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Touch screen computer health assessment in Australian general practice patients: a cross-sectional study protocol

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ABSTRACT

Introduction: Cardiovascular disease (CVD) and cancer are leading causes of death globally. Early detection of cancer and risk factors for CVD may improve health outcomes and reduce mortality. General practitioners (GPs) are accessed by the majority of the population and play a key role in the prevention and early detection of chronic disease risk factors. This cross-sectional study aims to assess the acceptability of an electronic method of data collection in general practice patients. The study will describe the proportion screened in line with guidelines for CVD risk factors and cancer as well as report the prevalence of depression, lifestyle risk factors, level of provision of preconception care, cervical cancer vaccination and bone density testing. Lastly, the study will assess the level of agreement between GPs and patients perception regarding presence of risk factors and screening.

Methods and analysis: The study has been designed to maximise recruitment of GPs by including practitioners in the research team, minimising participation burden on GPs and offering remuneration for participation. Patient recruitment will be carried out by a research assistant located in general practice waiting rooms. Participants will be asked regarding the acceptability of the touch screen computer and to report on a range of health risk and preventive behaviours using the touch screen computer. GPs will complete a one-page survey indicating their perception of the presence of risk behaviours in their patients. Descriptive statistics will be generated to describe the acceptability of the touch screen and prevalence of health risk behaviours. Cohen's κ will be used to assess agreement between GP and patient perception of presence of health risk behaviours.

Ethics and dissemination: This study has been approved by the human research committees in participating universities. Findings will be disseminated via peer-reviewed publications, conference presentations as well as practice summaries provided to participating practices.

ARTICLE SUMMARY

Article focus

- Cross-sectional study assessing the acceptability of the use of a portable touch screen computer in order to assess CVD and cancer-related health risk factors as well as the level of preventive behaviours in general practice patients.
- This study will also assess whether a touch screen computer health assessment is likely to provide useful information to GPs by assessing the level of agreement between GP and patient self-report on the presence of health risk behaviours.

Key message

- With touch screen technology becoming more accessible, there is likely to be increased potential to use these technologies to assist in health risk factor assessment as well as delivery of healthcare advice particularly in general practice.
- Whether this technology is acceptable to patients and GPs are key indicators of the potential of touch screen assessment to be integrated in delivery of healthcare in the general practice setting.

Strengths and limitations of this study

- The study has been designed in order to maximise recruitment of GPs.
- A large sample size of almost 3000 patients will be obtained.
- As this is a cross-sectional study, no causal relationships can be identified.

INTRODUCTION

Cardiovascular disease (CVD) and cancer continue to be leading causes of death globally.[1] These diseases are associated with modifiable lifestyle risk factors such as smoking, excessive alcohol consumption, lack of physical activity and being overweight.[2] Recently, depression has also been shown to be an independent risk factor for

the development of heart disease.[3] Other risk factors for the development of CVD include high blood pressure, high cholesterol and type 2 diabetes.[2] Early detection of cancer through screening tests[4] and early detection of lifestyle and metabolic risk factors for CVD[5] may improve outcomes for these diseases, respectively. Despite this, participation in cancer and cardiovascular screening remains suboptimal, although public health campaigns have been implemented to promote these activities.[6 7]

General practitioners (GPs) are accessed by a large and relatively representative sample of the population.[8] In Australia, approximately 83% of the population consult their GP each year.[9] Each primary care attendance represents an opportunity to increase awareness about relevant screening and health risks. Furthermore, both GPs and patients see preventive care as an important part of a GP's role,[8 10] suggesting that provision of preventive care in this setting is likely to be acceptable. Indeed, providing information in relation to preventive activities is seen by community members to be a key responsibility of GPs.[11] Primary care clinical practice guidelines recommend that patients be screened for metabolic and lifestyle risk factors for prevention and early management of CVD and other chronic diseases.[12 13] Current evidence suggests that screening for cancer and CVD risk factors in line with recommendations will improve outcomes for patients.[14 15]

While GPs play a vital role in screening and management of these risk factors,[16] time and resource barriers[11 17–19] as well as the need to deal with patients' primary reasons for presenting for care during consultation means that screening does not always occur in line with best practice guidelines.[20] While recall and reminder systems for monitoring of people with an existing chronic disease are becoming more widespread,[21] these are not routinely implemented for preventive care. Therefore, comparison of patient self-report and their GP's perception of the patient's risk status may provide valuable information about whether a quick and systematic method of collecting self-report information on risk behaviours from patients is likely to provide useful information to GPs.

