

The anatomical placement of body organs by Australian and New Zealand patients and health professionals in general practice

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ABSTRACT

INTRODUCTION: Understanding patients' awareness of the anatomical placement of their body organs is important for doctor–patient communication.

AIM: To measure the correct anatomical placement of body organs by people from Australian and New Zealand general practices

METHOD: A questionnaire survey containing drawings of 11 organs placed in different locations within each drawing.

RESULTS: Among 1156 participants, there was no difference in the proportion of correct placement of 11 organs between Australian (51.7%) and New Zealand (49.6%) general practices. There was a positive correlation between the proportion of correctly placed organs and the age participants left school ($p=0.012$) and a negative correlation with the number of GP visits in the previous year ($p=0.040$). Participants from rural Australia were more likely to correctly place organs than urban participants ($p=0.018$). The mean proportion of organs correctly placed for doctors was 80.5%, nurses 66.5%, allied health 61.5%, health administrators 50.6% and the remaining consulting patients 51.3%.

DISCUSSION: Patients from Australian and New Zealand general practice were poorly aware of the correct placement of organs. Health professionals were moderately better than patients at correct placement.

KEYWORDS: Health knowledge; attitudes; practice; anatomy; general practice

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Introduction

The general public has been poorly aware of the anatomical placement of body organs for many years. Three UK studies found that only 50% of people correctly identified the placement of organs.^{1–3} Understanding how patients place their organs is important for doctor–patient communication.¹

A literature search found only UK studies in this area.^{1–4} The aims of this study were to test the null hypothesis that the rate of correct placement of organs was 50% for patients attending Australian and New Zealand general practices and to compare the rate of correct placement of organs by patients and health professionals.

Methods

A convenience sample of three general practices from urban Australia, three from rural Australia, and two from urban New Zealand was approached. All participants over 18 years of age consented to completing the questionnaire while sitting in waiting rooms during normal practice hours over a three-day period. Health professionals from the practices, staff from the ACT Division of General Practice, and staff from the Southern General Practice Network also completed the questionnaire.

Weinman's cross-sectional questionnaire-based design was replicated.¹ Anatomical placement was the dependent variable. The first part of

J PRIM HEALTH CARE
2012;4(3):239–241.

Table 1. Comparison of the percentage of correct anatomical placement of 11 organs for 1156 participants from Australia and New Zealand who reported having the following chronic diseases: asthma, chronic obstructive pulmonary disease, diabetes, heart failure, or hypertension

Body organ	Total N (%)	Asthma N=142	COPD N=26	Depression N=151	Diabetes N=75	Heart failure N=26	Hypertension N=257
Bladder	1046 (93.5)	94.2%	96.2%	90.7%	83.8% [†]	93.3%	94.0%
Intestine	1031 (91.3)	93.6%	88.5%	91.4%	90.7%	80.6% [†]	89.8%
Liver	636 (57.5)	61.9%	48%	57.4%	50.7%	58.6%	54.2%
Stomach	557 (49.6)	51.8%	38.5%	46.3%	45.2%	30% [‡]	45.2%
Gallbladder	552 (50.5)	49.6%	65.2%	40.7%	47.9%	48.1%	54.1%
Pancreas	498 (45.6)	40.6%	48%	40.4%	46.5%	46.2%	51.0%
Heart	480 (42.9)	46.4%	38.5%	43.2%	45.2%	36.7%	36.4% [§]
Kidney	474 (42.2)	43.6%	46.2%	42.3%	38.4%	30.0%	44.2%
Ovaries	381 (34.1)	30.4%	52%	35.1%	38.7%	48.3%	32.4%
Lungs	351 (31.5)	28.1%	24%	31.1%	34.7%	35.5%	31.1%
Thyroid	270 (24.4)	17.9%	4.3%*	20.1%	17.8%	20.7%	25.8%

* $p=0.024$

† $p=0.001$

‡ $p=0.033$,

§ $p=0.02$

Table 2. Comparison of the percentage of correct anatomical placement of body organs by 1088 participants from occupations in Australia and New Zealand

Occupation	N	Mean % of correct placement	SD
Health professionals*	141	63.8%	18.9%
Teaching	56	51.8%	15.5%
Students	34	53.4%	17.3%
Employed	490	49.1%	16.1%
Not employed [†]	367	49.2%	16.3%
Total	1088	51.3%	17.2%

* Includes doctors, nurses, allied health, health administrators

† Includes unemployed, retired, at home, beneficiaries

the questionnaire consisted of drawings testing the placement of the heart, lungs, stomach, intestines, bladder, thyroid, liver, kidneys, pancreas, gallbladder, and ovaries.¹ Each drawing depicted four body outlines each with the organ placed in different locations within an outline. Participants selected one out of four drawings they felt correctly placed the organ within the body outline.

