we observed that patient history was difficult to obtain from critically ill patients. There was also noncompliance to the usage of the tool due to the ED nurses' preference for the paper-and-pen method. To sustain the project, the tool has been approved by the hospital's falls safety subcommittee to be incorporated in the hospital's electronic medical record system. All critically ill patients are deemed as 'high risk for fall' by default and the use of the tool is exempted.

A descriptive exploratory study on the factors contributing to the role transition of charge nurses in the emergency department

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INTRODUCTION With the changing trends in patient acuity and increasing healthcare demands in Singapore, charge nurses play an important role in the emergency department (ED) in ensuring safe and effective delivery of patient care. Unfortunately, the roles of charge nurses are undetermined, and inadequately prepared and supported. It is timely to review the emerging trends of charge nurses in order to better support their role transition. This study aimed to explore the factors contributing to the role transition of charge nurses in the ED. The goal was to provide recommendations to better support and prepare charge nurses in ED. We also addressed these questions: (a) what are the qualities essential for success in assuming the role of ED charge nurses?; (b) what are the challenging responsibilities of charge nurses in the ED?; (c) does seniority matter in the appointment of ED charge nurses?; and (d) would a structured training programme and/or preceptorship be beneficial in ED charge nurses' role transition?

METHODS An exploratory descriptive design was used for this study. Survey questionnaires comprising eight open- and close-ended questions were distributed to the participants via a link to Google forms. The questions were expanded from the survey form used by Sherman et al (2011) and a similar study design was replicated. Convenience sampling was used. Participants were recruited from the pool of registered nurses working in the ED of Ng Teng Fong General Hospital. The survey was disseminated during the nursing roll call sessions. Implied consent was assumed when participants accepted and completed the survey. Approval from the National Healthcare Group Domain Specific Review Board was obtained. The close-ended questions were tabulated using SPSS version 20.0. Content analysis and triangulation were done for the responses to the open-ended questions. The data was analysed for keywords before emerging themes were identified. The themes were reviewed by the institution's nurse leaders of the ED.

RESULTS There were several implications on nursing education. It is vital to invest in the continuous education and competency development of charge nurses. Furthermore, this study provided guidance to the design of the curriculum for a training programme intended to support the role transition of ED charge nurses. There were also several implications on nursing administration. Charge nurse is a preparatory role for nurses to assume leadership responsibilities. Thus, it is important to adequately prepare and empower them, and recognise their work. Also, seniority matters in the assignment of ED charge nurses. Nevertheless, a quarter of the participants opined that with adequate training and exposure, nurses who possess the required skills may be able to function as ED charge nurses.

CONCLUSION Having a structured training programme, complemented with on-the-job training, and a preceptorship model can be beneficial. Key challenges, such as managing conflicts, and communication and leadership skills should also be included in the programme. As for the implications of our study on nursing research, a replication of this study in a multisite population with a larger sample size is encouraged. It might also be interesting to explore the reasons why ED charge nurses find a lack of support in their course of work. Finally, future studies should evaluate the efficacy of ED charge nurse training programmes.

CATEGORY: NURSING

The prevalence of lipohypertrophy and the associated risk factors in insulin-treated patients with diabetes mellitus

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INTRODUCTION Diabetic patients on insulin therapy are at risk of insulin-induced lipohypertrophy. Lipohypertrophy may lead to poor insulin absorption resulting in erratic blood glucose levels and inaccurate titration of insulin. The purpose of this study was to explore the prevalence and risk factors of lipohypertrophy in insulin-treated diabetic patients. Our clinical observation suggested patients' lack of understanding on the impact of lipohypertrophy and its associated risk factors.

METHODS This was a cross-sectional study for which 100 diabetic patients on insulin therapy were recruited. Participants gave consent and filled out a questionnaire regarding their injection technique. Each participant was examined for lipohypertrophy. A noticeable or palpable lump at the injection site will require the participant to be reassessed independently by two diabetes mellitus nurse educators.

RESULTS Lipohypertrophy was identified in 41% of our study participants. Among those with lipohypertrophy, 68% either did not do site rotation or did an incorrect site rotation. Also, 54% of the participants with lipohypertrophy mentioned that they were not educated in or have forgotten the lessons on site rotation, as compared to 39% of those without lipohypertrophy. Only 41% of participants with lipohypertrophy checked the injection site for presence of lumps or skin hardening prior to injection, compared to 59% of patients without lipohypertrophy. Incidence of recent hypoglycaemia was found in 46% of participants with lipohypertrophy as compared to 34% of patients without lipohypertrophy.

CONCLUSION Lipohypertrophy is prevalent and cannot be ignored. Education on insulin injection, with an emphasis on site rotation, should be provided to all diabetic patients at the beginning of and periodically during insulin therapy.

CATEGORY: NURSING

An initiative to improve processes of managing deteriorating and Code Blue patients

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INTRODUCTION Ward 16 of Ng Teng Fong General Hospital is a respiratory ward. There was a recent incident where a patient's condition deteriorated and resulted in adverse outcomes due to delayed escalation to the appropriate level of care. The goal of this project was to eliminate incidents of delayed escalation when managing deteriorating patients, in a period of six months (June–November 2016).

METHODS The root cause of the incident was evaluated using the '5 Whys' method and was shown that nurses lacked the clinical exposure to recognise and manage deteriorating patients. The team conducted in-service and practical refresher sessions during the study period. Code Blue drills were simulated in November 2016 with external auditors to assess the nurses. Evaluation feedback forms were given to the nurses after the refresher and Code Blue drill sessions to evaluate the nurses' knowledge and skills, and effectiveness of the programme. Pocket-sized escalation cards were created and distributed to the nurses for easy reference.

RESULTS Up to the time of writing, there was no incident of delayed escalation when managing deteriorating patients. Most of the nurses who participated in the refresher sessions agreed that their levels of knowledge and skills were enhanced. Participants in the Code Blue drill stated that they were able to apply the knowledge and skills learned. External auditors observed that the nurses were confident and able to escalate appropriately. Commendations were received from the medical team doctors during actual resuscitation.

CONCLUSION The project was able to enhance nurses' confidence in handling deteriorating patients, and improve rapport and teamwork among the staff.

CATEGORY: NURSING

Improved adherence to hand hygiene practices among healthcare providers using the Five Moments for Hand Hygiene concept

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INTRODUCTION Hand hygiene is a crucial measure for preventing the spread of antimicrobial resistance and healthcare-associated infections (HCAIs). The hands of healthcare providers contribute to the spread of HCAIs and are the most common source for transmission of infection from patient to patient and within the healthcare environment. The monthly hand hygiene audit, conducted by the Infection Control team from June to December 2016, showed an average adherence rate of 62%. This audit result is below the hospital's target adherence rate of 70%. This study aimed to achieve a hand hygiene average adherence rate of 70% among healthcare providers using the Five Moments for Hand Hygiene concept from January to July 2017.

METHODS An online survey was conducted to analyse the problem of noncompliance in hand hygiene practices in Ward B15. The duration of survey was from 3 to 16 December 2016. A total of 48 staff (doctors, registered nurses and enrolled nurses) participated in the survey. Monthly audits on hand hygiene practice were conducted by the infection control nursing team using direct observation from January to July 2017.

RESULTS After the implementation of intervention strategies, results showed an improvement of hand hygiene average adherence rate of 78% from February to July 2017.

CONCLUSION The project raised awareness on the importance of good hand hygiene practices. The team will continue to be vigilant in ensuring good hand practices among the healthcare providers in Ward 15.

CATEGORY: NURSING

Standardisation of effluent drainage in continuous renal replacement therapy

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INTRODUCTION This study aimed to compare the effectiveness of the new method of draining effluent fluid directly to the dialysis inlet/outlet in the patient's room with the old method of draining effluent fluid from the bag to the pail, which is then brought to the utility room for disposal.

METHODS A comparative study is done with six patients on ongoing continuous renal replacement therapy located in different rooms. Three patients were placed on the old method (i.e. Method 2) of effluent drainage and the remaining three were placed on the new method (i.e. Method 1).

RESULTS Method 2 required a total average of 82.20 footsteps/drain, while Method 1 required a total average of 10.76 footsteps/drain. Method 2 required a total average time of 73.72 seconds/drain and Method 1 required 9.58 seconds/drain.

CONCLUSION Our findings show that the new method requires fewer footsteps and time per drainage, and proves that the new method is more efficient and saves time.

The delivery of a nurse-led fall intervention programme in a restructured hospital outpatient geriatric clinic

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INTRODUCTION A fall intervention programme, implemented in 2015 with the aim of providing a standardised assessment and individualised intervention, was led by clinic nurses in a geriatric clinic. We herein describe the implementation of the programme, the characteristics of the participants and the challenges faced.

METHODS Patients aged ≥ 75 years with recurrent falls, unsteadiness in walking or fear of falling resulting in limitations of activities were enrolled for the interdisciplinary programme. Fall risk assessment was carried out by the nurse. These patients were given the appropriate advice and referrals based on their assessments. All patients underwent physiotherapy and were given an individualised progressive home exercise programme. Fall risk and functional assessment scales were applied. Regular phone calls were done to monitor patients' compliance to the interventions.

RESULTS 28 patients were recruited, among whom eight completed the programme. 14 patients dropped out of the programme due to declined physiotherapy sessions. Three patients perceived poor health, one passed away and two had ongoing physiotherapy sessions. Interventions were shared with the patients and caregivers based on their identified risk factors; these interventions included avoiding risk-taking behaviour, and advice on postural hypotension, proper footwear, home modifications and equipment. They were also taught the proper way of getting up from falls. All patients were referred to the physiotherapist, and patients with polypharmacy and medications that increased patients' predisposition to falls were counselled by the pharmacist. Patients who completed the programme demonstrated improvement in gait and balance.

CONCLUSION Recruitment of elderly patients who regularly fall or are at risk of falls was challenging as they declined the outpatient exercise programme. Regular phone calls to patients reinforced their compliance to exercise through reminders and encouragement.

