Prevalence of the use of self-tests by adults in the United Kingdom: a questionnaire survey

A. Ryan, S. Wilson, S. Greenfield
Department of Primary Care and General Practice, The University of Birmingham, Edgbaston, Birmingham B15 2TT, UK
Address correspondence to: A. Ryan, E-mail: a.v.ryan@bham.ac.uk

ABSTRACT
Background Self-tests that people can do without a health professional are widely available, but there is little information about how many people have used one. Our aim was to describe the prevalence of use.
Methods An initial questionnaire, sent to 8048 adults registered with six general practices in North Birmingham and Warwickshire and Worcestershire, asked whether the person had self-tested. A second questionnaire validated the use for people from the final four practices by asking how each self-test had been obtained and why it had been used.
Results The age-standardised prevalence of confirmed use for any self-test other than for pregnancy or high blood pressure was 47 (95% confidence interval (CI): 37–57) per 1000 women and 22 (95% CI: 14–30) per 1000 men. If everyone who initially reported use but did not return an eligible second questionnaire had the same rates of confirmed use as eligible responders, this would increase to 95 (95% CI: 81–110) per 1000 women and 55 (95% CI: 41–68) per 1000 men.
Conclusion An appreciable minority of the population have self-tested for medical conditions.
Keywords diagnosis, diagnostic tests, routine, self-care

Introduction
Self-tests that people can do at home without involving a doctor, nurse or other health professional are now widely available via the internet and high street pharmacies. These tests do not require the user to communicate with a doctor before obtaining the test or when receiving the results: the results are available at home within minutes or a sample is sent to a laboratory and the results are returned directly to the user.

Self-tests have potential benefits, for example privacy or convenience, but they also have potential harms, such as false hope arising from false negative results or distress caused by false positive results. Despite the potential impact of self-tests, there is little published information about how many people have used one: a comprehensive literature review identified only two recent surveys in the United Kingdom that asked participants about whether they had used a home testing kit. The aim of this study was to describe the prevalence of having used a self-test.

Methods
Initial questionnaire
During June and July 2006, questionnaires and prepaid envelopes were sent to 2335 adults aged 18 years or older registered with two general practices from North Birmingham Primary Care Trust. From October 2007 to January 2008, questionnaires and prepaid envelopes were sent to 5713 adults registered with four practices from Warwickshire and Worcestershire Primary Care Trusts. General practices generated random samples of adults, but they were asked to exclude anyone who might be distressed by the questionnaire, for example because of recent illness or bereavement, and people who lived with them were then
also excluded. The total sample was 8389 people and 341 were excluded, leaving 8048 people. One reminder was sent after three to four weeks. For all mailings, the letter included the option of returning a blank questionnaire to indicate that the person did not want to take part.

The questionnaire asked for age and sex. Self-tests were defined—Self-tests are bought from shops or over the Internet. They are used to test for conditions or diseases without involving a doctor, nurse or other health professional.’—and the questionnaire then asked whether the person had used named self-tests, identified by a systematic search of the internet, or another self-test. The crude prevalence of the reported use of each self-test was calculated, and a combined analysis calculated the crude prevalence of the reported use of any self-test. Self-test for pregnancy had been included for validation purposes but was excluded from the combined analysis because its use is now routine. Self-test for high blood pressure was also analysed separately because, unlike the other named self-tests, the user does not need to take their own biological sample. The prevalence estimates were directly standardised to the population of England and Wales in 2006 and 95% confidence intervals were calculated.

Second questionnaire
The initial questionnaire sent to people from the first two practices asked for consent to contact them about taking part in an interview about self-tests, and interviews were conducted with 23 respondents. The interviews, supplemented by a literature review, informed the design of a second questionnaire to determine factors associated with using self-tests. The initial questionnaire sent to people from the remaining four practices asked if they would be willing to participate in an interview about self-tests, and questionnaires were sent to people who marked one or more self-tests included a section for each test asking how it had been obtained and why it had been used (Box 1). People were excluded if the sex and/or age (+ / − two years) given on the initial questionnaire did not match the practice records. One reminder was sent after three to five weeks.

To estimate the crude prevalence of confirmed self-test use, the number of people who gave answers that indicated that they had used a self-test without clinical involvement was divided by the number of people from the final four practices who returned the initial questionnaire. This was calculated for each self-test, and a combined analysis was conducted for any self-test other than for pregnancy or high blood pressure. These estimates were directly standardised to the population of England and Wales in 2006 and 95% confidence intervals were calculated. An exploratory analysis considered the effect of assuming that everyone who initially reported use but did not consent or respond to a second questionnaire had the same age- and sex-specific rates of confirmed use as responders.

