

Clinical research of health and medical issues in agricultural communities

**Agricultural Health and Medicine Research Group
Institute for Life Sciences and the Environment
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Summary

Agricultural Health and Medicine Research Group (AgH&M) was instated as a research collaboration between the University of Southern Queensland (USQ) and Queensland Rural Medical Education (QRME) Ltd. The main purpose of the collaboration was to research in to medical issues associated with agricultural work and exposure to agricultural endeavours including trauma through farm accidents, skin cancer, respiratory problems, cardiovascular disease, mental health issues and zoonoses. The key feature of group's operation is access to medical records in number of general practice surgeries throughout the Darling Downs, North Burnett and Western Downs regions. The group has undertaken a number of clinical audits at these practices. During the last few years, the group has also worked very closely with Griffith University postgraduate medical students undertaking the QRME Longlook Program. Through this collaboration, the group has provided guidance and support to medical students interested in pursuing research projects.

A major recent achievement in 2018 by the Group was the scoping, consulting and writing up of the Darling Downs Suicide Prevention Plan through a \$140,000 grant from the local Primary Health Network (PHN). The group has been approached by the PHN to tender for more grants. Previously, the group has secured a number of research grants from the Toowoomba Hospital Foundation to conduct health research in to areas of interest to the people living in the Darling Downs region.

This report provides a summary of research activities conducted by the group.

1. Establishing a database of agricultural workers using data from Clifton Medical Practice

Introduction: The aim of this task was to create a database consisting demographic and health related information of agricultural workers in a rural community. Clifton in rural Queensland was selected for this task as agricultural industries are the major commerce in this area. Clifton is serviced by a single general practice and made it an appropriate setting for the selected purpose. The practice staff and designated medical students scrutinised medical records to obtain demographic and health related information such as type of presentations, frequency of presentations, prescription and referral patterns and prevalence of chronic disease conditions among those directly related to agricultural industries. This project provided researchers a strong set of data for planning future longitudinal studies among agricultural workers in rural communities.

Outcomes: Data from 230 patient records were abstracted to the new database. The description of occupation as recorded under patient's social history is given in table 1.

Table 1. Agriculture related occupations in the Clifton community

Agriculture related job category	Frequency (n=230)	Percentage
Farmer	124	53.9
Farm manager and other managerial positions	9	3.9
Farm hand/ Station hand	48	20.9
Retired – previously on farm jobs	21	9.1
Farm support services	28	12.2

Other than supporting AgH&M group to develop future projects, following USQ students have used this database for developing their postgraduate/ honours research projects.

- Niki Lehane – Masters in Psychology. Project title: Work, Mental Health, and Physical Health in Rural Australia: A Literature Review and Thematic Content Analysis.
- James Ryatt - Bachelor of Health Honours. Project title: Identifying causes of rural obesity through a lifestyle survey

2. Health and lifestyle assessments in a farming environment

Introduction: This study was developed in collaboration with the National Centre for Farmer Health in response to the evidence that little is known about the health status of agricultural producers of Southern Queensland Region. The specific objectives of the project were;

- To identify health and wellbeing risk factors in agricultural producers and associated industries
- To identify and track farm family health indicators in agricultural regions
- To work with the diversity of people across the agricultural, health, academic and lobby groups to address the issues of health, wellbeing and safety of the agricultural workforce
- To communicate project findings to health, academia, agriculture and community

Outcomes: Health and lifestyle assessments were conducted by trained personal during agricultural field days held in Kingsthorpe, Kingaroy, Warwick and Charleville. A total of 702 participants benefited from these assessments. The study found that there was a high prevalence of behavioural risk factors and chronic diseases among the study participants. All participants were provided with a copy of their health and lifestyle assessment and recommendation on action to take including seeing their general practitioner or preferred health care professional.

