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Original Research Article

Identifying the presence of gastric cancer risk factors in Campbelltown residents aged 50 to 80 years old, and determining the potential for risk factor modification following education

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ABSTRACT

Background: Gastric cancer remains an important cause of mortality in Australia, with modifiable risk factors playing a prominent preventable part in its development. The primary objective of this study is to identify gastric cancer risk factors in people living in Campbelltown area aged 50-80 years old, and to determine the potential for risk factor modification following education.
Methods: This is a post-test only intervention study where data was collected through face to face interviews. The survey consisted of questions gathering general information on demographics and identifying the presence of gastric cancer risk factors. An educational sheet was then provided to educate participants on the risk factors and epidemiological data for gastric cancer. Participants were then asked questions to determine their willingness to modify their risk factors, based on what they had learnt from the educational pamphlet. The data collected was analysed using Statistical Package for the Social Sciences (SPSS) software.
Results: A total of 137 participants were included in the study. The results show participants were likely or highly likely to modify 45% of their gastric cancer risk factors following education. We also found that women were more likely to reduce their intake of pickled and processed food, and that participants in the younger age group were more likely to reduce salted food intake.
Conclusions: Our study indicates that education may influence and may have a varying impact on the willingness of participants to modify gastric cancer risk factors. Furthermore, variables such as age and gender have impact on the willingness to modify certain risk factors.

Keywords: Gastric cancer, Risk factors, Education, Behavioural modification

INTRODUCTION

Despite the decreasing incidence of gastric cancer over the past few decades, gastric cancer continues to remain the fifth most common cancer in the world.[1] In the past 5 years, the incidence of gastric cancer in Australia for men has been 13-16 per 100,000, with a mortality rate of 7-8 per 100,000, whereas in women the incidence has been 6-7 per 100,000, with a mortality rate of 3-4 per 100,000.[2] Within the Campbelltown area, the incidence of gastric cancer is higher than the state average (12.1/100,000 compared to 8.8/100,000).[3] The development of gastric cancer can be influenced by risk factors, which are divided into modifiable and non-modifiable risk factors. Non-modifiable risk factors include age, blood type and genetic predisposition.[4]

The development of gastric cancer is strongly influenced by modifiable risk factors. Studies indicate that the avoidance or reduction of modifiable risk factors may reduce gastric cancer incidence by 33%, and result in a 40% decline in the mortality of gastric cancer.[5] The chronic ingestion of high concentrations of nitrates (most abundant in dried, smoked and salted foods), smoking, alcohol consumption, radiation, and asbestos exposure are modifiable risk factors shown to increase the risk of developing gastric cancer.[6] Alcohol and smoking have been proven to play an important role in the development of gastric cancer.[5] Overall, 32.7% of people in Campbelltown drink alcohol (compared to 30.4% in NSW), as well as 25.3% of people being regular smokers (compared to 17.1% in NSW).[7] This may be one of the factors contributing to the higher risk of gastric cancer. With the high mortality and poor prognosis of gastric cancer, senior populations who are most susceptible require further preventative approaches to reduce their risk of gastric cancer.

In Australia, people aged 50-80 are especially vulnerable to gastric cancer, and for this reason the mortality due to gastric cancer remains high within this population.[2] Additionally, populations of lower socioeconomic status are a demographic that is susceptible to health inequality and at higher risk of gastric cancer.[8] Statistical data shows that the median weekly household income in Campbelltown is $1251 compared to $1447 in Greater Sydney, indicating a disparity in socioeconomic status exists within Campbelltown.[10] Studies have shown that there is an association between socio-economic disadvantage and gastric cancer incidence, which is not just explained due to the presence of risk factors.[8,9] There are often multiple factors that contribute to and determine socioeconomic disadvantage, some of which include: education, occupation, area of residence, income and access to health services.[10,15] These factors may be associated with an increased rate of modifiable risk factors for gastric cancer, and therefore a higher incidence of gastric cancer.