Results
Initial questionnaire
Eighty-four initial questionnaires were undelivered, for example because the addressee had died or moved, leaving 7964 questionnaires. Two thirds were returned (n = 5344, 67%): 259 were blank and 5085 (64%) were completed. Fifty-four people were excluded because they gave a different sex and/or age from the practice, indicating that they were not the intended recipient, and the discrepancies could not be resolved by checking for recipients at the same address who had filled in each other’s questionnaires. Six people who reported using non-sex-appropriate tests were excluded. Some of them reported using other tests, but they were completely excluded as their non-sex-appropriate answers indicate that the questionnaire may have been misunderstood. Men who said they had used pregnancy tests (n = 14) were not excluded though as this probably refers to use as part of a couple. Ten ‘other’ self-tests were excluded because the free text indicated that the test did not involve a biological sample, for example peak flow meter, but the respondents were not completely excluded as this did not indicate that the questionnaire had been misunderstood.

This left 5025 (63%) eligible completed questionnaires (see online Supplementary data, Table S1). The age and sex distribution of the overall study population was similar to the population of England and Wales in 2006, but response rates varied by age group. The youngest age groups had the lowest response rates, although younger women had considerably higher response rates than younger men.

Six hundred and seventy-eight (135 per 1000) people said that they had used a self-test other than for pregnancy or high blood pressure (Table 1). The crude prevalence of the reported use of any self-test other than for pregnancy or high blood pressure was 149 per 1000 women and 118 per 1000 men. The age-standardised prevalence was 144 (95% confidence interval (CI): 129–159) per 1000 women and 102 (95% CI: 89–116) per 1000 men. Most people (n = 537, 79%) said they had used one test, but 103 reported two tests, 24 reported three tests, and 14 reported four or more tests. The most commonly reported test, by 341 (68 per 1000) people, was for diabetes.
The use of a self-test for high blood pressure was reported by 822 (164 per 1000) respondents, and most (n = 554, 67%) reported no other use or only having also used a pregnancy test. The crude prevalence of the reported use of a self-test for high blood pressure was 158 per 1000 women and 170 per 1000 men. The age-standardised prevalence was 141 (95% CI: 127–155) per 1000 women and 143 (95% CI: 127–159) per 1000 men.

Second questionnaire
Nine hundred and twelve people from the final four practices said that they had used a self-test other than for pregnancy. Six hundred and seventy of them consented to a second questionnaire but 658 were sent out: five people were excluded because the sex and/or age on the initial questionnaire did not match details from the practice, although these discrepancies were later resolved by checking
for recipients at the same address who had filled in each other’s questionnaires; four people were excluded because it was not possible to confirm if they were the intended recipient as they did not give an sex and/or age on the initial questionnaire; and three people returned the initial questionnaire after the second questionnaires had been mailed. Two questionnaires were undelivered, leaving 656 (see online Supplementary data, Table S2). Over three quarters were returned (n = 497, 76%) and only 26 were blank, leaving 471 (72%) completed questionnaires. Three were excluded because the person gave a different sex and/or age than the practice, leaving 468 (71%) eligible questionnaires. These people had a similar age and sex profile to people who initially reported having used any self-test other than for pregnancy.

One hundred and thirty-two (56%) of the 235 people who initially reported use of a self-test other than for pregnancy or high blood pressure indicated that they had used the test without clinical involvement (Table 2). Use was usually confirmed for self-tests for diabetes, urine infection, cholesterol, vaginal infection, and allergies. For example, 28 (80%) of 35 people who originally reported having used a cholesterol test and 74 (62%) of 119 people who originally reported having used a diabetes test had actually done so. In contrast though, less than five of 49 people who initially said they had used a self-test for blood in the stool without the involvement of a health professional had actually done so. No valid use was reported for tests for sperm count, kidney disorders, chlamydia or HIV infection.

The crude prevalence of the confirmed use of any self-test other than for pregnancy or high blood pressure was 49 per 1000 women and 23 per 1000 men. The age-standardised prevalence was 47 (95% CI: 37–57) per 1000 women and 22 (95% CI: 14–30) per 1000 men. If everyone who initially reported use but was not sent or did not return an eligible second questionnaire had the same age- and sex-specific rates of confirmed use as eligible responders, the age-standardised prevalence would increase to 95 (95% CI: 81–110) per 1000 women and 55 (95% CI: 41–68) per 1000 men.

