1. *Buja LM. Medical education today: all that glitters is not gold. BMC Med Educ. 2019 Apr 16;19(1):110.*

ABSTRACT

Background: The medical education system based on principles advocated by Flexner and Osler has produced generations of scientifically grounded and clinically skilled physicians whose collective experiences and contributions have served medicine and patients well. Yet sweeping changes launched around the turn of the millennium have constituted a revolution in medical education. In this article, a critique is presented of the new undergraduate medical education (UME) curricula in relationship to graduate medical education (GME) and clinical practice.

Discussion: Medical education has changed and will continue to change in response to scientific advances and societal needs. However, enthusiasm for reform needs to be tempered by a more measured approach to avoid unintended consequences. Movement from novice to master in medicine cannot be rushed. An argument is made for a shoring up of biomedical science in revised curricula with the beneficiaries being nascent practitioners, developing physician-scientists --and the public.

Conclusion: Unless there is further modification, the new integrated curricula are at risk of produce graduates deficient in the characteristics that have set physicians apart from other healthcare professionals, namely high-level clinical expertise based on a deep grounding in biomedical science and understanding of the pathologic basis of disease. The challenges for education of the best possible physicians are great but the benefits to medicine and society are enormous.

Keywords: Graduate medical education; Medical science; Undergraduate medical education; pathology, physician-scientists.

2. *Klein R, Julian KA, Snyder ED, Koch J, Ufere NN, Volerman A, et al. Gender Bias in Resident Assessment in Graduate Medical Education: Review of the Literature. J Gen Intern Med. 2019 May;34(5):712-719.*

ABSTRACT

Background: Competency-based medical education relies on meaningful resident assessment. Implicit gender bias represents a potential threat to the integrity of resident assessment. We sought to examine the available evidence of the potential for and impact of gender bias in resident assessment in graduate medical education.

Methods: A systematic literature review was performed to evaluate the presence and influence of gender bias on resident assessment. We searched Medline and Embase databases to capture relevant articles using a tiered strategy. Review was conducted by two independent, blinded reviewers. We included studies with primary objective of examining the impact of gender on resident assessment in graduate medical education in the USA or Canada published from 1998 to 2018.

Results: Nine studies examined the existence and influence of gender bias in resident assessment and data included rating scores and qualitative comments. Heterogeneity in tools, outcome measures, and methodologic approach precluded meta-analysis. Five of the nine studies reported a difference in outcomes attributed to gender including gender-based differences in traits ascribed to residents, consistency of feedback, and performance measures.

Conclusion: Our review suggests that gender bias poses a potential threat to the integrity of resident assessment in graduate medical education. Future study is warranted to understand how gender bias manifests in resident assessment, impact on learners and approaches to mitigate this bias.

Keywords: assessment; evaluation; gender; gender bias; graduate medical education; implicit bias; postgraduate medical education; residency training.

3. *Jidkov L, Alexander M, Bark P, Williams JG, Kay J, Taylor P, et al. Health informatics competencies in postgraduate medical education and training in the UK: a mixed methods study. BMJ Open. 2019 Mar 30;9(3):e025460.*

ABSTRACT

Objective: To assess health informatics (HI) training in UK postgraduate medical education, across all specialties, against international standards in the context of UK digital health initiatives (eg, Health Data Research UK, National Health Service Digital Academy and Global Digital Exemplars).

Design: A mixed methods study of UK postgraduate clinician training curricula (71 specialties) against international HI standards: scoping review, curricular content analysis and expert consultation.

Setting and participants: A scoping literature review (PubMed until March 2017) informed development of a contemporary framework of HI competency domains for doctors. National training curricula for 71 postgraduate medical specialties were obtained from the UK General Medical Council and were analysed. Seven UK HI experts were consulted regarding findings.

Outcomes: The International Medical Informatics Association (IMIA) Recommendations for Biomedical and Health Informatics Education were used to develop a framework of competency domains. The number (maximum 50) of HI competency domains included in each of the 71 UK postgraduate medical specialties was investigated. After expert review, a universal HI competency framework was proposed.

Results: A framework of 50 HI competency domains was developed using 21 curricula from a scoping review, curricular content analysis and expert consultation. All 71 UK postgraduate medical curricula documents were mapped across 29 of 50 framework domains; that is, 21 domains were unrepresented. Curricula mapped between 0 (child and adolescent psychiatry and core surgical training) and 16 (chemical pathology and paediatric and perinatal pathology) of the 50 domains (median=7). Expert consultation found that HI competencies should be universal and integrated with existing competencies for UK clinicians and were under-represented in current curricula. Additional universal HI competencies were identified, including information governance and security and secondary use of data.