Literature reviews have shown there are no previous studies examining the efficacy of education in gastric cancer risk factor modification.[11] There have however been studies examining the efficacy of education and risk factor modification for other conditions.[11] Similar studies looking at the efficacy of education have shown promising results. For example, a study on diabetic education using verbal and written patient education material found a statistically significant improvement in clinical parameters (weight, BMI, blood pressure) in a 6-month follow-up.[11] Education has similarly found to be successful in drug adherence, physical activity in coronary heart disease and heart failure self-care, in terms of both knowledge retention and clinical implications.[12-14] We therefore hope that the pilot of our educational tool will have a similar success to the previous studies.

Studies investigating modifiable risk factors for other cancers have shown that lack of awareness correlated with a poorer prognosis.[16] However, research has not yet been conducted to investigate population attitudes and awareness of gastric cancer risk factors in Australia. Identifying the presence of gastric cancer risk factors will enable us to develop strategies for gastric cancer prevention.

The aim of this project is to identify the presence of gastric cancer risk factors in the population aged 50-80 that reside in the Campbelltown area, and to identify the potential for risk factor modification following education. Our main hypothesis is that education regarding the risk factors of gastric cancer will result in participants being more likely to modify their behaviour regarding these risk factors. Our secondary hypotheses are that age and gender will have an influence on the rates of behavioural modification regarding gastric cancer risk factors.

METHODS

This is a post-test only intervention study that was conducted through individual, face-to-face interviews. We used written surveys to first collect information regarding the presence of associated risk factors for gastric cancer, and then to assess the potential willingness for risk factor modification.

The project was based in the Campbelltown area in Australia and participants were recruited at Campbelltown Mall and The Myrtle Cottage between the 9th and the14th of February 2016. We selected these locations due to the high volume of people in who were in the desired age group. Written permission was obtained to conduct surveys from Nina Sanders, the Marketing and Property Asset Manager at Campbelltown Mall, and from Elizabeth Delcasse, the manager of Myrtle Cottage. After reviewing relative literatures our aim for this study is to recruit 137 participants. According to Stevens (1996) there should be 15 participants per predictor to give statistical significance.[17] People in public areas were approached and introduced to our team and informed about the study. With verbal informed consent they were asked if they were aged between 50 and 80 years old. This was confirmed with their date of birth. Participants above the age of 80 will be excluded from the study, as the five-year survival rate for patients with gastric cancer above the age of 80 is only 8% thus modifying lifestyle would less likely to benefit the participants.[29,30]

Our survey was developed as a new pilot survey. To develop it we used a textbook titled “Design, Evaluation, and Analysis of Questionnaires for Survey Research”.[31] The information sheet was constructed using information from various sources, including government websites.[20-22] The survey and educational material have not been tested previously.

All surveys conducted were anonymous and confidential, and verbal informed consent was obtained prior to commencing the survey. Participants were informed they could withdraw from the study at any time. This research project and associated documents have been approved by the Western Sydney University Human Research Ethics Committee. Participants were given a participant information sheet, providing information regarding the study. Each participant was given an initial survey, with questions asking about presence of gastric cancer risk factors. Following that they were given the educational pamphlet, informing them about the risk factors and recent epidemiological data regarding gastric cancer in Australia. Based on the information provided in the pamphlet, participants then completed a follow-up survey, asking them how likely they were to modify their behaviours, on a scale from highly unlikely to very likely.

Following the collection of the data, the responses were coded and then statistically analysed using Statistical Package for the Social Sciences (SPSS) software.

To enable us to answer our research question regarding the association between age and behaviour modification we had determined to use Chi Square testing. Therefore, we converted age from a continuous to a categorical variable. Younger participants were grouped from 50-64 years old, and senior participants were grouped from 65-80 years old. The age groups were based on definitions from the Department of Health and Ageing, as one is considered a pensioner at the age of 65 and above.[3,18]

In addition to this, alcohol and tobacco consumption were also graded into 3 groups; light, moderate and heavy) based on Department of Health guidelines.[20,21] Light daily smokers who smoked between 1 to 10 cigarettes per day and moderate smokers who smoked between 11 and 19 cigarettes per day while heavy smokers who smoked at least 20 cigarettes per day. On the other hand, a light drinker who drinks up to 1 drinks occasionally for women and up to 2 drinks occasionally for men. While a moderate drinker who drinks up to 1 drink per day for women and up to 2 drinks per day for men. However, a heavy drinker who drinks 5 or more alcoholic drinks for males or 4 or more alcoholic drinks for females on the same occasion on 5 or more days in the past month.[23]