Research papers/conference presentations

- Safety behaviour and mental health in farmers: trends and implications. Harte J., Kitchener S., Pinidiyapathirage J., Brumby S. 14th National Rural Health Conference, 27-29 April 2017, Cairns.
- Chronic disease and health risk behaviors among rural agricultural workforce in Queensland. Pinidiyapathirage J., O'Shannessy M., Harte J., Brumby S., Kitchener S. *Journal of Agromedicine*. 2018; 23(1).

3. Farm injuries presenting to hospital emergency departments on the Darling Downs, Granite Belt and South Burnett regions

Introduction: This study aimed to provide a foundation for community intervention programs for agricultural injury prevention and to provide recommendations to improve rural emergency medicine practices from injury to recovery. Using a retrospective design, the study gathered agricultural injury data on adult emergency presentations to four rural generalist hospitals in the Queensland Granite Belt (Stanthorpe), the Southern Downs (Warwick), Western Downs (Dalby) and South Burnett (Kingaroy) regions, over a sampling period of six-months. A subsequent study, gathered more details on life-threatening injuries identified during the initial phase of the study. Post-graduate medical students on long-term rural clinical placements collected the relevant injury data using a survey tool similar to that used by the National Injury Surveillance Information System, with modifications relevant to rural settings. The proposed study was approved by the Darling Downs Hospital and Health Services (DDHHS) Human Research Ethics Committee (HREC) and was partially funded by a Toowoomba Hospital Foundation Grant.

Outcomes: Our findings demonstrated that agricultural injuries represented 11% of the total injury presentations to emergency departments in the selected hospitals and the nature of injuries presenting from farms to these hospitals was different to that identified in other Australian studies. The noted time delay between injury and definitive management was of concern and must be taken into consideration in response planning by both farmers and hospitals. The findings of this study were disseminated to local health authorities and farmer groups.

Research papers/conference presentations

- Agricultural injuries presenting to rural hospitals on the Darling Downs. J Lewkowicz¹ J, J Pinidiyapathirage J, Kitchener S, 2015 Griffith Rural Longlook cohort. Rural Medicine Australia 2016, 20-22 October 2016, Canberra.
- Social and environmental determinants of agricultural injuries presenting to rural generalist hospitals on the Darling Downs, Australia. Kitchener S., Pinidiyapathirage J., 2015 Griffith Rural Longlook cohort. 14th World Rural Health Conference, 29 April - 2 May 2017, Cairns.
- An analysis of agriculture related life-threatening injuries presenting to emergency departments of rural generalist hospitals in Southern Queensland Pinidiyapathirage J., Kitchener S., McNamee S., Wynter S., Langford J., Doyle A.,

4. Farming and the risk of melanoma and non-melanoma skin cancer: epidemiological evidence from Queensland

Introduction: In rural communities where access to preventive and therapeutic services for cancer is equivalent, farmers have nevertheless been identified as a group at greater risk of skin cancer. Using a case control design within a retrospective chart review, this study aimed to evaluate the role of farming as an occupational exposure in developing melanoma and non-melanoma skin cancer. Participants were residents of six agricultural communities on the Darling Downs presenting to local primary care clinics. The study was approved by the RACGP NREEC and supported by the Skin Cancer College of Australasia.

Outcomes: This study gathered information from 317 melanoma cases, 5463 non-melanoma cases, and 1870 controls. It was found that the epidemiology of keratocytic skin cancers were different to that previously described in Queensland. It is believed that the distinct rural epidemiology possibly represents different behavioural exposures from environmental ultraviolet exposure in these rural areas. Further investigations of the management of this significant burden of disease is currently underway using the data collected.