A workflow to screen for and offer eligible elderly patients pneumococcal and influenza vaccinations in a geriatric outpatient clinic

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INTRODUCTION Pneumococcal and influenza vaccinations are recommended for the elderly. However, the adherence rate of vaccination administrations for these patients at the geriatric clinic is low. There is no workflow to screen for patient eligibility and offer vaccinations to patients. This project aimed to screen all patients following up at the geriatric outpatient clinic and offer pneumococcal and/or influenza vaccination to suitable patients in the duration of six months (from October 2016 to March 2017).

METHODS This project utilised a cause-and-effect fishbone diagram for problem analysis, Pareto chart to identify the problems for improvement and run chart to facilitate solutions. To raise staff knowledge on the vaccines, vendors were invited to update on vaccine products and profiles, and educational and information materials were also provided. We involved the medical informatics team to capture vaccination history in the Epic system. A vaccination screening workflow was explained to the nurses, and subsequently implemented in the clinic. A questionnaire sheet (Trifolder brochure) was used by the nurses to screen for vaccine eligibility and to collect data. The nurses were constantly reinforced to adhere to the implemented screening workflow. Regular feedback was obtained from the nurses and their clarifications answered.

RESULTS The results showed an overall 92% success rate – pneumococcal vaccination rate increased to 39% and influenza vaccination rate increased to 55%. A possible reason of not achieving a 100% rate of screening is patients presenting at the clinic for technical visits were not screened.

CONCLUSION The project helped to raise awareness on the need to promote influenza and pneumococcal vaccinations in the elderly population.

CATEGORY: NURSING

Exploring patients' perception of patient-centred care: a descriptive qualitative study conducted in an acute public hospital in Singapore

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INTRODUCTION The concept of patient-centred care gained prominence when the Institute of Medicine included it as an aspect of high-quality care. In Singapore, many healthcare institutions have started to pursue a patient-centred approach in care delivery. However, despite the association of patient-centred care with increased adherence to and participation in treatment, and decreased use of resources, the ambiguity of its characteristics has resulted in difficult implementation. Studies have also shown that patients' sociodemographic affects perception of what constitutes patient-centred care, which implies the need to understand patient-centred care from patients' perspectives. This study aimed to explore patients' perception of what constitutes patient-centred care and identify areas for improvement in patient-centred care delivery.

METHODS A descriptive qualitative design was employed for this study. Data was collected via individual, semi-structured face-to-face interviews. A purposive sample of 16 inpatients was recruited and interviewed from November 2016 to January 2017. However, only 15 were included as one was unable to complete the interview in English. Data was analysed via thematic analysis.

RESULTS Our analysis revealed six themes: (a) understanding of patient-centred care; (b) information and education; (c) communication with healthcare providers; (d) perceived multi-aspects of care; (e) shared decision-making; and (f) family involvement in care. Participants were unfamiliar with patient-centred care, but gave it meaning through sharing information with others when care was focused on them as patients. Participants acknowledged components of patient-centred care as themes (b) to (f).

CONCLUSION This study provides insights into patients' perception of components of patient-centred care and suggests areas for improvement in patient-centred care delivery.

CATEGORY: NURSING

Implementation and effectiveness of foam dressings in critically ill patients

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INTRODUCTION In 2016, 78 incidences of pressure ulcers (PU) were reported in the intensive care unit (ICU), out of which two patients developed PU. In this study, a foam dressing, the Mepilex Border Sacrum (MBS), was applied on patients with the aim of reducing the incidence of PU.

METHODS We used a quasi-experimental, one-group only post-test study design. A patient selection criteria (PSC) and MBS workflow was created based on the latest evidence-based rationale. Upon admission to the ICU, patients were assessed. Those who met the inclusion criteria were recruited for the study and had the MBS applied onto their sacral region within the first eight hours. Patients receiving MBS treatment were assessed once daily during shift handover; their underlying skin was assessed for redness and any broken skin. Each dressing was targeted to be kept for a maximum of five days. Daily skin assessment was documented on the PSC forms. Treatment was terminated once patients expired or were transferred to the general ward.

RESULTS The sample size was ten patients. The MBS proved to last more than 72 hours, reduce preadmission redness, maintain its integrity after use, not cause any further broken skin or redness on the patients, and be cost-effective.

CONCLUSION Our results suggest that foam dressings, such as the MBS, have a positive outcome on critically ill patients when used in conjunction with standard PU prevention.

CATEGORY: NURSING

The development and evaluation of a fall prevention educational video on fall risk awareness, knowledge on falls and help-seeking behaviour among surgical patients

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INTRODUCTION The aims of this study were to: (a) develop the content and format of a fall prevention educational video; and (b) evaluate the effectiveness of the video on fall risk awareness, knowledge on falls and help-seeking behaviour.
METHODS The content and format of the video were developed using theoretical frameworks, literature reviews and hospital protocols. The duration of the video was 2 minutes 30 seconds and the mean content validation index was 0.97. Content validity of the video was based on review criteria and conducted by five experts. A quasi-experimental post-test comparison research design was used to evaluate the effectiveness of the video among adult patients admitted in a surgical and orthopaedic ward of a tertiary hospital in Singapore. A total of 202 patients participated in the study. The video consisted of background information on and consequences of falls. The causes of falls and fall prevention strategies were also discussed.
RESULTS Independent t-test showed that the intervention group had a significant improvement (p = 0.021) in fall risk awareness. However, independent t-test and Mann-Whitney U test showed no significant results for knowledge on falls (p = 0.348) and help-seeking behaviour (p = 0.519).
CONCLUSION The content and format of the video were developed with satisfactory content validity. Fall risk awareness was found to be significantly higher in the intervention group.

CATEGORY: NURSING

A negative test clinic to decongest the cardiology clinic and improve patient experience

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INTRODUCTION The negative test clinic (NTC) is a pilot nurse-led clinic that aims to effectively manage cardiac stress tests in overbooked cardiology clinics. Patients will be offered the options of either a telephonic consultation or a visit to the NTC for the test results. This study aimed to improve the process of disposition of a negative test result and ensure that appropriate management is delivered in a timely manner. This would also theoretically minimise missed results and help to alleviate patients' anxiety.
METHODS A specialist nurse conveys normal test results and counsels patients either via phone calls or clinic visits. Abnormal test results are fast-tracked into primary physicians' clinics for further management.
RESULTS The majority (89%) of cases referred to the NTC have normal results and most were contacted by the specialist nurse within 1–2 weeks. We found that the majority (86%) of patients preferred telephonic consultation as it was more convenient for them.
CONCLUSION As hypothesised, the NTC enhanced the timely disposition of results and fast-tracked abnormal results for appropriate intervention. The NTC also helped to optimise general cardiology clinics' slot utilisation. The NTC increased patient satisfaction and convenience, as the majority of patients preferred telephonic consultation over clinic visits when given the choice. No-show rates were reduced via screening of results prior to scheduled appointments. We observed that there is a rising trend of patients being more open to nurse-led clinics.

CATEGORY: NURSING

Student nurses' perception on the accessibility of electronic health records during clinical placements

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INTRODUCTION This study aimed to examine student nurses' access to the electronic health records (EHR) during clinical placements, factors affecting EHR accessibility, how EHR accessibility impacts their knowledge, communication and patient outcomes, and their perceptions toward EHR utilisation.

METHODS Nursing students from a Singapore university were recruited for this study. A concurrent mixed-method design was used with a cross-sectional, descriptive-correlative (quantitative) and a descriptive-qualitative (qualitative) design. In the quantitative design, a census sample of 235 nursing students were recruited and data was collected in the institution's lecture theatre using a self-reported questionnaire. Data analysis using descriptive statistics and simple linear regression was performed via SPSS v 24.0. In the qualitative design, a purposive sample of 25 nursing students were recruited, with four focus-group interviews conducted in the institution's meeting room and guided by an interview guide. Thematic analysis was employed to analyse the data.

RESULTS This study identified available EHR systems in Singapore, and benefits and challenges of EHR utilisation. One challenge was students' limited EHR accessibility due to insufficient computers, confidentiality measures and provision of student accounts. Students with EHR access reported better knowledge, patient outcomes and communication. They also perceived provision of student accounts to be beneficial.

CONCLUSION Among the perceived barriers, insufficient computers caused student nurses' level of EHR accessibility to be the lowest while system being down caused it to be the highest. Accessibility has a significant effect on knowledge, communication and patient outcomes, with knowledge being impacted the most and communication, the least. Future research can examine the impact of provision of student accounts on student nurses' competency after they pass out.

CATEGORY: NURSING

Nurses' perception of contributing factors and preventive measures on medication errors in the emergency department

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INTRODUCTION Medication errors (MEs) in the hospital are not only costly, but they also cause unintended harm to patients. Literature reviews have shown that one-quarter of errors occur in the administrative phase and could have been well prevented. A recent review revealed that the emergency department (ED) contributed to 20% of all nursing MEs at Ng Teng Fong General Hospital in the first half of 2017. As such, it is crucial to perform a cause analysis of errors to improve overall safety and quality of medication administration.

METHODS The medication team conducted a pre-survey among the ED nurses using a three-part questionnaire to assess their awareness of MEs by ranking these parameters – most common ME, most important contributing factor and most effective solution for prevention – based on individual perceptions. After analysis, multiple sharing sessions were conducted during the ED nurses roll call over two weeks. Subsequent occurrences of MEs were reiterated during roll call for a week, and the team's key performance index was displayed in the conference room to track ME-free days.

RESULTS Based on the pre-survey results, the questionnaire participants listed unknown allergy as the most common ME in the ED (29.8%), followed by dosage (28.9%), route (12.2%), patient's identity (11.4%) and wrong medication (7.8%). Contributing factors were ranked as follows: limited access to allergy status (37.4%); drug information (22.6%); and lack of communication among healthcare professionals (19.2%). The most effective preventive measure was perceived to be effective communication (33.3%), followed by raising awareness (22.8%) and training (18.4%).

CONCLUSION Through creating awareness of MEs among the ED nurses, promoting effective communication among healthcare professionals and improving the standardised work processes, the incidence of MEs was reduced.