RESULTS

A total of 137 participants from the Campbelltown area were included in this study. Of the 137 participants, 54 (39.4%) were male and 80 (58.4%) were female. Three (2.2%) participants did not specify their gender. The mean age of the participants was 67.6 years (SD: 8.3). The age was not normally distributed, with a Kolomogorov-Smirnov p value of 0.023 (Figure 1, Table 1).

Table 1: Modifiable and non-modifiable risk factors.

Variables (n=137)		Frequency	Percentage (%)
Gender*	Male	54	39.4
	Female	80	58.4
	Unspecified	3	2.2
Tobacco smoking	Heavy	7	5.1
	Moderate	7	5.1
	Light	2	1.5
	Total	16	11.7
Alcohol consumption	Heavy	1	0.7
	Moderate	5	3.6
	Light	45	32.8
	Total	51	37.2
Salt intake		58	42.3
Pickled food intake		46	33.6
Processed food intake		71	51.8
Cured meat consumption		49	35.8
Asbestos exposure		29	21.1
Long term radiation exposure**		29	21.3
Positive family history of gastric cancer		11	8.0

*n=134; **n=136.

Out of the surveyed respondents, 51.8% (71/137) consumed processed food in daily basis for more than 10 years, 42.3% (58/137) always consumed salted foods, 35.8% (49/137) consumed cured meats approximately 2-3 times a week for more than 10 years and 33.6% (46/137) consumed pickled foods once every two weeks for more than 10 years (Table 1). Exposure to asbestos (unknown period) and radiation (for more than 5 years) was 21.1% (29/137) and 21.3% (29/136) respectively.

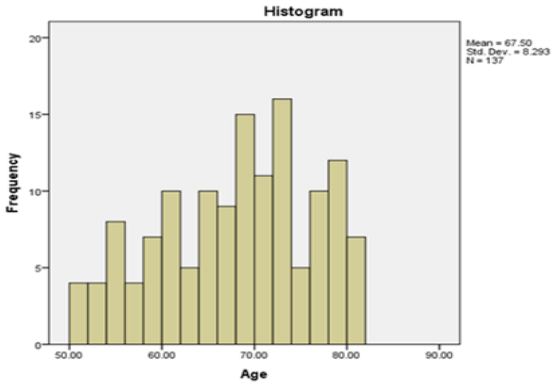

Figure 1: Distribution of participants age.

Family history of gastric cancer was present in 8.0% (11/137) of participants. Having blood type A was reported by 14.4% (19/132) of participants, however 49.2% (65/132) of participants did not know their blood type.

Overall, 37.2% (51/137) of participants reported consuming alcohol. Of these participants, 88.2% (45/51) were light drinkers, 9.8% (5/51) were moderate drinkers and 1.9% (1/51) were heavy drinkers. Only 11.7% (16/137) of participants admitted to smoking cigarettes. Of these participants, 12.5% (2/16) were light smokers, 43.8% (7/16) were moderate smokers, and 43.8% (7/16) were heavy smokers (Table 1).

Table 2: Follow up questionnaire.

Variable	Unlikely/highly unlikely		Likely/very likely		Not sure	
	n	(%)	n	(%)	n	(%)
Reducing/stopping tobacco (n=16)	6	37.5	8	50.0	2	12.5
Reducing/stopping alcohol* (n=51)	27	52.9	11	21.6	5	9.8
Reducing/stopping salty food* (n=58)	22	37.9	29	50.0	5	8.6
Reducing/stopping processed food* (n=71)	26	36.6	40	56.3	5	7.0
Reducing/stopping pickled food* (n=46)	18	39.1	24	52.2	2	4.3
Reducing/stopping cured meat* (n=49)	21	42.9	19	38.8	3	6.1
Total	41.2%		45%		7.7%	

* In some follow up questions there were participants WITH the risk factor who answered non-applicable for that question.