Conclusions: Postgraduate medical education in the UK neglects HI competencies set out by international standards. Key HI competencies need to be urgently integrated into training curricula to prepare doctors for work in increasingly digitised healthcare environments.

Keywords: health informatics; information management; information technology.

4. *Yuan S-M. Acute Kidney Injury after Cardiac Surgery: Risk Factors and Novel Biomarkers. Braz J Cardiovasc Surg. 2019 Jun 1;34(3):352-360.*

ABSTRACT

Acute kidney injury (AKI) is a common and severe complication after cardiac surgery. Currently, a series of novel biomarkers have favored the assessment of AKI after cardiac surgery in addition to the conventional indicators. The biomarkers, such as urinary liver fatty acid binding protein (L-FABP), urinary neutrophil gelatinase-associated lipocalin (NGAL), serum L-FABP, heart-type FABP, kidney injury molecule 1 (KIM-1), and interleukin-18 were found to be significantly higher in patients who developed AKI after cardiac surgery than those who did not. Apart from urinary interleukin-18, the novel biomarkers have been recognized as reliable indicators for predicting the diagnosis, adverse outcome, and even mortality of AKI after cardiac surgery. The timing of the renal replacement therapy is a significant predictor relating to patients' prognoses. In patients with AKI after cardiac surgery, renal replacement therapy should be performed as early as possible in order to achieve promising outcomes. In children, AKI after cardiac surgery can be managed with peritoneal dialysis. AKI after cardiac surgery has received extensive attention as it may increase early mortality and impact long-term survival of patients as well. The purpose of this article was to analyze the changes of the pertinent biomarkers, to explore the related risk factors leading to the occurrence of AKI after cardiac surgery, and to provide a basis for the clinical prevention and reduction of AKI.

Keywords: Acute Kidney Injury; Biomarkers; Dialysis; Renal Replacement Therapy; Risk Factors.

5. *Koponen T, Karttunen J, Musialowicz T, Pietiläinen L, Uusaro A, Lahtinen P. Vasoactive-inotropic score and the prediction of morbidity and mortality after cardiac surgery. Br J Anaesth. 2019 Apr;122(4):428-436.*

ABSTRACT

Background: The vasoactive-inotropic score (VIS) predicts mortality and morbidity after paediatric cardiac surgery. Here we examined whether VIS also predicted outcome in adults after cardiac surgery, and compared predictive capability between VIS and three widely used scoring systems.

Methods: This single-centre retrospective cohort study included 3213 cardiac surgery patients. Maximal VIS (VISmax) was calculated using the highest doses of vasoactive and inotropic medications administered during the first 24 h post-surgery. We established five VISmax categories: 0-5, >5-15, >15-30, >30-45, and >45 points. The predictive accuracy of VISmax was evaluated for a composite outcome, which included 30-day mortality, mediastinitis, stroke, acute kidney injury, and myocardial infarction.

Results: VISmax showed good prediction accuracy for the composite outcome [area under the curve (AUC), 0.72; 95% confidence interval (CI), 0.69-0.75]. The incidence of the composite outcome was 9.6% overall and 43% in the highest VISmax group (>45). VISmax predicted 30-day mortality (AUC, 0.76; 95% CI, 0.69-0.83) and 1-yr mortality (AUC, 0.70; 95% CI, 0.65-0.74). Prediction accuracy for unfavourable outcome was significantly better with VISmax than with Acute Physiology and Chronic Health Evaluation II (P=0.01) and Simplified Acute Physiological Score II (P=0.048), but not with the Sequential Organ Failure Assessment score (P=0.32).

Conclusions: In adults after cardiac surgery, VISmax predicted a composite of unfavourable outcomes and predicted mortality up to 1 yr after surgery.

Keywords: acute kidney injury; cardiac surgery; cardiovascular system; mortality; myocardial infarction; postoperative outcome; risk assessment scoring system; stroke.

6. *Whitlock EL, Diaz-Ramirez LG, Smith AK, Boscardin WJ, Avidan MS, Glymour MM. Cognitive Change After Cardiac Surgery Versus Cardiac Catheterization: A Population-Based Study. Ann Thorac Surg. 2019 Apr;107(4):1119-1125.*

ABSTRACT

Background: Despite concern that cardiac surgery may adversely affect cognition, little evidence is available from population-based studies using presurgery data. With the use of the Health and Retirement Study, we compared memory change after participant-reported cardiac catheterization or cardiac surgery.