Enhanced nursing compliance with speech therapist recommendations using an effective communication tool and a dysphagia kit for patients with oropharyngeal dysphagia

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INTRODUCTION This study aimed to assess if a multicomponent intervention helps to improve nurses' compliance with speech therapy recommendations when caring for patients with oropharyngeal dysphagia in Ward 14 of Ng Teng Fong General Hospital. The interventions include a bedside chart to communicate speech therapy recommendations, a dysphagia kit to aid the preparation phase and short in-service education sessions to improve knowledge. **METHODS** This was a quantitative, interventional pre-post study. Pre-intervention data collection was done using a two-part questionnaire adapted from a questionnaire by McCoullough et al (2007) to gather nursing staff's feedback about their compliance with speech therapy recommendations. An anonymous variable-measured audit was also done to gather data on their compliance, based on various aspects of speech therapy recommendations, such as correct utensil use, diet and fluid preparations – components suggested by Crawford et al (2007) and Rosenvinge et al (2005). In the multicomponent intervention, four short in-service sessions were held in Ward B14. Nurses were given a presentation about managing patients with oropharyngeal dysphagia. Communication chart, which included interchangeable components of speech therapy recommendations based on the six principles by Rosenvinge and Starke (2005), was prepared. The components were verified with the ward speech therapist. A dysphagia kit consisting of feeding utensils, such as teaspoons and a shaker for accurate preparation of thickened fluid, was also made available. Oral care requisites included oral swab sticks and cups. **RESULTS** Nurses were found to have poor compliance to speech therapy recommendations and reported frustration when caring for patients with oropharyngeal dysphagia. The intervention was found to be useful in helping to improve nurses' compliance. **CONCLUSION** Noncompliance to speech therapy recommendations when managing patients with oropharyngeal dysphagia can put patients at risk for health complications and jeopardise their safety. Our intervention has enhanced nurses' compliance. This should lead to improvement in patient care.

Enteral nutrition in neurology and neurosurgical patients: a prospective observational study on the extent of nutrition support and interruptions

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INTRODUCTION Enteral nutrition (EN) in patients with neurological injuries/disorders is often interrupted, resulting in suboptimal nutrition delivery. Previous studies documented that these patients meet approximately 60%–80% of their nutrition prescriptions during ward-based care. This study aimed to measure the extent of nutrition support and investigate reasons for its interruptions.

METHODS We performed a prospective, observational study of patients admitted to the neurology/neurosurgical ward in Ng Teng Fong General Hospital who had brain injuries and were prescribed EN (n = 54). Observational data on energy and protein delivered via EN was collected from May to November 2016. Energy and protein deficits were calculated as mean daily absolute difference between estimated requirements and actual intake from all enteral formulas fed. Deficits between energy (n = 45) and protein (n = 32) fed, and the respective patients' estimated energy and protein requirements were assessed using paired sample *t*-test. Reasons for interruptions to EN were investigated.

RESULTS Over the entire stay in the general ward, mean daily energy and protein intakes from enteral feeds were 1,339 (SD = 323) kcal and 57.4 (SD = 16.5) g, respectively. Compared against dietitian prescriptions, patients met an average of 87.1% (SD = 15.9%) of energy and 94.2% (SD = 19.5%) of protein. For both energy and protein, there were significant differences between the amounts prescribed for intake via EN and those eventually delivered (energy: 252 [SD = 239] kcal, p < 0.001; protein: 11.2 [SD = 11.2] g, p < 0.001). The reasons identified for interrupted feeding included imaging study, high gastric residual volume, gastrointestinal issues and others.

CONCLUSION In our cohort, the extent of nutrition support via EN and reasons for its interruptions are congruent with current literature.

Diabetes mellitus-related nutrition knowledge questionnaire: a tool to assess nutrition knowledge in individuals with type 2 diabetes mellitus or pre-diabetes mellitus in Singapore

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INTRODUCTION Patients with type 2 diabetes mellitus (T2DM) or pre-DM are often provided with DM-related nutrition knowledge (DRNK) to facilitate better food choices, but there are no local tools to measure their level of understanding. The aim of this study was to develop a questionnaire to objectively measure DRNK.

METHODS Following a literature review, a pool of potential questions relating to DRNK was compiled from an expert panel comprising three dietitians, an academic and a psychologist. The study was divided into three stages. Stage one involved assessing the user-friendliness and ambiguity of the first draft of the questionnaire. Stage two involved examining item difficulty, index of discrimination and internal consistency of the second draft. In stage three, the finalised questionnaire (DRNK-Q©) was examined for construct validity and test-retest reliability. The DRNK-Q was used to assess DRNK in a separate group of free-living individuals with T2DM.

RESULTS The questions were found to be user-friendly and comprehensible. The item difficulty and index of discrimination scores of the selected questions ranged from difficult to desirable (2–85) and from poor to very good (0.00–0.65), respectively. There was good overall internal consistency (Cronbach's alpha = 0.838), construct validity (independent *t*-test, p < 0.001) and test-retest reliability (intraclass correlation = 0.824–0.840). The final questionnaire consisted of 27 questions that were divided into four sections. In our study, subjects had fair DRNK scores (mean [SD] = 13 [4.50]).

CONCLUSION The DRNK-Q is a consistent and reliable measure of DRNK in patients with T2DM or pre-DM.

CATEGORY: ALLIED HEALTH

Establishing the prevalence and perception of tinnitus among Singaporean elderly population in the western part of Singapore

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INTRODUCTION Tinnitus is a common disorder of the auditory system and affects the general population. Severe tinnitus can potentially affect an individual's ability to lead a normal life. Numerous studies have been conducted globally to understand the prevalence and severity of tinnitus. However, none has been carried out in Singapore. This study examined the prevalence and risk factors of tinnitus and severe tinnitus in the elderly (aged ≥ 50 years) in Singapore.

METHODS The study involved a total of 594 participants recruited from the Ghim Moh planning subzone. Participants were identified from a door-to-door interview and two sets of standardised questionnaires were administered. These questionnaires consisted of selected sociodemographic and clinical factors, and questions adopted from four validated questionnaires: the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S); the National Health and Nutrition Examination Survey; the 12-Item Short Form Health Survey; and the Tinnitus Functional Index.

RESULTS Findings from the study revealed the prevalence of tinnitus and severe tinnitus to be 21.1% and 2.2%, respectively. Ethnicity and HHIE-S scores were found to be associated with tinnitus, while severe tinnitus was found to be associated with ethnicity, HHIE-S scores and emotional distress.

CONCLUSION Tinnitus is a prevailing problem in the Singapore elderly population. It is related to cultural and behavioural differences, as well as to auditory and emotional aspects. The association of tinnitus with reduced quality of life emphasises the need for clinicians to include appropriate management tools for this higher-risk group.

CATEGORY: ALLIED HEALTH

Estimating the sound intensity reaching the cochlea as a result of dental drilling

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INTRODUCTION A potential risk has been identified in patients undergoing dental procedures – those receiving treatment under the dental drill are exposed to sound from the drill via the bone conduction pathway. This sound exposure could potentially lead to noise-induced hearing loss (NIHL) and/or tinnitus among such patients. This study aimed to develop and test a method to measure the amount of sound energy from dental drilling reaching the cochlea via bone conduction.

METHODS A total of 25 participants with hearing thresholds no worse than 20 dB HL were analysed. To simulate dental drilling, white noise (masking sound) was presented through the mastoid via bone conduction at 50 dB HL. Simultaneously, a pure tone was presented via air conduction to the ipsilateral ear. The tone was manually increased by 5-dB steps until it was at a just-audible level above the masking sound. The intensity of the tone required to be detected just above the level of the masking sound should be an estimate of the intensity of the masking sound as they reach the cochlea. The method was tested on four participants with hearing thresholds no worse than 25 dB HL in the ear on the surgical side of the lower jaw. Participants were patients who underwent wisdom tooth surgery.

RESULTS The results from the simulation showed that the average masked threshold was 53.4 (SD = 7.5) dB HL. The masked thresholds measured against the actual dental drill sound ranged between 75 dB HL and 110 dB HL (median = 87.5–95.0 dB HL).

CONCLUSION The method is a simple and reliable technique of estimating bone-conducted sound levels. The amount of sound energy reaching the cochlea from dental drilling was above the safe sound levels of 85 dBA and could cause damage to the ears over a prolonged duration of exposure. Dental drill-generated sounds must be looked upon as risks of potential damage to the cochlea.

CATEGORY: ALLIED HEALTH

Performances of the Acute Physiology and Chronic Health Evaluation and the Sequential Organ Failure Assessment in the prediction of hospital mortality in a mixed intensive care unit in Singapore

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INTRODUCTION The Acute Physiology and Chronic Health Evaluation (APACHE II) and the Sequential Organ Failure Assessment (SOFA) are commonly used in the intensive care unit (ICU) to predict hospital mortality, but their accuracy in the Singapore context remains questionable, since they have never been validated locally with established statistical methods. This study aimed to validate the performances of these assessment methods in predicting hospital mortality in a 35-bed mixed ICU.

METHODS All adult ICU patients who had ≥ 24-hour length of stay, and admitted between August 2015 and October 2016 were included. Data was prospectively recorded in the electronic medical records and the outcome of interest was hospital mortality.

RESULTS There were 503 patients (medical = 335; surgical = 168) and their mean age was 61.2 ± 15.8 years. 89.9% of the patients received mechanical ventilation. Hospital mortality was 31.0% and no patient was lost to follow-up. Mean APACHE II and SOFA scores were 24.5 ± 8.2 and 8.6 ± 3.8, respectively. Both scores had good discrimination; the areas under the receiver operating characteristic curve for APACHE II and SOFA were 0.755 and 0.712, respectively. Calibration for the APACHE II was poor (Hosmer-Lemeshow C [HL-C] test, $\chi^2 = 147.02$; p < 0.001) and its calibration curve demonstrated an overestimation of risk at all deciles. However, calibration for the SOFA was good (HL-C test, $\chi^2 = 4.02$; p = 0.675). According to the Brier score, the APACHE II and SOFA had very poor overall accuracy of prediction (0.22 and 0.19, respectively).

CONCLUSION The overall validity of the APACHE II and SOFA in predicting hospital mortality was poor and one must exercise caution when using them for any clinical decision or quality evaluation. There is a dire need to recalibrate the APACHE II or develop a new prognostic model specifically for the local ICU population.