In the follow up questionnaire, 50% (8/16) of tobacco smokers answered likely or very likely to reduce or stop their tobacco consumption, however only 21.6% (11/51) of alcohol drinkers were willing to reduce or stop their consumption. Consumption of processed foods was a risk factor which 56.3% (40/71) of participants were willing to reduce. Participants who consumed salted, pickled or cured foods also answered that they would modify these risks, with 50.0% (29/58), 52.2% (24/46) and 38.8% (19/49) of respondents saying they were likely to reduce their consumption respectively.

Overall, the results show participants were likely or highly likely to modify 45% (131/291) of their gastric cancer risk factors following education (Table 2).

There was a statistically significant association between gender and reduction/stopping of processed food ($\chi^{2=}$6.355a, df=2, p=0.042). The results indicate that more females were likely to reduce/stop their consumption of processed food compared with males (40% [28/70]) vs (15.7% [11/70]) respectively. There was also a statistically significant association between gender and reduction/stopping pickled food consumption ($\chi^{2=}$11.192[a], df=3, p=0.011). The results showed that 32.0% (14/44) of females were likely to reduce or stop their consumption of pickled foods, compared to 18.2% (8/44) of males.

Age also had a statistically significant influence on the willingness to modify salted food consumption ($\chi^{2=}$10.096[a], df=3, p=0.018). Our results demonstrate that 33% (19/58) of the respondents who were aged 65 to 80 years old were less likely to reduce their salted food intake, compared to 5.2% (3/58) of those who were aged 50 to 64 years old.

DISCUSSION

Summary and analysis of results

Our study found that participants had varying levels of willingness to change risk factors. We found that 50% or more of people were likely or very likely to reduce tobacco intake, salty food intake, processed food intake and pickled food intake following education of gastric cancer risk factors. Our results show that age had an impact in the willingness to modify some risk factors, as participants in the 50 to 64-year-old group were more likely to reduce intake of salted foods. We also found that gender had an impact in the willingness to modify risk factors, as females were more likely to reduce intake of processed foods and pickled foods than males. Overall, we found that participants were likely or very unlikely to modify 45% of their risk factors following education. This study indicates that our interventional tool may influence and may have a varying impact on the willingness of participants to modify their behaviour.

A surprising finding was the varying responses we received for each risk factor. We believe that attitudes

towards lifestyle choices may have an impact on their willingness to quit. For example, many people believe mild to moderate alcohol consumption is rather harmless and socially accepted, and were therefore less likely to quit.[23] On the other hand, there was a higher response for tobacco smoking, however this figure may have been higher still if not for the addictive nature of smoking, and the unwillingness of some participants to stop.[24,25]

We were also surprised by the impact age and gender had on some risk factors. The reasons as to why this is so, is unknown. Previous studies have not shown why only specific risk factors are influenced by certain age groups, or a specific gender.[3,14,26] Further research is needed to determine if there is a strong correlation between these variables, and whether there is any clinical significance. A possible explanation may be due to the differing attitudes towards lifestyle choices based on age and gender, and unwillingness to cease certain lifestyle risk factors. Older participants often were unwilling to make drastic changes, and wished to enjoy their current comforts in life. Further studies could identify impacts of gender and age on risk factor modification, which could help develop tailored education, targeting those most likely to change and benefit.

Overall, our findings found success in increasing the willingness of participants to modify risk factors. We were however unable to compare our results with previous studies due to the descriptive nature of our results, and the lack of clinical parameters. Previous studies did however suggest that increased motivation correlated with actual behavioural modification, as well as changes in clinical parameters.[11,27,28]

Practical implications

This study shows that education has the potential to increase willingness to modify behaviour. In order to determine if our educational tool truly did modify behaviour, the study would have to involve follow-up with participants. It would require getting a more detailed baseline of participants' behaviour, and then following up over time to determine if they actually changed behaviour. Further studies could also determine the amount of information retained over time. This data may have significant implications in the education of those in the Campbelltown area, which may then be extended to the general population. The current incidence of stomach cancer in the Campbelltown area is 12.1/100,000, which is almost 40% higher than the state average (8.8/100,000).[19] The higher incidences of gastric cancer and its risk factors make Campbelltown an ideal area to conduct future studies regarding risk factor modification.[17,18]

The use of such educational tools is relatively inexpensive, and it would therefore be interesting to see whether it is more cost-effective in prevention compared to other techniques such as the use of paid health care billboards advertisement.[28] This would however require extensive research as to how many participants actually reduced exposure to risk factors, and then to how this correlated to the change in gastric cancer incidence. Educational information sheets as a method of risk factor modification may also be trialled for other health issues.