Methods: Participants were community-dwelling adults aged 65 years and older who self-reported cardiac catheterization or "heart surgery" at any biennial Health and Retirement Study interview between 2000 and 2014. Participants may have undergone the index procedure any time in the preceding 2 years. We modeled preprocedure to postprocedure change in composite memory score, derived from objective memory testing, using linear mixed effects models. We modeled postprocedure subjective memory decline with logistic regression. To quantify clinical relevance, we used the predicted memory change to estimate impact on ability to manage medications and finances independently.

Results: Of 3,105 participants, 1,921 (62%) underwent catheterization and 1,184 (38%) underwent operation. In adjusted analyses, surgery participants had little difference in preprocedure to postprocedure memory change compared with participants undergoing cardiac catheterization (-0.021 memory units; 95% confidence interval: -0.046 to 0.005 memory units, p = 0.12). If the relationship were causal, the point estimate for memory decline would confer an absolute 0.26% or 0.19% decrease in ability to manage finances or medications, respectively, corresponding to 4.6 additional months of cognitive aging. Cardiac surgery was not associated with subjective memory decline (adjusted odds ratio 0.93, 95% confidence interval: 0.74 to 1.18).

Conclusions: In this large, population-based cohort, memory declines after heart surgery and cardiac catheterization were similar. These findings suggest intermediate-term population-level adverse cognitive effects of cardiac surgery, if any, are likely subtle.

7. *Chellaiyan VG, Suliankatchi RA. Health research methodology workshop: Evaluation with the Kirkpatrick model. Natl Med J India. Mar-Apr 2019;32(2):100-102.*

ABSTRACT

Background: Workshops on research methodology impart skills of research among medical students. Both qualitative and quantitative evaluation of an academic programme is essential to enhance the effectiveness and quality improvement. We assessed the gain in learning and effect of a workshop on research methodology among medical students.

Methods: We did a quasi-experimental, single-group study at a tertiary care hospital and research institute in southern India. It included 33 students enrolled in various residency positions of the institute. The Kirkpatrick 4-level model was used to assess the effectiveness of the workshop on research methodology. Paired t-test was used to compare pre- and postworkshop scores.

Results: Twenty-five students rated the academic sessions as excellent. The score before the workshop ranged from 0 to 17 with mean (SD) 9.27 (4.2). The post-workshop score had a minimum to maximum score of 10-26 with mean (SD) of 16.18 (3.7) (p<0.005). The effect size d cohen (confidence interval [CI]) was 1.743 (0.942-2.545). The mean (SD) of absolute and relative gain was 10.8 (3.8) and 1.41 (0.07), respectively. 66.7% medical students showed a 30% rise in their post-workshop scores, the cut-off for effectiveness of the workshop.

Conclusion: The evaluation of a workshop on research methodology provided insights into the outcomes and modifications required for their future improvement.

8. *Ji P, Hongling Chu H, Zhang C, Xiao P, Liu M, Zhou L, et al. How to strengthen clinical research in Shenzhen, China: qualitative study. BMJ Open. 2019 Apr 3;9(4):e024534.*

ABSTRACT

Objectives: To better understand the strengths and weaknesses, and to propose policy recommendations, regarding conducting high-quality clinical research in Shenzhen, China.

Design: A qualitative study conducted from August to November 2016 using a semistructured interview format involving both focus group interviews and individual interviews.

Setting: Shenzhen, China.

Participants: Stratified purposive and convenience sampling were used. Thirty individuals experienced in conducting and managing clinical research were selected from key stakeholder groups, comprising 11 from local hospitals, 14 from pharmaceutical/medical device companies and 5 from government agencies.

Methods: A semistructured interview guide was developed by the study group and used by experienced interviewers in focus group discussions and individual interviews. The interviewees were encouraged to share their opinions freely and discuss their own topics of interest during the interviews. Thematic analysis was used for analysis and all data were coded and extracted using NVivo V.11.0 software.

Results: Favourable driving factors for clinical research in Shenzhen identified by all stakeholders included the recent trend of increased governmental funding for clinical research, supportive governmental policies, wide recognition of the value of clinical research and high demands from local industry. The major challenges include a lack of technical infrastructure, weak human research subject protection and a lack of capable research resources.