Electronic assessments presented on touch screen computers may be a useful method of providing clinicians with extra information regarding their patients' risk factors in order to assist with delivery of best practice clinical care. Patients indicate a preference for electronic methods of data collection.[22] Touch screen computers are portable, light and can potentially provide patients with more privacy during completion of health surveys compared with a paper and pencil survey. This method has been shown to be as accurate as paper and pencil surveys in recording patient information and may lead to less under-reporting and fewer missing values.[22] Additionally, electronic data collection enables automated data entry and tailoring of survey questions, minimising both provider and patient burden. The use of electronic data collection methods has previously been proven to be acceptable in a variety of settings such as oncology wards and primary care.[23] It has been used to collect a range of self-report information including patient quality of life,[24] psychosocial distress[25] and pain.[26]

The aim of this study will be to estimate the acceptability and feasibility of collection of health risk information using an electronic questionnaire presented on a touch screen computer in the general practice setting. This research will also report on the prevalence of self-reported cancer and cardiovascular risk screening practices, lifestyle risk factors (physical inactivity, alcohol consumption, smoking, overweight or obese), depression as indicated by a score of 10 or more on the Patient Health Questionnaire-9 (PHQ-9), bone density screening in those aged >70 years and receipt of preconception care and cervical cancer vaccination in women aged <46 years. Lastly, this research will report on the level of agreement between GPs and patients regarding whether the patient is depressed, whether the patient has been screened for CVD risk factors and cancer in line with current guideline recommendations and whether the patient has lifestyle risk factors for these diseases.

METHODS

Study design

This study will be a cross-sectional health assessment of approximately 2400−3000 Australian general practice patients.

Population

Selection of general practices

Defined geographic areas with a radius of approximately 20 km from a university department of general practice will be selected in the following regions of Australia: Newcastle, Melbourne and Sydney. A list of postcodes for each geographic region will be generated using the Australasian Medical Publishing Company Medical Directory of Australia. Randomly selected practices on the list generated for each region will be approached until four practices in each region are recruited. It is anticipated that a final sample of 12 practices will be recruited.

Eligibility criteria

General practices will be eligible if at least two full time equivalent GPs consent to participate.

Piloting of procedures

Three teams will be responsible for recruitment of practices and data collection: one in Newcastle, one in Melbourne and one in Sydney. Each team will pilot study procedures in one selected convenient practice within their local area. This will be done to ensure standardisation of study methods across sites.

Recruitment of practices and GPs

A package containing an invitation letter, information statement, consent form and reply paid envelope will be

mailed out to all individual GPs and the practice manager within each randomly selected practice. Follow-up phone calls will be made to the practices, and additional information will be sent out as well as practice visits undertaken. Recruitment of GPs for research studies is often challenging due to GPs' time constraints, lack of remuneration and workforce shortages.[27] In order to maximise recruitment, we will implement the following strategies as recommended by the Royal Australian College of General Practitioners (RACGP)[28]—(1) Including practitioners in research team: three GPs (GR, DM and MM) are included as chief investigators on the research team and will be involved in development of the questionnaire and study implementation. The GP investigators will also play a role in advising on the development of recruitment protocols as well as encouraging GP buy-in to the project. (2) Designing studies to reduce demand on GPs: minimal time and participation demands will be placed on participating GPs. Each participating GP is required to complete a simple one-page checklist for only a subset of 35 of their participating patients. Completion of the survey for each patient is expected to take no more than 2–3 min. At the end of the study, GPs will also be asked to complete a one-page questionnaire, assessing the acceptability of the study procedures in the practice. Completion of this survey is one-off and is expected to take no more than 3 min. (3) Facilitating recruitment of patients to minimise time burden placed on GPs: to minimise time burden placed on GPs, all patient recruitment study will be carried out by a research assistant based in the practice waiting room. (4) Remuneration: reimbursement will be offered to practices for GPs' time spent on participation. The amount of reimbursement ranged from $A800 (for two participating GPs) to $A2000 (five or more participating GPs). Additionally, 40 category 1 Quality Improvement & Continuing Professional Development (RACGP QI & CPD) points will be offered to participating GPs if they chose to do a follow-up audit for their identification of clinical depression.