Research papers/conference presentations

- First evidence that farmers experience more skin cancer. Hunter K., Pennell A., Raine K., Poologasundrum M., Watts B., Pinidiyapathirage J., Kitchener S. Rural Medicine Australia 2016, 20-22 October 2016, Canberra.
- First evidence of increased non-melanoma and melanoma skin cancer in Australian farmers. Hunter K., Pennell A., Raine K., Poologasundrum M., Watts B., Pinidiyapathirage J., Kitchener S. 2016 Gold Coast Health & Medical Research Conference, 1-2 December 2016, Gold Coast.
- First evidence of higher risk and different epidemiology of skin cancer among farmers. Kitchener S., Hunter K., Pinidiyapathirage J., Pennell A., Raine K., Poologasundrum M., Watts B. 15th World Congress on Public Health, 3-7 April 2017, Melbourne, Australia,
- Farming as a social and environmental determinant of skin cancer – first evidence of farming as a significant risk factor for skin cancer. Kitchener S. 14th World Rural Health Conference, 29 April - 2 May 2017, Cairns, Australia.

- Social and environmental determinants of skin cancer in rural Queensland, Australia. Kitchener S. 14th World Rural Health Conference, 29 April - 2 May 2017, Cairns, Australia.
- The epidemiology of melanoma in rural Queensland, Australia. Hunter K., Pinidiyapathirage J., Kitchener S. Gundy Medical Muster, 7-9 September 2018, Goondiwindi.

5. Living with chronic diseases in agricultural communities

Introduction: Chronic diseases are a leading cause of morbidity and mortality in Australia. This study was aimed at understanding healthcare needs and barriers and facilitators in managing chronic diseases among rural agricultural workers who are already diagnosed with one or more chronic disease conditions. The study explored behavioural, geographical, social and economic factors that influence chronic disease management within this unique population group. The findings will assist in designing effective interventions for primary and secondary prevention of chronic disease in rural populations, particularly that of agricultural communities. The study was approved by the USQ HREC and supported in kind by the rural general practices involved in the study.

Outcomes: Using semi-structured interviews, data were collected from 64 patients with chronic disease presenting to eight general practice surgeries in regional and rural Queensland. A chronic disease management care plan was completed for all participating patients. Interviews were conducted in person at the surgery. Results analysed through a thematic analysis process and showed that the effect of rurality was woven throughout each of the four predominant themes that emerged from the data; nature of rural work, accessibility and availability of health care, transportation, and reliance on family. These influences affected the patient's ability to manage their condition both negatively and positively, however, living in rural areas was not always perceived by patients as a barrier to manage chronic disease.

Research papers/conference presentations

- Living with chronic disease in rural settings. Pinidiyapathirage J., Kitchener S., Harte J. 14th World Rural Health Conference, 29 April - 2 May 2017, Cairns, Australia.

6. Absolute cardiovascular risk assessment to direct primary cardiovascular disease prevention in rural agricultural communities

Introduction: Cardiovascular disease (CVD) is Australia's leading killer and accounts for an enormous amount of health care expenditure. A large proportion of cardiovascular events are preventable with interventions and individual management of risk in general practice. The use of an absolute risk calculator can provide significant improvements to patient outcomes as an absolute risk targeted approach facilitate appropriate risk stratification. This is important to consider given patients with the highest baseline risk gain the greatest relative risk reduction when appropriate medications are prescribed. The proposed clinical audit aimed to determine the proportion of patients with missing information for risk calculation, the cardiovascular medication prescribing patterns and differences in risk stratification between farming and non-farming patients in rural agricultural communities. The study was approved by the RACGP NREEC and supported in kind by the rural general practices involved in the study.

Outcomes: The audit found that absolute CVD risk calculation is not routinely conducted by rural general practitioners. In some patients risk calculation was not possible due to the lack of data recorded. Compared to recent Australian findings, a higher proportion of patients with moderate and high primary CVD risk were found in these rural communities highlighting the opportunities for improved preventive medication practices. The calculated risk scores were made available to the general practitioners to review during subsequent consultations. This audit supported the National Heart Foundation efforts in investigating the use of the absolute cardiovascular disease risk calculator in rural general practice and helped to further understand the issues related to limitations of its use and prescribing of required medications in rural agricultural communities. This audit is currently being expanded to include more cases and following the analysis of the complete dataset a manuscript will be submitted for publication.