Conclusions: Despite the established strengths, Shenzhen still needs to develop suitable technical platforms, human resources training programmes and strong human research subject protection programmes pertaining to clinical research. This would facilitate the establishment of a functional system that can be expected to lead to increased medical research innovation in Shenzhen.

Keywords: clincial research; qualitative research; techinical platform; training.

9. *Al Dalbhi S, Alodhayani A, Alghamdi Y, Alrasheed S, Alshehri A, Alotaibi N. Difficulties in conducting clinical research among healthcare practitioners in Saudi Arabia: A cross-sectional survey. J Family Med Prim Care. 2019 Jun;8(6):1877-1883.*

ABSTRACT

Background: Research activity represents an important process conducted to address an issue in a precise and systematic manner. Data of this kind regarding the methodological difficulties encountered by healthcare practitioners in conducting clinical research in Saudi Arabia are scarce. This study aims to assess the methodological difficulties encountered by healthcare practitioners in conducting clinical research in Saudi Arabia.

Materials and methods: This cross-sectional survey was conducted among healthcare practitioners who conducted or who were involved in research in Saudi Arabia from June 2018 through August 2018. Data were collected through SurveyMonkey, using a modified version of a questionnaire from a previous similar study.

Results: Overall, 236 respondents participated in the study, more than half, that is, 131 (55.50%) had conducted research as principal investigators, 41 (17.40%) had never attended a research workshop, and 57 (24.20%) were members of research committees. Respondents identified "formulating the research title" and "cooperation between research partners" as the easiest research steps by 58 (24.58%) for each. "Receiving funds and financial resources to complete the research project" ranked the highest difficult step by 124 (52.54%) of the respondents. Attending >2 clinical research workshops was significantly associated with lower methodological difficulty scores. Specifically, those who attended scored 35.28 ± 12.86, while those who did not scored 42.34 ± 12.64, with a highly statistically significant difference (P = 0.001).

Conclusion: These findings show that securing funding and finding an available biostatistician contributed greatly to the methodological difficulties of conducting clinical research. The difficulty score decreased significantly with increasing the number of clinical research workshops attended by the researchers.

Keywords: Clinical research; cross-sectional survey; health care practitioners; methodological difficulties.

10. *Andrews LM, Hesselink DA, van Schaik RHN, van Gelder T, de Fijter JW, Lloberas N, et al. A population pharmacokinetic model to predict the individual starting dose of tacrolimus in adult renal transplant recipients. Br J Clin Pharmacol. 2019 Mar;85(3):601-615.*

ABSTRACT

Aims: The aims of this study were to describe the pharmacokinetics of tacrolimus immediately after kidney transplantation, and to develop a clinical tool for selecting the best starting dose for each patient.

Methods: Data on tacrolimus exposure were collected for the first 3 months following renal transplantation. A population pharmacokinetic analysis was conducted using nonlinear mixed-effects modelling. Demographic, clinical and genetic parameters were evaluated as covariates.

Results: A total of 4527 tacrolimus blood samples collected from 337 kidney transplant recipients were available. Data were best described using a two-compartment model. The mean absorption rate was 3.6 h-1, clearance was 23.0 l h-1 (39% interindividual variability, IIV), central volume of distribution was 692 l (49% IIV) and the peripheral volume of distribution 5340 l (53% IIV). Interoccasion variability was added to clearance (14%). Higher body surface area (BSA), lower serum creatinine, younger age, higher albumin and lower haematocrit levels were identified as covariates enhancing tacrolimus clearance. Cytochrome P450 (CYP) 3A5 expressers had a significantly higher tacrolimus clearance (160%), whereas CYP3A4*22 carriers had a significantly lower clearance (80%). From these significant covariates, age, BSA, CYP3A4 and CYP3A5 genotype were incorporated in a second model to individualize the tacrolimus starting dose: [Formula: see text] Both models were successfully internally and externally validated. A clinical trial was simulated to demonstrate the added value of the starting dose model.

Conclusions: For a good prediction of tacrolimus pharmacokinetics, age, BSA, CYP3A4 and CYP3A5 genotype are important covariates. These covariates explained 30% of the variability in CL/F. The model proved effective in calculating the optimal tacrolimus dose based on these parameters and can be used to individualize the tacrolimus dose in the early period after transplantation.

Keywords: cytochrome P450 enzymes; genetics and pharmacogenetics; immunosuppression Immunology; pharmacokinetics; population analysis; renal transplantation.