CATEGORY: ALLIED HEALTH

The association between malnutrition and mortality outcomes among the critically ill: a cohort study and meta-analysis

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INTRODUCTION This study aimed to determine the association between malnutrition and hospital mortality among the critically ill via a large prospective cohort study and meta-analysis.

METHODS Between August 2015 and October 2016, all patients who had ≥ 24 hours length of stay in a 35-bed mixed intensive care unit (ICU) had their nutritional status assessed within 48 hours of ICU admission. The outcome of interest was hospital mortality. For the systematic review, a literature search was performed on August 2014 in four large databases. Eligible studies were cohort studies that assessed patients' nutritional status within 48 hours of ICU admission and reported mortality outcomes.

RESULTS There were 439 patients (medical = 293; surgical = 156) and their mean age was 61.4 ± 15.8 years. Mean Acute Physiology and Chronic Health Evaluation score was 24.5 ± 8.1. Hospital mortality was 29.6% and no patient was lost to follow-up. The prevalence of malnutrition was 27.6%. After adjusting for important covariates, malnutrition was found to be independently associated with hospital mortality (adjusted OR 3.38, 95% CI 1.77–6.44; p < 0.001). Literature search conducted for the meta-analysis revealed 20 eligible studies (out of 1,168 studies), but only one study by Fontes et al (2014) had low risk-of-bias and was suitable for data pooling (n = 185; adjusted OR 8.12, 95% CI 2.94–22.42). The pooled adjusted OR for the association between malnutrition and hospital mortality was 4.78 (95% CI 2.06–11.07; p = 0.003; $I^2 = 51\%$).

CONCLUSION There is a clear association between malnutrition and hospital mortality in critically ill patients. Therefore, nutritional status should be considered along with other conventional prognostic variables to better predict hospital mortality.

The Subjective Global Assessment and Nutrition Risk in Critically ill score should both be used in the intensive care unit

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INTRODUCTION The modified NUTrition Risk in Critically ill (mNUTRIC) score and the Subjective Global Assessment (SGA) are both predictive of mortality among intensive care unit (ICU) patients. This study aimed to determine the agreement between both tools, and compare their ability in discriminating and quantifying mortality risk independently and in combination.

METHODS Between August 2015 and October 2016, all ICU patients in a Singapore tertiary care facility received nutritional assessment (i.e. SGA) from the dietitian within 48 hours of ICU admission. Nutritional status was dichotomised as presence/absence of malnutrition. The mNUTRIC score of patients who had ≥ 24 hours of ICU length of stay were retrospectively calculated at the end of the study, and high mNUTRIC was defined as scores > 5.

RESULTS There were 439 patients enrolled in this study, of whom 67.9% had high mNUTRIC whereas only 28.0% were malnourished (via SGA). Hospital mortality was 29.6% and no patient was lost to follow-up. Although both tools had poor agreement (κ = 0.13; p < 0.001), they had similar discriminative value for hospital mortality (C-statistic [95% CI], high mNUTRIC: 0.66 [0.62–0.70]; malnutrition: 0.61 [0.56–0.66]; p = 0.12). However, high mNUTRIC was more significantly associated with hospital mortality than malnutrition (OR 5.32, 95% CI 2.15–13.17; p < 0.001 vs. OR 4.27, 95% CI 1.03–17.71; p = 0.046). Combination of both tools showed the greatest association with hospital mortality (OR 14.43, 95% CI 5.38–38.78; p < 0.001).

CONCLUSION Individually, the mNUTRIC and SGA provided a fair discriminative value for hospital mortality, although there was poor agreement for this outcome. However, the combination of these approaches is a better discriminator to quantify mortality risk.

Chronic obstructive pulmonary disease patients want information about their condition

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INTRODUCTION This study aimed to: (a) investigate the needs and experiences of patients with severe chronic obstructive pulmonary disease (COPD) and their caregivers; and (b) analyse existing post-discharge interventions initiated by acute hospitals.

METHODS A literature search on Google Scholar and PubMed was done with the following terms: 'COPD'; 'post-discharge'; 'caregiver'; 'support'; 'social'; 'needs'; 'care-coordination'; 'home-visits'; and its permutations. Articles were included if they covered the needs of patients with COPD, the experience of caregivers of patients with COPD and/or discharge support programmes for patients with COPD that were started by the hospital from which the patient was discharged. The articles were then categorised into three categories: (a) experiences of patients with COPD; (b) interventions to support patients with COPD after discharge; and (c) experiences of caregivers of patients with COPD. All study designs were included in the search.

RESULTS Patients and their caregivers ranked information needs as the most important to them. They wanted to know about their prognosis and disease progression. Patients also desired advanced care discussions and these discussions were seen as an opportunity to obtain information about their condition.

CONCLUSION Patients with COPD seek information about their condition. Advanced care planning should be seen as an opportunity for provision of information.

CATEGORY: ALLIED HEALTH

A pilot study of patients with chronic obstructive pulmonary disease and their advanced care planning preferences

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INTRODUCTION This study aimed to find out whether advanced care planning (ACP) preferences of patients with chronic obstructive pulmonary disease (COPD) were carried out during the end-of-life process. There is little research on how ACP relates to the actual experiences of patients and their caregivers at the end of life. This study hypothesised that ACP helps patients to fulfil their preferences during the end-of-life process.

METHODS A retrospective cross-sectional analysis was done by checking past medical records for ACP records. We also checked all the discharge summaries filed after the ACP discussion was completed to determine if cardiopulmonary resuscitation, intubation or intensive care unit interventions were carried out for the patients.

RESULTS Out of 505 patients on the COPD integrated care pathway, only 31 were found to have ACP. Of these 31 patients, 14 were alive and 15 were deceased at the time of study. All of the 31 patients had their ACP wishes respected. Two patients who had passed on had three out of four wishes carried out. The preference that was not carried out was their location of death; both patients passed on in the hospital instead of their own homes.

CONCLUSION ACP helps patients with COPD to fulfil their preferences for care during the final stages of their illness. A limitation of this study is that it is unclear if the clinicians adhered to the patient's wishes by tracing the patient's ACP record in the system during each admission, discussing with family members or asking the patient directly.

CATEGORY: ALLIED HEALTH

Social factors associated with chronic obstructive pulmonary disease readmissions

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INTRODUCTION This study sought to verify key social factors identified in the literature influencing readmission of patients with chronic obstructive pulmonary disease (COPD) in Singapore. The likes of this study have not been performed in the Singapore context. This study is, to our knowledge, the first in exploring the role of social influences in the readmission of patients for COPD exacerbation in the Singapore population. It is a small retrospective cross-sectional pilot study to identify key social influences and explore the feasibility of following up with a larger prospective study subsequently.

METHODS A list of patients presenting with COPD exacerbation who were readmitted more than once in 30 days at Ng Teng Fong General Hospital (NTFGH) was generated every month. Patients from a compiled list of 12 months (between May 2016 and April 2017) were included. Patients who were deceased or not known to the medical social worker were excluded. 25 unique patients were included in the final sample. Data was collected from patient charts and medical social worker inputs in the case notes.

RESULTS The majority of patients were elderly men and came from low-income households. One in four patients who frequently readmitted to NTFGH for COPD exacerbation lived in rental housing.

CONCLUSION This study supports the literature that patients from lower socioeconomic status have poorer health outcomes. The study also found that in the Singapore context, patients with COPD who live in rental housing form a vulnerable group. Further studies can be undertaken to explore the relationship between rental housing and health outcomes.

CATEGORY: ALLIED HEALTH

Does video-based training improve occupational therapists' inter-rater reliability in scoring the Modified Barthel Index?

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INTRODUCTION The Modified Barthel Index (MBI) is the standardised outcome measure used by the local Ministry of Health to evaluate improvements in patient function after community rehabilitation. Inconsistency in MBI scoring among occupational therapists (OTs) can lead to incorrect outcome reporting, especially when OTs hand over patients due to leave or rotations. This study aimed to determine if video-based training leads to sustained improvement of Jurong Community Hospital (JCH) OTs' inter-rater reliability in scoring the MBI.

METHODS 11 patients were video-recorded while performing activities of daily-living as per routine occupational therapy initial assessments. Five patient videos were selected for testing. 13 OTs (participants of this study) scored the MBI for these five patients at three timepoints: pre-training (T1); one week post-training (T2); and four months post-training (T3). Training sessions involved participants discussing discrepancies in their MBI scoring of the remaining six patient videos. Interpretations of item descriptors were discussed and standardised. Inter-rater reliability was measured using intraclass correlation coefficient (ICC) type 2,1. ICCs for each MBI item and the total MBI score, at each timepoint, were calculated using the Statistical Package for the Social Sciences and analysed.

RESULTS T1 ICCs (range 0.640–0.915) indicated that participants had good (0.5–0.74) to excellent (> 0.74) baseline inter-rater reliability in scoring MBI items. ICCs across all MBI items, except 'ambulation', increased by 0.007 to 0.215 (mean 0.076) from T1 to T2. Three items ('transfers', 'toileting' and 'bathing') showed significant ICC improvements, resulting in excellent inter-rater reliability at T2 for all MBI items (ICCs range 0.743–0.939). While 'transfers' and 'toileting' had further ICC improvements at T3, other items, except 'dressing', had T3 ICCs below their corresponding T2 ICCs but above their corresponding T1 ICCs. At all timepoints, ICCs of the total MBI score were above 0.9, indicating excellent inter-rater reliability among participants in overall scoring of the MBI.

CONCLUSION JCH OTs scored the MBI with good-to-excellent baseline inter-rater reliability, which improved with video-based training. However, some improvements were not sustained four months after training. Periodical refresher training sessions may be beneficial.

CATEGORY: ALLIED HEALTH

Functional characteristics of lower limb muscles in recreational runners with chronic lower back pain

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INTRODUCTION This study aimed to investigate lower limb isokinetic strength in runners with chronic lower back pain (LBP).

METHODS 18 recreational runners (9 males, 9 females) with mean age of 27.8 (SD 5.6) years who experienced chronic LBP and 18 healthy runners (9 males, 9 females) with mean age of 24.6 (SD 3.5) years were recruited in a retrospective cross-sectional study. Lower limb isokinetic strength, peak concentric torque of bilateral hip extensors and abductors, and knee extensors were measured using an isokinetic dynamometer at 60°/second. The peak torques were normalised to individuals' body mass by ratio scaling. A general linear model with repeated measures was used to detect differences in the lower limb strengths between the chronic LBP and healthy runners (between-subject factor: LBP condition; within-subject factor: side of the body; covariate: age).