Participants

Eligibility

Those aged 18 years or older; presenting for general practice care, able to complete the touch screen computer survey in English, and physically and mentally able to give informed consent will be eligible to participate in the study. Patients with an intellectual impairment that precludes provision of informed consent and those presenting for care to a non-GP provider within a participating practice will be excluded.

Recruitment procedure

Patients

Two to three touch screen computers will be available in each practice for collection of survey data, depending on patient volume. The touch screen tablets are portable, protect privacy, are robust and can be rested on a patient's lap, thereby overcoming disadvantages of previous technology using standalone computers.[23] Signage and pamphlets will be available in participating practices to encourage patient participation in the study and minimise practice staff time in explaining study procedures.

Eligible patients will be approached by the research assistant and invited to participate in the study. Following informed consent, participants will be asked to complete a health assessment using the touch screen computer in the waiting room prior to their consultation. A brief information statement will appear on the first screen of the questionnaire and patients will be asked to touch 'NEXT' if they are willing to commence the questionnaire. Willingness to complete the survey will be taken as consent to participate. Each consenting participant will be allocated a unique participant ID. Each patient will also be provided with a hard copy patient information statement with their unique IDs printed on the information statements. Consenting participants will be presented with a series of questions on the touch screen and asked to 'touch' the response that represents their answer. A stylus or participant's finger can be used to 'touch' the appropriate responses. The research assistant will record the proportion of consenting, non-consenting and ineligible patients on a recruitment log sheet. For non-consenting participants, the research assistant will also record their sex on a recruitment log sheet in order to assess consent bias.

General practitioners

For a consecutive subgroup of 35 of their participating patients, each GP will be asked to complete a questionnaire assessing the GP's perceptions of each patient's screening and lifestyle risk factors and depression status. The questionnaire will contain the patient's name and date of birth so that it can be linked to patient survey results. The GPs will hand the completed surveys back to the research staff present at the practice. At the end of the study period, GPs will be asked to fill in a short questionnaire asking for feedback regarding the acceptability of using the touch screen computer survey in practice waiting rooms.

Overview of touch screen computer questionnaire

As the recommended frequency of screening for high blood pressure, high cholesterol and diabetes varies depending on family history, age and sex, the electronic health risk assessment will be programmed to allow tailoring to each participant's age, gender and other relevant risk factors such as family medical history. All questions on screening will be based upon the intervals recommended by the RACGP Preventive Care guidelines.[29] Commercial programming software, Digivey survey suite software (CREOSO—Digivey Survey Center, Phoenix, Arizona, USA), will be used to programme the electronic health risk assessment. The survey will be administered using Dell Latitude XT2 touch screen laptop computers.

Variables

Name and date of birth

Participants will be asked to provide their name and date of birth. This information will enable GP's to identify the patient for which they are providing their perception of health risk status.

Demographics

Participants will report their age, gender, postcode, ethnicity, level of education and whether they hold a healthcare concession card.

Personal and family history of chronic diseases

Participants will be asked whether they have ever been diagnosed with high blood pressure, high cholesterol, diabetes, depression, stroke, chronic pain, heart disease or kidney disease. Participants will also be asked if they have a first-degree relative (parents, siblings or children) who had previously been diagnosed with heart disease at <60 years of age.

CVD metabolic risk factor screening

Respondents will also be asked to indicate the time-frame in which they had their last test for blood cholesterol, blood pressure and blood glucose levels if appropriate to age and pre-existing risk factors. Response options will be tailored to RACGP recommendations, which correspond to the participant's age and pre-existing risk factors for each test. For example, it is recommended that those with a history of heart disease/stroke, gestational diabetes mellitus or pre-diabetes have their blood glucose checked every 3 years.[30] Participants who report a history of any of the aforementioned conditions will be asked whether they had their blood glucose level checked in the last 4 years, more than 4 years ago, never or not sure. A 1-year leeway will be added to the recommended screening interval to ensure a conservative approach to categorising participants as underscreened.