Community engagement

During the course of our research, we were able to engage and interact with members of the community within the Campbelltown area. We gained valuable experience talking to people not within a hospital setting, and were able to gain insight regarding healthcare perception in the community, including education and prevention. We found it extremely helpful in trying to communicate scientific and medical knowledge to people in the community, which we believe is an essential skill for a healthcare professional to have. We received varying responses, with many participants in the community very supportive and grateful for our research and attempt at education, however many other people also seemed to have little interest. We did at times experience difficulty in recruiting participants, however we learnt how to overcome some barriers in attracting people, and learnt to accept that some people just weren't interested. Nonetheless, we believe the overall attitude was very positive and encouraging, and we received feedback suggesting we really did have an impact on some people we engaged with.

We were surprised at how many people were very interested in learning about gastric cancer. Many participants knew very little about gastric cancer, and did not know how common it actually was. It was also nice to hear when participants take a particular interest in our study, and those who wished to learn more about gastric cancer as a result of it. It was especially surprising to hear that some participants intended to pass on the educational forms to their family members and friends. This was incredibly rewarding, as we realised that our education may be able to extend further into the community, potentially have further benefits in attitudes towards risk factors.

We were very pleased to hear all our feedback, and reflecting on this helped us to continue to engage members of the community. We developed skills in communicating with participants, and were more effectively able to get our study across to people. It was especially encouraging when participants then recruited friends and family for our study, and seeing the varying attitudes existing within families or social groups. We believe this research provided us with an invaluable experience in interacting with people in the community, and to better understand attitudes towards healthcare perception, which we hope, will aid us in our future clinical practice.

Limitations

This study was a pilot study where we looked at the efficacy of an educational tool in behavioural modification. Therefore, we are unable to validate our results, and would require further studies to see if our results can be replicated. We also acknowledge several limitations with our data collection tool. The next step would be to improve the survey tool and retest. For example, for our follow-up survey, we believe the not-applicable option confused participants, as there were participants with a risk factor who subsequently answered not-applicable to the follow up question.

In the future, we believe administering a pre-education and post-education survey about attitudes towards risk factors would provide a better representation of the effects of education, rather than using descriptive statistics to present our results. However, we do still believe that results regarding participant attitudes towards risk factors may have been influenced by our educational tool on risk factor modification.

We did not set a target for the proportion of participants who were willing to modify risk factors, as there is no way to determine a statistically significant result that we could signify as a success for the study. We do however believe that any proportion of participants who are willing to modify risk factors is a positive one, and determining a proportion of participants who are potentially willing to modify risk factors will be helpful in future studies. Any results from this study will provide a good foundation base for future studies on behaviour modification.

The lack of long-term follow-up from this study means we are unable to ascertain whether there was indeed risk factor modification, and we are unable to quantify any potential change. Further studies are also required to look at the follow up retention of our results, and whether education does correlate to clinical results (e.g. reduction in gastric cancer incidence).

CONCLUSION

In conclusion, our study found that providing education regarding gastric cancer risk factors may have influenced participants to modify their behaviour. We found that participants were likely or very likely to modify 45% of their risk factors relating to gastric cancer following education. We also found that gender and age might have an influence on the willingness to modify certain risk factors. We believe that further research should be implemented to evaluate the actual efficacy of education on risk factor modification, as well as any impact this may have on future gastric cancer incidence and mortality. If any such educational tool were to be introduced to the general public or to targeted populations, it would be important to determine the cost-benefit of such program, and to determine the ideal target population for education as opposed to other possible interventions in the prevention of gastric cancer.

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