RESULTS The LBP group presented reduced lower knee extensors peak torque compared to the control group (dominant side: 2.19 [SD 0.43] Nm/kg vs. 2.49 [SD 0.39] Nm/kg, non-dominant side: 1.96 [SD 0.38] Nm/kg vs. 2.41 [SD 0.36] Nm/kg; $F[1, 35] = 6.72$; $p = 0.02$). There was no significant difference found between the groups in hip extensor and abductor isokinetic strength.

CONCLUSION Chronic LBP runners showed reduced knee extensor isokinetic strength. Assessing knee extensor strength may contribute to the screening, diagnosis and rehabilitation of chronic LBP runners.

Managing medications: the prevention of medication stockpiling by empowering patients to maintain a medication list

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INTRODUCTION This study aimed to decrease the prevalence of oversupply of medications, which can potentially reduce the overall healthcare expenditure by saving in medication cost and minimising medication wastage. In addition, this is targeted to improve patient turnaround time at the pharmacy.

METHOD Patients with more than one chronic medication and excessive stock of medications were identified. Shortlisted patients were educated by pharmacy staff to record the balance quantity of their chronic medications using the medication list provided. Patients were reminded to drop off this list at the pharmacy before attending consultation. Upon receipt of the electronic prescriptions, pharmacy staff will pack and supply medications based on existing patient supplies (to last till the next appointment) prior to patient arrival at the pharmacy. The number of medication lists given out and returned was tracked. Cost-savings with each returned medication list were also recorded.

RESULT An average of 120 medication lists per month was given out over a period of six months. There was a steady increase in the number of patients presenting at the pharmacy with completed medication lists prior to clinic visit; there was a tenfold increase since the start of the initiative. Total cost-savings during the study period for these patients amounted to SGD 4,769.65.

CONCLUSION The initiative has proven to save medication cost for patients. Based on the increase in number of returned medication lists, patients appear receptive to this initiative. Time-saving is expected as reworks due to patient request for reduced supply of medication on dispensing is reduced. Further measures, such as administering a questionnaire, may be considered to assess additional benefits for patients, such as having fewer expired medications.

Reducing patient waiting time in outpatient pharmacy through the optimisation of manpower allocation and workload during lunchtime

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INTRODUCTION Most of the medications for patients from Ng Teng Fong General Hospital's specialist outpatient clinics are packed in the hospital's main outpatient pharmacy before they are delivered to satellite pharmacies, on various clinic floors, via pneumatic tubes. Manpower distribution to cope with lunchtime workload has always been a challenge in the main outpatient pharmacy. This study aimed to: (a) optimise manpower in the main outpatient pharmacy to cope with workload during lunchtime; and (b) evaluate if reducing non-urgent work during lunchtime helps with reducing patient waiting time.

METHODS In the experimental arm, manpower in the main outpatient pharmacy was divided into three groups – two were allocated to the busier lunch hour and the last, to the less busy lunch hour. In the control arm, manpower was divided equally between the two lunch hours. Both arrangements were run for one week and mean patient waiting times were compared. Packing of medications for satellite pharmacies during lunch hour was restricted until the patient arrives at the pharmacy. For control, no restrictions were placed. Both experiments were run for one week and mean waiting times for all pharmacies were compared.

RESULTS A mean decrease of 0.88 minutes (range –1.8 minutes to 2.9 minutes) in patient waiting time for the experimental group was observed only on days with renal clinic, as compared to the control group's mean patient waiting time. No significant differences in mean patient waiting times were found between the experimental and control groups in restriction of packing of medications for satellite pharmacies.

CONCLUSION Optimisation of manpower during lunchtime is slightly beneficial on days with renal clinics, as it reduces patient waiting time. However, waiting time is not significantly shortened by reducing non-urgent work.

CATEGORY: ALLIED HEALTH

Reducing prescriptions ordered in the wrong encounter in dental clinics

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INTRODUCTION This study aimed to reduce billing errors resulting from prescriptions being ordered in the wrong encounter. Such errors cause waste due to reworks. Man-hours are used in an unproductive manner to process refunds and errors also negatively impact patient experience.

METHODS Baseline data on the prevalence of prescriptions ordered in wrong encounters was collected in Weeks 3 and 4 of December 2016 and presented to the dental clinic executive, who acted on the data by emailing the dentists regarding the errors and gave them the guide to order medications under the correct encounter. A simple guide was also printed and placed in the consultation rooms for easy reference when ordering medications. Data was collected again in Weeks 3 and 4 of January 2017 to measure the effectiveness of the steps taken.

RESULTS Baseline data showed 100% of dental prescriptions, which should have been ordered in inpatient encounter, were ordered wrongly in outpatient encounter. After communicating with the dentists and providing the guide on ordering medication in the correct encounter, 93% of the prescriptions were ordered in the correct encounter, leading to fewer billing errors and subsequent reworks.

CONCLUSION Intra-departmental collaboration between pharmacy, operations and dentistry staff led to prompt and effective actions taken. With charges flowing into the correct encounter, incidences of patients being billed wrongly and their consequences were averted.

CATEGORY: ALLIED HEALTH

Improving packing efficiency by pre-packing medications in the outpatient pharmacy

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INTRODUCTION This study aimed to improve and maximise packing efficiency of medications, potentially allowing more efficient mobilisation of manpower to perform other tasks (e.g. dispensing and prescription-checking) during peak periods.

METHODS Monthly dispensing data from the iPharm module was analysed. Medications and corresponding quantities that were most commonly dispensed were identified. A trial was carried out with dental prescriptions, which consisted of similar medication combinations. Subsequently, pre-packing was expanded to medications requiring more time-consuming packing processes. Weekly top-up of pre-packs was based on the previous week's dispensing data. Pharmacy staff was informed about the pre-packing initiative during roll calls. Data on utilisation of pre-packed medications was collected. Packing time-savings were tabulated and staff feedback regarding the pre-packing initiative was gathered using a four-point scale, close-ended questionnaire.

RESULTS A high usage of pre-packed medications was observed, where 9 out of 14 medications had ≥ 75% utilisation rate. Time-savings of up to 76% was observed, with 80% of the medications having ≥ 40% improvement in packing times. This is especially significant since pre-packing takes place during lull period but benefits are reaped during peak timings at the pharmacy. There is also consensus for continuous review of the list of pre-packed medications depending on changes in prescribing patterns.

CONCLUSION Pre-packing of commonly packed medications, especially those with additional packing requirements (e.g. cutting of blister packs, manual labelling of expiry dates), improved packing efficiency during busy periods. Coupled with receptiveness of pharmacy staff to aid with medication pre-packing, this initiative proves to be potentially sustainable in the long run.

CATEGORY: ALLIED HEALTH

Pharmacist interventions in a community hospital with electronic prescribing system

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INTRODUCTION This study aimed to elucidate the potential benefit of pharmacist-based medication review in a community hospital setting that utilises electronic prescribing with clinical decision support systems.

METHODS A retrospective analysis of pharmacist interventions made over a five-month period was carried out. Interventions documented by ward pharmacists from October 2015 to February 2016 were extracted from the electronic prescribing system and analysed. Duplicate interventions and interventions for operational issues were omitted.

RESULTS Over the five-month period, a total of 1,205 interventions were made, with an acceptance rate of 81%. Among the interventions, discontinuation of medication (n = 294) ranked highest – 31% of orders were stopped due to a lack of prevailing indications, 30% due to inappropriate durations, 28% due to therapeutic duplications and 11% due to relative drug contraindications or side effects.

The second highest category concerned drug administration. Of 237 interventions made, 61% corrected transcription errors, while 33% prevented missed or duplicate doses by adjustment of administration schedule. 185 recommendations were accepted for optimisation of pharmacotherapy while 98 were accepted for dose adjustments. 79 interventions optimised drug therapy through changes in dosage forms, route or timing of administration. 31 recommendations were accepted for laboratory monitoring while another 28 for more cost-effective alternatives. Of note, 72 accepted interventions involved high-alert medications.

CONCLUSION Pharmacist-based medication review in a community hospital can contribute to patient care by streamlining medication reconciliation during care transition, preventing medication administration errors, and through optimisation of chronic disease management following acute illness.

CATEGORY: ALLIED HEALTH

Promoting a weight management programme for at-risk individuals

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INTRODUCTION The 2010 National Health Survey estimated 55.3% of the population to be overweight or obese. Research has shown that a 5%–10% weight loss can significantly reduce cardiovascular risks associated with obesity. Our hospital runs a 16-week medical weight management programme for identified at-risk individuals. The aim of this study was to evaluate the performance of the programme, particularly among participants with a 'very high risk' body mass index (BMI) ($\geq$ 32.5 kg/m²).

METHODS The programme recruited participants aged 16–65 years with 'moderate risk' BMI (23.0–27.4 kg/m²) with comorbidities or 'high risk' BMI ($\geq$ 27.5 kg/m²). Participants must not have any psychological issues or severe pain that limited their mobility. Each participant underwent 16 weeks of structured weight loss programme managed by a multidisciplinary team of physicians, dieticians, physiotherapists, strength and conditioning coaches, and occupational therapists. There

were 87 participants who completed the programme since 2013 across two hospital sites in the western region of Singapore.

RESULTS Overall, the participants' mean weight loss after intervention was 4.81% (95% CI 4.00%, 5.62%). 58.6% of participants who completed the programme initially had 'very high risk' BMI; their post-intervention mean weight loss was 4.41% (95% CI 3.30%, 5.53%), which was statistically significant (p < 0.001). The 'high risk' BMI and 'moderate risk' BMI groups achieved 4.92% (95% CI 3.66%, 6.18%) and 6.98% (95% CI 3.45%, 10.51%) mean weight losses, respectively, and both results were statistically significant (p < 0.01).

CONCLUSION The programme can be effective in achieving significant weight loss and reducing risks of cardiovascular diseases. This is evident even for individuals with 'very high risk' BMI. Further health promotion efforts should be encouraged to improve participation in weight management programmes among the local population.