Cancer screening

Respondents will be asked to indicate the timeframe in which they had their last screening test for colorectal cancer, breast cancer, cervical cancer and melanoma if appropriate to age and gender. Response options will be tailored to the RACGP guideline recommendations corresponding to each patient's level of risk for the particular test.

Lifestyle risk factors

Physical activity

Level of physical activity will be assessed using a one-item validated questionnaire asking whether participants carry out at least half an hour of moderate or vigorous exercise on ≥5 days/week. This tool has been shown to have 77% sensitivity and 81% specificity when compared with the New Zealand Physical Activity Questionnaire-Long.[31] Participants will be classified as at risk if they indicate that they do not do 30 min of moderate or vigorous exercise at least 5 days/week.

Alcohol

A modified version of the AUDIT-C questionnaire, a three-item alcohol screening tool, will be used to identify participants who are risk drinkers or have active alcohol disorders.[32] Participants who reported having more than two standard drinks on a typical day (chronic drinking) or more than four standard drinks on any drinking occasion (binge drinking) will be considered at risk as defined by the Australian National Health and Medical Research Centre alcohol guidelines.[33]

Smoking

A single question from the New South Wales (NSW) Health Survey will be used to assess smoking status.[34] The question is worded as follows: 'Which of the following best describes your smoking status? This includes cigarettes, cigars and pipes'. Response options include 1= I smoke daily, 2= I smoke occasionally, 3= I don't smoke now but I used to, 4= I've tried it a few times but never smoked regularly or 5= I've never smoked. Participants will be classified as at risk if they indicate that they smoke daily or occasionally.

Body mass index

Self-reported estimates of weight (in kilograms or stones) and height (in centimetres or feet/inches) will be requested to calculate body mass index (BMI).[35] Participants will be considered overweight/obese if they have a BMI of ≥25 kg/m^2 and non-overweight if they have a BMI <25 kg/m^2.

Current depressive symptoms

Depression will be assessed using the nine-item PHQ. This tool has been used in the primary care setting and shows high correlation with functional status score on the SF-20 subscales. A score of ≥10 on this scale has been shown to have a sensitivity of 88% and specificity of 88% for major depression when compared against a mental health professional assessment. Participants will be considered at risk if they have a PHQ score of 10 or above.[36]

Other prevention

Female respondents of reproductive age (18–45 years) will be asked to indicate whether or not they have ever received preconception care (and the nature of that care) and/or cervical cancer vaccination from their GP. Response options will be tailored to the RACGP guideline recommendations. In relation to screening for osteoporosis, men and women aged >70 years will be asked whether they have ever had a bone density test.

Acceptability of the electronic health assessment

The final section of the survey will assess participants' opinions of the acceptability of the touch screen computer. Participants will be asked if they felt that the survey instructions were easy to follow and easy to understand, if the touch screen provided enough privacy, whether the touch screen was easy and comfortable to use. For each of those questions, participants will be able to respond Yes or No. Participants will also be asked

whether they would be willing to complete a similar touch screen questionnaire (with different questions) each time they presented to a GP and if they would be happy for their doctors to have access to their answers. Participants will be able to respond 'Yes, No or Unsure'.

GP surveys

A one-page paper and pen survey will be used to assess GPs' perceptions on whether the patient has been screened for high blood pressure, high cholesterol and diabetes and cancer in line with current guideline recommendations, and whether the patient has the following risk factors: depression, current smoker status, risky alcohol consumption, overweight or obese. GPs will be able to select from 'Yes, No, Unsure or Not Applicable'.

At the completion of the study, each participating GP will be asked to complete a brief questionnaire assessing the acceptability of the implementation of the electronic health assessment within their practice. GPs will be asked whether they thought that the touch screen computer survey could be implemented as part of routine practice, whether it increased patient waiting times or staff burden, whether it was well received by patients, whether it was an acceptable way to collect patient data, whether it was disruptive to the waiting area, whether it was disruptive to the consultation process and whether it prompted patients to ask GPs about issues outside of the primary purpose of the consultation. GPs will able to select responses on a 5-point Likert scale ranging from 'Strongly disagree' to 'Strongly agree'.