Research papers/conference presentations

- Absolute cardiovascular risk assessment to direct primary cardiovascular disease prevention in rural general practice. Pinidiyapathirage J., Raine K., Kitchener S. 15th World Rural Health Conference, 26-29 April 2018, New Delhi, India.

7. Reviewing local detail in relation to the National Heart Foundation Map

Introduction: The hospital admission rates due to acute heart disease in the Darling Downs Region is significantly higher than the national average and is exemplified in the National Heart Foundation “Heart Maps”. The proposed study aimed to provide details of patients and their experiences behind the elevated aged-standardised rates in rural agricultural areas in the Darling Downs. The findings will substantiate the need for developing appropriate and timely interventions for cardiovascular disease prevention and management across the Darling Downs. The project was approved by the DDHHS HREC and was funded by a Toowoomba Hospital Foundation Grant.

Outcomes: Using a retrospective clinical audit medical records were scrutinised to gather data from patients with a diagnosis of an acute myocardial infarction presenting to Warwick, Stanthorpe, Kingaroy and Dalby hospitals in the Darling Downs during the period 1 January 2015 to 31 December 2015. During this period 195 eligible cases were identified. In the preliminary analysis, the outcome measures of note were the time from onset of symptoms in the rural community to presentation at the local hospitals; the mode of transport; and management. Recording of occupation was inadequate to make any determinations of relationships between farming and cardiovascular outcomes. The study has been further expanded to include cases presented during January to December 2016.

At the conclusion of data abstraction and analysis a report will be prepared and presented to the National Heart Foundation (NHF) and prospects of developing a larger study in collaboration with the NHF will be explored.

8. Opiate use in rural agricultural communities

Introduction: Research data indicates that prescription drug abuse is on the rise in Australia. A recent survey in rural America found that opioid use among farmers was high compared to those engaged in other occupations. In Australia, data on opioid use among agricultural workers are not readily available. Using a clinical audit, this study aims to identify opioid prescription patterns in a rural general practice that predominately serves people from agriculture related backgrounds. The audit will also compare and contrast opioid prescription use before and after the government imposed restrictions to access codeine containing medication. Data on prescription patterns before the restriction was imposed (February 2018) have been collected and

the second component of the audit needs to be implemented to compare pre and post restriction changes to prescribing.

Outcomes: The design of this research pilots the use of the PEN Clinical Audit Tool to identify patients for future research. The outcomes of this method is that practices may more accurately and critically observe their prescribing practices with respect to opiates. The benefit of this will primarily be more critical prescribing of opiates in general practice by prescribing general practitioners and describing opiate prescribing in rural and regional practices, potentially in the future in a manner that is comparable to metropolitan general practices. A funding application for this study to the RACGP Foundation Grants 2018 was unsuccessful and other funding opportunities are currently being explored.

9. Respiratory conditions in a grain farming community in the Darling Downs: A pilot study in Clifton

Introduction: The Darling Downs is the largest grain producing region in Australia. Although there is substantive evidence that a variety of potentially debilitating respiratory conditions is associated with grain workers (particularly in the United States), there is very little understanding of the extent of these conditions in the local population of farmers and those working with grain handling such as transport operators and labourers. This study aims to describe the extent of respiratory conditions in grain farmers and handlers, as well as the general population, in a Darling Downs community whose predominant agricultural production is based on grain. This study will comprise a pilot project for further work in grain producing communities in the larger region. The study was approved by the USQ HREC and supported by QRME summer scholarships to two medical students.

Outcomes: Data collection of the pilot study is now completed and data analysis is underway. The findings of the study will contribute to our understanding of the local epidemiology of respiratory illnesses among people in a community which has a high prevalence of grain production and handling. These findings will inform any future interventions targeting this group and the wider community, whether they work directly with grain production and handling or are exposed to it indirectly. A report from the pilot study will be presented to relevant industry groups to seek funding for a larger scale study in the future.