CATEGORY: ALLIED HEALTH

A qualitative study of how physiotherapists acquire management skills as they transition from a clinical role to a managerial role

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INTRODUCTION Previous studies have not specifically examined how physiotherapists acquire management skills during role transition. This research explored how physiotherapists currently acquire management skills. A theory that attempts to explain how this occurs is developed and recommendations to improve role transition are formulated.
METHODS Semi-structured interviews obtained qualitative data from eight purposively sampled physiotherapists. Physiotherapists who were a senior grade or above were included due to the managerial responsibilities in such positions. A constructivist-grounded theory approach involving the constant comparative method of analysis was deemed suitable due to the exploratory nature into participants' beliefs and understandings. For theoretical sensitivity, secondary data was collected from current sources including research, journals, academic literature and professional regulatory bodies.

RESULTS An analysis using the iterative process of coding and category formation from interview transcripts indicated that physiotherapists seem to acquire management skills using a combination of experience, support, and reflection. This research developed a model entitled, "Fountain of management skills acquisition for physiotherapists" to show the interactions and process of these findings. Our findings helped to formulate recommendations that suggested how to provide early integration of managerial responsibilities, facilitative supervision supported by a network of peers and learning opportunities, and effective use of current management-specific resources in tandem with critical reflection.
CONCLUSION This research suggests that management skill acquisition is a dynamic, complex and flexible learning process, used from a combination of experience and support structures. These are sorted, filtered and made sense of via the practice of critical reflection. Recommendations could help to improve managerial abilities and better prepare successors.

CATEGORY: ALLIED HEALTH

A prospective observational cohort study to determine the modified Iowa Level of Assistance score required for appropriate discharge destination of patients with total knee replacement in Singapore: a protocol

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INTRODUCTION Patients on the total knee replacement (TKR) pathway at Ng Teng Fong General Hospital (NTFGH) have their discharge destinations predicted preoperatively by the Risk Assessment and Prediction Tool (RAPT). While the RAPT is validated in predicting discharge disposition, studies have shown postoperative variability in recovery. Evidence is lacking in evaluating whether preoperative predictions result in objective improvements during postoperative recovery. This study aims to investigate if postoperative administration of an objective functional outcome measure, the modified Iowa Level of Assistance Scale (mILOA), is able to improve prediction of discharge destination.
METHODS This prospective observational cohort study will recruit 100 consecutive patients undergoing unilateral elective TKR in NTFGH. Patients undergoing revision or bilateral TKR will be excluded. All patients will have their RAPT scored preoperatively.

Patients will receive once-daily physiotherapy treatment as routine care until discharge. Patients will be discharged either home with outpatient follow-up or to extended rehabilitation. The mILOA will be scored on the second day after operation as baseline and one week after discharge. The minimal clinical important difference of mILOA is five points. Categorisation of correct and incorrect destinations will be determined through RAPT score and change of mILOA. Binary regression analysis will be performed to evaluate the factors influencing the accurate categorisation of the patients. Receiver-operating characteristic curves and the Youden index will illustrate the optimal cut-off score of baseline mILOA required to indicate discharge destinations.
DISCUSSION This study will demonstrate whether a postoperative objective outcome measure improves accuracy of discharge destination.

CATEGORY: ALLIED HEALTH

The effects of the JurongHealth pharmacy outreach programme on hospital readmissions and cost-savings

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INTRODUCTION This study aimed to investigate the effects of the JurongHealth pharmacist outreach programme (POP) on the frequency and length of stay (LOS) of hospital readmissions, non-admission emergency department (ED) visits and costs to the patient.

METHODS In this retrospective cohort study, we evaluated records of patients recruited into the POP between July 2015 and December 2016. The primary outcome was the frequency and LOS of hospital readmissions and non-admission ED visits before and after the first home visit at one, three and six months. The secondary objective was the cost incurred by patients from these admissions and ED visits at the same timepoints. Data was presented as mean (SD).

RESULTS The analysis included 96 patients with a mean age of 74.5 (12.4) years. Hospital readmissions, LOS and cost showed statistically significant reductions at one, three and six months

after the first home visit (p < 0.001). Mean hospital readmissions decreased from 1.17 (0.85) to 0.40 (0.79) at one month, and from 2.99 (2.33) to 1.69 (2.34) at six months after the first home visit. Mean LOS of each patient decreased from 7.09 (7.12) to 2.91 (6.10) at one month, and from 19.22 (19.24) to 10.79 (16.73) at six months after the first home visit. Mean cost of hospital readmissions and ED visits per patient decreased from SGD 1,335.13 (SGD 1,303.80) to SGD 324.41 (SGD 672.63) at one month, and from SGD 3,249.33 (SGD 3,030.05) to SGD 1,384.75 (SGD 2,338.10) at six months after the first home visit.

CONCLUSION Pharmacist-led home visits were able to improve the patient's clinical outcomes by reducing hospital readmissions and LOS. It has also been demonstrated to save costs for the patient and resources for the hospital.

CATEGORY: ALLIED HEALTH

Nutrition status and hospital length of stay in patients undergoing gastrectomy

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INTRODUCTION Malnutrition and its associated consequences are significant issues for patients undergoing gastrointestinal surgery. It is likely that malnutrition in these patients leads to adverse clinical outcomes. This study aimed to investigate if poor nutrition status in patients who have undergone gastrectomy leads to an increased hospital length of stay (LOS) and postoperative complications.

METHODS Patients admitted for a total or subtotal gastrectomy and referred to a dietitian over a period of 19 months from January 2016 to July 2017 underwent a medical history audit assessing nutrition status (using the Subjective Global Assessment), use of parenteral and enteral nutrition, presence of postoperative complications and LOS. Only survivors were considered in the analysis to account for the competing risk of death on LOS.

RESULTS 31 patients (22 males, 9 females) with a mean age of 67 (SD 8) years were included, of whom 12 (38.7%) were malnourished before surgery. Three patients died during their hospital admission and 14 (45.2%) required parenteral or enteral nutrition support after surgery. Malnourished patients were more likely to develop postoperative complications (50.0% vs. 31.6%) but this was not statistically significant (p = 0.26). The median LOS for malnourished patients was more than twice of that for patients who were well nourished (21.5 [IQR 14.0–41.0] days vs. 9.0 [IQR 7.0–13.0] days; p = 0.02).

CONCLUSION Malnutrition is prevalent among patients undergoing gastrectomy. Poor nutrition status remains significantly associated with a longer LOS. Further research studying the effects of nutrition support before and after surgery is warranted to improve care in this group of patients.

CATEGORY: ALLIED HEALTH

An evaluation of a chronic disease self-management programme

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INTRODUCTION Several studies have demonstrated the potential of self-management in improving health in patients with chronic diseases. This study aimed to evaluate the outcomes of a chronic disease self-management programme (CDSMP) in Singapore.

METHODS The Better Choices, Better Health™ CDSMP is a six-week, small group intervention attended by people with different chronic conditions. Workshops are facilitated by two trained leaders from the allied health profession. Health behaviour, health status and healthcare utilisation are assessed at baseline and at six months via self-administered questionnaires.

RESULTS 129 participants completed the baseline questionnaire while 75 participants returned for the six months post-intervention questionnaire. At six months, participants in the programme had statistically significant improvements in self-rated health score (3.38 [SD 1.04] vs. 2.29 [SD 0.88]; p = 0.01), quality of life score (pain: 1.66 [SD 0.57] vs. 1.51 [SD 0.50]; p = 0.04; anxiety: 1.32 [SD 0.53] vs. 1.11 [SD 0.31]; p < 0.01), symptoms score based on fatigue, pain, stress, shortness of breath and sleeping (2.83 [SD 2.06] vs. 2.22 [SD 1.72]; p < 0.01) and feelings (tiredness: 0.85 [SD 0.96] vs. 0.43 [SD 0.64]; p < 0.01; concentration: 0.28 [SD 0.60] vs. 0.09 [SD 0.30]; p = 0.03). Participants also reported that their health issues interfered less in their normal activities (0.74 [SD 1.07] vs. 0.42 [SD 0.90]; p = 0.04) and hobbies (0.85 [SD 1.18] vs. 0.45 [SD 0.86]; p = 0.01).

CONCLUSION Patients experienced statistically significant improvements in a variety of health outcomes six months after the programme. The CDSMP can be an effective way to manage chronic diseases in the community.

CATEGORY: ALLIED HEALTH

Weight-prediction equations in adults in the clinical setting: a systematic review

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INTRODUCTION Weight is an important parameter to evaluate many clinical interventions. However, it is not always possible to weigh patients accurately in the clinical setting. No standardised adult weight-estimation tools are currently available locally. This review aimed to synthesise the existing literature on methods of predicting weight in an adult population.

METHODS We conducted a literature review using PubMed, Cochrane, CINAHL and Google Scholar databases. The following search terms were used: 'weight'; 'estimation'; 'formulae'; 'predicting'; 'approximation'; and its associated MeSH terms. Studies were excluded if they were not conducted in human adults, measured body composition or ideal body weight, or examined weights estimated only via subjective means.

RESULTS 21 studies that met the inclusion criteria were found. Most weight-prediction formulae used a combination of the following ten anthropometric measurements: tricipital skinfolds (n = 2); height (n = 7), knee height (n = 4); and leg length (n = 1), and circumferences: waist/abdominal (n = 6); thigh (n = 3); mid-arm/arm (n = 14); chest (n = 1); calf (n = 6); and hip (n = 5). Most (76%) of the studies were conducted in a hospital setting. Few studies (24%) were done in an Asian population. Studies using the Bland-Altman plot revealed a good agreement between the prediction equations and actual weight.

CONCLUSION Weight-prediction equations seem to be a promising alternative when weighing is not possible. Equations using anthropometric measures are able to predict weight accurately in adults. However, few equations are validated in the Asian inpatient population. Hence, future research is warranted in order to validate and apply these equations in the local setting.

CATEGORY: ALLIED HEALTH

Optimising laboratory efficiency through automation: an evaluation of automated body fluid cell count analysis on the haematology analyser Sysmex XN-10™

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INTRODUCTION Our study aimed to evaluate the performance of automated body fluid cell count analysis using the Sysmex XN-10™ in comparison to the existing haemocytometer manual cell count method.