The independent variables were gender; age; occupation; age on leaving full-time education; which, if any, of the following chronic diseases they had—asthma, chronic obstructive pulmonary disease (COPD), bronchitis/emphysema, depression, diabetes, heart failure, and hypertension/high blood pressure; urban or rural place-

ment of the practice; and number of times they had visited a general practitioner (GP) and/or a practice nurse over the previous 12 months.

The data were entered into PASW[®] Statistics 18 for appropriate statistical analysis. The Australian National University Human Ethics Committee and the New Zealand Health and Disability Ethics Committee, University of Otago Medical School, approved the study. Questionnaire responses were anonymous.

Results

Out of 1184 questionnaires returned, 28 were removed because participants were too young. Australians compared to New Zealanders were no different in their mean (SD) age (51.18 (16.23) years versus 49.26 (18.04) years, t -test=1.621, $p=0.105$). They left school at a slightly older age (19.20 (6.63) years versus 18.2 (6.25) years, t -test=2.115, $p=0.035$). They visited their GP more often in the previous year (4.32 (2.94) visits versus 3.59 (2.75) visits, t -test=3.299, $p<0.001$). And visited the nurse less often in the previous year (1.05 (2.14) visits versus 1.97 (2.32) visits, t -test=-5.734, $p<0.001$).

The mean (SD) proportion of organs correctly placed was 55.1% (19.2%) with no difference between Australia (51.7% (7.1%)) and New Zealand (49.6% (17.4%)).

There was no gender difference in the overall mean proportion of correct placement of organs (males 50.0% versus females 52.0%, $p=0.061$). There was a positive correlation between correct placement and the age participants left school ($r=0.076$, $p=0.012$). There was a negative correlation between correct placement and the number of GP visits in the previous year ($r=-0.061$, $p=0.040$). Participants from rural Australia were more likely to correctly place organs than from urban Australia (mean (SD) correct placement 5.68 (1.94) versus 5.41 (1.90), $t=2.36$, $p=0.018$). There was no correlation found for age of patient, number of nurse visits in the previous year and the number of reported chronic diseases.

Table 1 shows no difference in the proportion of correctly placed organs for participants reporting they had asthma or depression. Participants reporting COPD were less likely to correctly place the thyroid (Fisher's exact test, $p=0.034$). Participants reporting diabetes were less likely to correctly place the bladder ($\chi^2=11.484$, $df=1$, $p=0.001$). Participants reporting heart failure were less likely to correctly place the intestine ($\chi^2=4.549$, $df=1$, $p=0.033$) and the stomach ($\chi^2=4.528$, $df=1$, $p=0.033$). Participants reporting hypertension were less likely to correctly place the heart ($\chi^2=5.396$, $df=1$, $p=0.02$).

Table 2 lists the occupations of 1088 participants including 27 (2.5%) doctors, 40 (3.7%) nurses, 38 (3.5%) health administrators and 37 (3.4%) allied health workers. The mean (SD) proportion of organs correctly placed for doctors was 80.5% (11.5%), nurses 66.5% (13.4%), allied health 61.5% (18.1%), health administrators 50.6% (19.7%) and the remaining consulting patients 51.3% (17.2%). Health professionals (63.8%) were modestly better than the remaining occupations (51.3%) at correctly placing organs (one-way ANOVA, $p<0.001$).

Discussion

This study found people from Australia and New Zealand were poorly aware of the correct anatomical placement of 11 organs—a finding no different from the UK.¹ The biological characteristics of age, gender (as in the UK¹), and chronic disease did not appear to influence the correct

WHAT THIS GAP FILLS

What we already know: Patients in the United Kingdom have a poor understanding of anatomy.

What this study adds: Patients from Australian and New Zealand general practice also are poorly aware of the correct anatomical placement of organs. Health professionals were moderately better than patients at correct placement.

placement of organs. Social characteristics such as education (as in the UK,¹ the longer patients were educated, the more correct they were at placing organs), living in a rural location in Australia, or access to general practice services did appear to have an influence.

A limitation of this study is that it did not distinguish between patients' personal experience from what they had been taught when deciding on the correct placement of organs.

Understanding how patients place their organs is important for doctor-patient communication. For example, only 28% of patients with asthma could place their lungs correctly. This poor understanding of lung anatomy might influence the poor peak flow meter technique found among patients with asthma.⁵ Furthermore, the negative correlation between the correct placement of organs and the number of GP visits in the previous year, and the lack of correlation with visits to the nurse, suggests contact with health professionals did not add to patients' knowledge of anatomy. Perhaps also, communication difficulties arose because health professionals were only modestly better than their patients at correctly placing organs.

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ACKNOWLEDGEMENT

The authors would like to thank the people who contributed to this study.

FUNDING

This study was funded by the PHCRED researcher development programme.

COMPETING INTERESTS

None declared.