Statistical methods

Characteristics of consenting and non-consenting patients will be compared using Pearson's χ^2 test for categorical variables. Consent rate will be calculated and descriptive statistics (including number, percentage and 95% CI) for each item on the acceptability questions will be generated to assess acceptability of the use of the touch screen computer health assessment questionnaire. Prevalence of patient-reported appropriate cancer and CVD risk factor screening, depression, bone density testing and receipt of preconception care and cervical cancer vaccination will be calculated with a 95% CI. Level of agreement between patients and GPs perceptions of depression status, appropriate screening and presence of lifestyle risk factors will be calculated using Cohen's κ statistic.

Study size

Depending on the size of the practices recruited, 24–30 GPs and 2400–3000 patients will be recruited. A subsample of 200 patients will answer the questions regarding acceptability of use of touch screen computer. It is estimated that this will provide sufficient numbers to estimate rates of acceptability within ±5%. A sample size of 2400 patients will enable the prevalence of the outcomes of interest CVD risk factor screening, cancer screening, depression bone density testing and receipt of preconception care and cervical cancer vaccination to be estimated within ±2%. Approximately 30 GPs each completing checklists for 35 of their participating patients will be required. This will provide 80% power, at a significance level of 5% to detect: (1) a κ of 0.5 or more as statistically significantly >0 for each GP and (2) a κ of 0.5 as being statistically significantly >0.4 for all GPs (assuming an observed proportion of agreement of 0.3 or more).[37]

Ethics and dissemination

This study protocol has been approved by the University of Newcastle Human Research Ethics Committee (Approval no: H-2009-0341) and ratified by the University of New South Wales Human Research Ethics Committee (HREC09393/UN H-2009-0341) and Monash University Human Research Ethics Committee (2009001860). Participants will be able to withdraw from the study at any time by contacting the research team and quoting their unique participant ID printed on the hard copy information statement. Findings from this study will be disseminated via peer-reviewed publications, conference presentations and reports to funding bodies. Additionally, a summary of findings will be provided to participating general practices.

DISCUSSION

This study will enable the collection of valuable information regarding the utility of touch screen assessment tools in the general practice setting. The study is designed to minimise the time burden placed on both GPs and practice staff in order to increase general practice recruitment rates, minimising recruitment bias of practitioners and subsequently patients.

The study will generate one of the largest Australian data sets on self-reported risk factors and current preventive care among general practice patients. It will be one of the first studies to compare the level of agreement between patients' and GPs' assessment of risk and thus provide important information that can inform future quality of care initiatives.

While previous studies have assessed the use of touch screen technology in primary care, this study is novel in that it uses portable tablets that can be rested on a patients' lap instead of large free-standing touch screen kiosks. With touch screen technology becoming more accessible in the form of computer tablets, iPads and smart phones, there is likely to be increased potential to use these technologies to assist in health risk factor assessment as well as delivery of healthcare advice.

LIMITATIONS

All practices recruited will be located in urban areas. This study is a cross-sectional study and does not provide information on causal relationship.

CONCLUSIONS

Electronic health assessments completed in the waiting room could potentially help GPs with the early detection

and subsequent management of CVD-related conditions, cancer and the organisation and delivery of preventive care—a necessary step in the implementation of evidence-based preventive care.[38] If found to be useful, additional ways of integrating results from self-report tools into existing general practice databases need to be explored.

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Contributors SLY assisted with development of the questionnaire and drafted the initial manuscript; MLC, CP and KI designed the final study protocol, assisted with development of the questionnaire and drafted the initial manuscript; RWS-F conceived the study and designed the study protocol; GR, DM and MM assisted with questionnaire development and technical design. CDE contributed to study design and provided expert statistical advice. All authors read and approved the final manuscript.

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Competing interests None.

Ethics approval Ethics approval was provided by the University of Newcastle Human Research Ethics Committee.

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