METHODS Imprecision, limit of quantitation, linearity and carryover studies were evaluated using patient body fluid samples of different concentrations for white blood cells (WBC), total nucleated cells (TNC) and red blood cells (RBC) parameters. WBC, TNC and RBC counts of 64 body fluid samples consisted of 35 serous fluids, 16 cerebrospinal fluids and 13 joint fluids were analysed on the Sysmex XN-10 and then compared with the manual cell count analysis.

RESULTS Imprecision studies for TNC, WBC and RBC were satisfactory, with the coefficient of variation ranging from 2.8% to 10.0%. Linearity for WBC and TNC was verified over the range of 2–10,000 cells/uL and RBC over 1,000–5,000,000 cells/uL. No significant carryover was detected. Both automated and manual methods showed good agreement for WBC, TNC and RBC counts, with R^2 ranging from 0.908 to 0.983 for all sample types.

CONCLUSION Our evaluation results show that the performance of automated body fluid cell count on Sysmex XN-10 is satisfactory and superior to the manual cell count method as it has a shorter turnaround time and improved precision by reducing inter-observer variability.

CATEGORY: ALLIED HEALTH

Reducing delivery times of emergency blood products through pneumatic tube systems

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INTRODUCTION In our hospital, emergency blood products are transported to the requesting locations by porter manually. The aim of this project was to assess the possibility of using the pneumatic tube system (PTS) to improve delivery time without compromising blood product quality.

METHODS A total of seven units of thawed fresh frozen plasma (FFP) and 14 units of packed red blood cells (pRBC) were subjected to PTS transportation between blood transfusion services and critical care locations including the emergency department, main operating theatres and intensive care units. The following parameters were measured: PTS transit time; product temperature; product integrity; haemolysis percentage of pRBC; and incidences of misdirected delivery. The following criteria were set as a cut-off for the measured parameters: transit time < 10 minutes; product temperature maintained at ≤ 10°C, haemolysis percentage < 1% (based on the US Food and Drug Administration guidelines); no physical changes occurred on blood products; and arrival at the correct destination. Mann-Whitney *U* test was used to compare the transport time between the PTS and manual portering system.

RESULTS Mean transport time using PTS was significantly reduced compared to that using the manual portering system (5 min 24 sec vs. 10 min 19 sec; p < 0.05). All products arrived at the desired locations and the temperature was ≤ 10°C. The highest degree of haemolysis was 0.52%. All products passed the physical check with no incidence of misrouted delivery.

CONCLUSION The application of the PTS in delivering blood products has significantly shortened transport time while maintaining the quality of blood products.

An evaluation of a highly automated capillary electrophoresis system for serum protein electrophoresis

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INTRODUCTION The objective of this study was to evaluate the performance of a highly automated capillary electrophoresis instrument, the Sebia CAPILLARYS 2, for the assessment of monoclonal gammopathies.

METHODS Serum imprecision, carryover, interference and concordance studies were performed and compared to the Sebia HYDRASYS conventional agarose gel electrophoresis and immunofixation (IF). Imprecision was assessed using hypergamma control and normal pooled sera in triplicates over five days. Carryover was done using high concentration of gamma-globulins followed by low gamma-globulins. The interfering effect from fibrinogen from plasma samples and haemolysis was also evaluated. Interpretation of serum protein electrophoresis (SPE) and IF were compared with results from reference laboratory for 61 samples and 41 samples, respectively.

RESULTS The imprecision for hypergamma control and normal pooled sera were acceptable, with the coefficient of variation ranging from 2% to 7%. No carryover was demonstrated. Plasma and haemolysed samples were verified as interferents and must be avoided to prevent inaccurate result interpretation. There were good agreements for result interpretation of SPE and IF between our laboratory and reference laboratory (SPE: $\kappa = 95\%$; IF: $\kappa = 100\%$).

CONCLUSION The results of this evaluation attest that the Sebia CAPILLARYS 2 is deemed fit for purpose for routine SPE.

Improving laboratory productivity and efficiency through automation of urinary-free cortisol

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INTRODUCTION The objective was to evaluate the performance of direct measurement method (i.e. non-extraction method) for urinary-free cortisol on the Abbott ARCHITECT i2000 to replace the existing time-consuming extraction method in our laboratory.

METHODS Imprecision, limit of detection (LoD), linearity and method comparison studies were performed on the direct measurement of centrifuged urine and compared with the dichloromethane extraction method. Imprecision was tested over five days in duplicate using two levels of Bio-Rad quality controls and quadruplicate using two patient urine samples of low and high cortisol concentrations. LoD and linearity were assessed using commercial AUDIT MicroControls kits. Method comparison was performed on 72 samples comprising random urine, 24-hour urine and quality-control materials. Diagnostic accuracy was compared for both methods using 40 24-hour urine samples with known clinical diagnosis.

RESULTS Imprecision for both methods was acceptable, with coefficient of variation < 10%. Manufacturer's claims for urine LoD of 22 nmol/L and linearity of 28–1,650 nmol/L were analysed and verified. The direct method was comparable to the extraction method, with $r^2 = 0.98$, intercept = 0 and slope = 1.009. The diagnostic accuracy assessment showed excellent agreement for both methods ($\kappa = 100\%$). The turnaround time is shortened from seven days (extraction method) to three hours (direct method). The direct method is estimated to give an annual savings of SGD 3,000 worth of reagents and 0.1 full-time employee, which has been redeployed to other duties.

CONCLUSION The results of this evaluation show that the direct method is comparable with the dichloromethane extraction method and has since been implemented.

A downtime protocol for the Sysmex UX-2000™ Fully Automated Integrated Urine Analyzer®

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INTRODUCTION Our laboratory uses the automated urine analyser, the Sysmex UX-2000™, and the MEDITAPE II 9U urine test strips for urine dipstick and microscopic analysis. The MEDITAPE II-9U strips do not come with the usual chemical coloured test pads on the test strips and therefore cannot be visually read. We found that the MEDITAPE II 9U strips are not fit for manual use in the event of analyser breakdown and do not meet our laboratory contingency requirement. This prompted us to evaluate the performance and appropriateness of another urine test strip, the MEDITAPE UC-9A, for analyser downtime use.

METHODS Method comparisons between the automated urine test strip (MEDITAPE II 9U) and the manual urine test strip (MEDITAPE UC-9A) were evaluated using 40 patient samples that comprised normal and abnormal urine test parameters. Samples were collected between 14 and 22 February 2017. Both test strips are manufactured by the same manufacturer (i.e. Sysmex). The degree of concordance was evaluated using Microsoft Excel.

RESULTS Test parameters such as glucose, protein, urobilinogen, bilirubin, ketones, blood, nitrite and leukocyte esterase showed excellent agreement, with 100% concordance, between the two test strips. The degree of concordance for pH and specific gravity were satisfactory (MEDITAPE II 9U: 92.5%; MEDITAPE UC-9A: 98.6%).

CONCLUSION The evaluation data showed good agreement between the Meditape II-9U and the Meditape UC-9A test strips. We concluded that the MEDITAPE UC-9A is suitable to be used as a manual urine dipstick during analyser downtime.

Acute hepatitis B infection after vaccination

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INTRODUCTION We received a call from a renal medicine resident doctor to investigate the possibility of a case of acute hepatitis B infection following vaccination or a laboratory error. On 9 February 2017, a 68-year-old female with a past history of chronic kidney disease presented to the emergency department with a three-week history of worsening shortness of breath. The patient was admitted and the doctor ordered a hepatitis screening as part of the standard workup for dialysis assessment. The doctor proceeded to vaccinate the patient with a 1-mL dose of Engerix B (GlaxoSmithKline) administered intramuscularly in the deltoid muscle. However, a repeat hepatitis screening was mistakenly ordered three days later.

METHODS The hepatitis markers were done on our Abbott ARCHITECT analysers. The specimens were retrieved and reanalysed. We also performed additional tests on the patient on Days 5 and 21 after vaccination. Other hepatitis markers were also added.

RESULTS The patient was reactive to the hepatitis B surface antigen (HBsAg) test on Days 3 and 5, but returned to being non-reactive on Day 21. Her hepatitis B surface antibody measured 1 IU/mL before vaccination, dropped to 0 IU/mL on subsequent tests and increased to 138 IU/mL on Day 21. She was non-reactive in the HBc-IgM (IgM antibody to hepatitis B core antigen), hepatitis Be antibody and hepatitis Be antigen tests; these were not performed again on Day 21. Hepatitis B virus DNA test was not performed except on Day 5, during which no viral load was detected.

CONCLUSION This is a case of false-positive HBsAg reactivity. There have been several publications of false HBsAg positivity attributed to vaccination. Clinicians should keep in mind the possibility of transient hepatitis B surface antigenaemia following vaccination, to avoid unnecessary high-cost investigations, by appropriate history-taking and proper counselling.

CATEGORY: ALLIED HEALTH

Interference of the ClinRep® HPLC Complete Kit for Metanephrines in Urine: a Singapore hospital experience

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INTRODUCTION Our objective was to evaluate the commercial ClinRep® HPLC Complete Kit for Metanephrines in Urine on its high-performance liquid chromatography (HPLC) and electrochemical detection system, and its suitability of use in our laboratory.
METHODS The HPLC system was the Agilent 1260 Infinity with ClinLab Digital Amperometric Detector EC3000. Sample collection, storage conditions and sample preparation was performed as per vendor's instruction manual and mobile phase was used as supplied. We collected 39 patient samples over several months and tested in two batch runs.
RESULTS Our sample population, which consisted of 28 Chinese, eight Malays, two Indians and one Other, adequately represented the multiracial proportions of the Singapore society. We found that in 64% of our samples, the internal standard was higher than expected. We defined interference as any multifold increase above 1.35 relative to the internal standard peak height of the calibrator with the respective batches. Interference was chromatographically and electrochemically indistinguishable from the internal standard. Of the different ethnic groups, we found that Indians were the most affected (100%), followed by Malays (75%) and Chinese (57%).
CONCLUSION The suspected interference is likely an isomer of methoxyhydroxybenzylamine, a common ingredient of curry leaves. This interfering component co-elutes exactly with internal standard and artificially decreases the metanephrine and normetanephrine levels. We conclude that this commercial kit is not suitable for use in our population and in our laboratory as it is inconvenient and impractical to ask our patients to adhere to this dietary restriction for at least 24 hours prior to specimen collection.

CATEGORY: ALLIED HEALTH

Switching from MDRD to CKD-EPI: a Singapore hospital experience

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INTRODUCTION The aim of this study was to assess the agreement between kidney functions as estimated by the MDRD and CKD-EPI equations.
METHODS We retrieved all creatinine test results performed in our laboratory using the Abbott ARCHITECT enzymatic assay from 1 January to 30 September 2016.
RESULTS There were 93,343 tests performed on a patient population with the following demographics and presentations: age range 21–91 years (2.5th–97.5th percentile); 54.7% males, 45.3% females; and 38.0% inpatient, 38.0% emergency and 24.0% outpatient attendances. The estimated glomerular filtration rate (GFR) was classified into six categories: ≥ 90; 60–89; 45–59; 30–44; 15–29; and ≤ 15 L/min/1.73 m^2) by both equations. Compared with our current MDRD study equation (IDMS traceable multiplier 175), 21.2% and 10.5% of our study population were reclassified to a higher and lower estimated GFR category, respectively, by the CKD-EPI equation, and the prevalence of CKD (chronic kidney disease) stages 3–5 (estimated GFR ≤ 60 mL/min/1.73 m^2) was reduced from 30.8% to 30.2%. In the estimated GFR of 45–59 mL/min/1.73 m^2 by the MDRD study equation, 11.2% of participants were reclassified to an estimated GFR of 60–89 mL/min/1.73 m^2 by the CKD-EPI equation.
CONCLUSION The CKD-EPI equation classified fewer individuals as having CKD. It is hoped that this switch will mostly benefit people with mildly to moderately reduced GFR but who have otherwise no evidence of kidney disease, avoiding them from unnecessarily becoming "patients with a chronic disease" and allowing nephrology resources to be more concentrated on the patients who require them.

CATEGORY: ALLIED HEALTH

Hyperglycaemia from eating preserved sweet plums?

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INTRODUCTION On 27 May 2017, a point-of-care testing (POCT) glucose result of 33.1 mmol/L was observed in a ward diabetic patient. The test was repeated, showing a result of 9.3 mmol/L. The next day, a POCT glucose result of 33.1 mmol/L was observed in the same patient. The test was repeated, with a result of 9.8 mmol/L. We suspected the elevated POCT glucose results could be due to pre-analytical factors. On both occasions, we found out that the patient was eating preserved sweet plums 1–2 hours before the blood test. We designed a study to replicate the clinical scenario to validate our suspicion of possible finger contamination with food containing sugar, resulting in a false high glucose.

METHODS A nondiabetic subject was recruited for the study. POCT glucose was performed for the subject after handling preserved sweet plum, followed by no cleaning with alcohol swab, cleaning the fingertip with alcohol swab once and swabbing three times. POCT glucose was analysed using the Roche Accu-Chek Inform II glucometer.

RESULTS POCT glucose levels before and after handling preserved sweet plums (with no cleaning with alcohol swab) were 5.2 mmol/L and 19.1 mmol/L, respectively. POCT glucose level was 8.4 mmol/L after cleaning the fingertip with alcohol swab once. When the fingertip was cleaned thoroughly with three alcohol swabbing, the POCT glucose was 5.2 mmol/L.

CONCLUSION Inadequate cleaning of fingertip with alcohol swab prior to POCT glucose testing in patients who handled food containing sugar could produce falsely elevated blood glucose result.

CATEGORY: ALLIED HEALTH

Anion gap reference value in Southeast Asian adult populations

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INTRODUCTION Anion gap is used in the differential diagnosis of acid-base disorders and can help in identifying errors in clinical laboratories. The traditional anion gap mean value of 12 mmol/L was established in the 1970s with methods that are not used widely nowadays. Recently, most laboratories measure sodium and chloride via ion-selective electrodes, which give lower results in anion gap calculation. However, the anion gap from some laboratories is similar to that initially described in the 1970s due to lower calibration set for chloride measurement. This study aimed to establish the reference value of anion gap to use as a guide in identifying laboratory errors.

METHODS We retrieved laboratory data from Siriraj Hospital (SH) (analysed using the Roche cobas® 8000) and Ng Teng Fong General Hospital (NTFGH) (analysed using the Abbott ARCHITECT c16000) from May to June 2017. Inclusion criteria were adults aged $\geq$ 18 years, estimated glomerular filtration rate $\geq$ 60 mL/min/1.73 m^2 and electrolytes (Na, K, Cl, HCO$_3$) within their reference range. Anion gap formula is Na$^-$(Cl$^+$HCO$_3$). We derived the reference intervals from both institutes and performed a subpopulation analysis between the results with normal albumin ($\geq$ 40 g/L) and low albumin (< 30 g/L) to demonstrate the effect of albumin on anion gap reference values. Mean value of each pair was compared using independent *t*-test.

RESULTS Anion gaps from both institutes were normally distributed. The reference intervals of anion gap were 10–17 (n = 10,163) mmol/L and 3–13 (n = 961) mmol/L in SH and NTFGH, respectively (p < 0.001). At SH, reference intervals were 8–16 (n = 217) mmol/L and 10–17 (n = 2,936) mmol/L in hypoalbuminaemic and normoalbuminaemic patients, respectively (p < 0.001). At NTFGH, reference intervals were 4–12 (n = 54) mmol/L and 4–12 (n = 539) mmol/L in hypoalbuminaemic and normoalbuminaemic patients, respectively (p = 0.63).

CONCLUSION Reference ranges of anion gap may differ among different laboratories, probably due to the different analysers or populations. Laboratory practitioners can use this range as a guide to detect laboratory errors.

CATEGORY: ALLIED HEALTH

A performance evaluation of the AITbiotech abTES Flu 4 qPCR VII test kit

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INTRODUCTION All laboratories in restructured hospitals must be ready for pandemic testing as per the local Ministry of Health (MOH) requirements. The aim of this project was to evaluate the performance and suitability of the AITbiotech abTES Flu 4 qPCR VII kit for pandemic testing, as our current method using the Cepheid GeneXpert® System does not have the capacity for pandemic testing.

METHODS Nucleic acids were extracted using the QIAGEN EZ1 Virus Mini Kit. Polymerase chain reactions (PCR) were performed using the abTES Flu 4 qPCR VII kit with the Bio-Rad CFX96 PCR detection system. Results obtained using the abTES Flu 4 qPCR VII kit were compared with the results obtained using the GeneXpert Flu (Flu A/H3) in-house PCR.

RESULTS A total of 25 samples were tested. Results of 24 samples tallied with the known GeneXpert Flu and H3 PCR results (96% agreement). One Flu A/H3 positive sample tested negative for Flu A but positive for H3N2 (cycle threshold [Ct] = 39, weak). This sample was retested and the result remained the same. This sample was retested twice by the vendor and the results were positive for both Flu A (Ct = 38, weak) and H3N2 (Ct = 37, weak).

CONCLUSION The performance of the abTES Flu 4 qPCR test kit is acceptable. Up to 94 samples can be tested in one PCR run with a two-hour reaction time. The high throughput enables high-volume samples to be tested within one day and this meets the MOH requirement of testing 200 samples per day in our laboratory during pandemic situations.

CATEGORY: ALLIED HEALTH

Leveraging on robotic technology to increase productivity via an intra-laboratory specimen transport

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INTRODUCTION Clinical laboratories in many parts of the world, including Singapore, are facing a critical and growing shortage of qualified laboratory personnel. When our new hospital, Ng Teng Fong General Hospital, opened in July 2015, we piloted the use of a robotic automated guided vehicle (AGV) to transport patient specimens from our main specimen reception area (SRA) to other sections of the laboratory.

METHODS We reviewed the performance of the AGV from January 2016 to March 2017 and measured the following parameters: time clocked; distance travelled; and downtime. The AGV was programmed to run 18 trips on weekdays and eight trips on Saturdays to the microbiology section, and four trips on weekdays only to the anatomic pathology section. The distances from the SRA to the microbiology and anatomic pathology sections are 80.4 m and 193.0 m, respectively.

The estimated times taken by a medical technologist for a return trip from the SRA to the microbiology and anatomic pathology sections are 2 minutes and 3 minutes, respectively.

RESULTS During the study period, the AGV made approximately 7,500 trips and travelled almost 750 km. The time savings of about 250 hours translated into cost savings of SGD 10,000. Mean monthly uptime for the AGV was 97.6% (range 89.3%–100%) with the main problems of downtime being navigational, mechanical and electronic in nature.

CONCLUSION The successful implementation of the AGV has improved job satisfaction among our medical technologists, freeing up their time to perform more complex tasks. The consistency and reliability of the AGV has contributed to improved timeliness of specimen delivery and turnaround times.

An evaluation of the initiatives implemented by the charge reconciliation workgroup to minimise rejected charges

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INTRODUCTION This project's overarching aim was to reduce rejected charges when processing discharge medications. To achieve this, the team analysed contributing factors, implemented initiatives and tracked its outcomes. This is a preliminary report evaluating the impact of two initiatives aimed at minimising the incidence rate of: (a) rejected charges due to amendment of prescriptions occurring after the patient has been discharged from EPIC (Ng Teng Fong General Hospital's electronic health records system) (i.e. Initiative A); and (b) amending finalised bills due to uncollected discharge medications (i.e. Initiative B).

METHODS This retrospective study analysed rejected charges from processing of discharge medications from January to July 2017. Initiative A was implemented in January 2017 while Initiative B was implemented in May 2017. The compiled rejected charges data was then compared using statistical analysis (chi-square test) and mean percentage of errors was calculated.

RESULTS A total of 135 rejected charges were analysed from January to July 2017. The mean proportion of rejected charges due to Initiative A decreased from 0.35% to 0.15% ($p = 0.0104$). The mean proportion of rejected charges due to Initiative B decreased from 0.12% to 0.01% ($p = 0.0003$).

CONCLUSION This study showed that the initiatives implemented to minimise occurrence of rejected charges were proven to be effective.