Initial use of a self-test for high blood pressure was confirmed for 254 (77%) of 330 people who initially reported use. The crude prevalence of the confirmed use of a self-test for blood pressure was 71 per 1000 women and 73 per 1000 men. The age-standardised prevalence was 63 (95% CI: 52–75) per 1000 women and 58 (95% CI: 46–69) per 1000 men. If everyone who initially reported use but was not sent or did not return an eligible second questionnaire had the same age- and sex-specific rates of confirmed use as eligible responders, the age-standardised prevalence would increase to 123 (95% CI: 107–139) per 1000 women and 112 (95% CI: 95–129) per 1000 men.

People accessed different self-tests in different ways (Table 3). People who had used cholesterol tests and tests for high blood pressure were most likely to have bought them from a pharmacy to use at home. In contrast, people who had used tests for diabetes had usually borrowed a friend’s or relative’s testing equipment, and people who had used tests for urine infection had most often accessed testing equipment at work.

**Discussion**

**Main findings of this study**

Extrapolating rates of confirmed use from eligible responders to people who did not consent to, or respond to the second questionnaire suggests that about 1 in 11 women and 1 in 19 men have used any self-test other than for pregnancy or high blood pressure, and that about 1 in 8 women and 1

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**Table 1** Crude prevalence of reported self-test use per 1000 respondents to the initial questionnaire

<table>
<thead>
<tr>
<th>Self-test for:</th>
<th>All (n = 5025)</th>
<th>Women (n = 2740)</th>
<th>Men (n = 2285)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>Prevalence</td>
<td>n</td>
<td>Prevalence</td>
</tr>
<tr>
<td>Diabetes</td>
<td>341</td>
<td>67.9</td>
<td>205</td>
</tr>
<tr>
<td>Urine infection</td>
<td>127</td>
<td>25.3</td>
<td>106</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>120</td>
<td>23.9</td>
<td>63</td>
</tr>
<tr>
<td>Blood in the stool</td>
<td>114</td>
<td>22.7</td>
<td>48</td>
</tr>
<tr>
<td>Vaginal infection</td>
<td>27</td>
<td>9.9</td>
<td></td>
</tr>
<tr>
<td>Allergies</td>
<td>48</td>
<td>9.6</td>
<td>33</td>
</tr>
<tr>
<td>Menopause</td>
<td>25</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>Prostate disorders</td>
<td>11</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>Low blood count</td>
<td>20</td>
<td>4.0</td>
<td>11</td>
</tr>
<tr>
<td>Sperm count</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney disorders</td>
<td>10</td>
<td>2.0</td>
<td>a</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>9</td>
<td>1.8</td>
<td>a</td>
</tr>
<tr>
<td>HIV infection</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
<td>3.6</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>678</td>
<td>134.9</td>
<td>409</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>822</td>
<td>163.6</td>
<td>433</td>
</tr>
</tbody>
</table>

*Numbers less than five and results that could lead to the deduction of numbers less than five have been masked.

**Total (any self-test other than for pregnancy or high blood pressure) is less than the sum of the components because some respondents used more than one test.*
in 9 men have used a blood pressure monitor. Tests were also accessed in a variety of ways other than simply buying a test, and this varied according to the test. Blood pressure monitors were usually bought at a pharmacy, but tests for diabetes, the next most commonly reported test, were most often accessed by using a friend’s or relative’s monitor.

What is already known on this topic

There have been few published studies in this area. A survey of around 2500 people about public attitudes to genetic testing conducted between December 2002 and January 2003 reported that 32% said that they ‘had ever bought a health testing kit, for example a cholesterol, pregnancy or blood sugar test, to carry out at home’.6 Prevalence estimates from the initial questionnaire in this study for diabetes (7%) and cholesterol (2%) were similar to estimates from a survey of around 3000 adults registered with general practices in Birmingham conducted in June 2005 (8 and 2% respectively).5 The estimate from the initial questionnaire from this study for the use of a self-test for high blood pressure (16%) was, however, much higher than that reported from the previous survey (9%).4 Differences in the populations surveyed would probably have affected other tests and the wording and layout of the questionnaires were similar, suggesting that this may reflect a real
difference, for example due to changes in the prevalence of use over time. The crude prevalence of the use of a self-test for high blood pressure reported on the initial questionnaire was 15% for the first two practices and 17% for the final four practices, which may support an increase over time. Interviewees from the first two practices mentioned advert for home blood pressure monitors, and increased awareness and availability could have contributed to a true increase in the prevalence of their use since the previous survey.

**What this study adds**

Self-tests are accessed in a variety of ways other than simply buying a test, and this study suggests that an appreciable minority of the population have self-tested for medical conditions. About 1 in 11 women and 1 in 19 men have used any self-test other than for pregnancy or high blood pressure, and about 1 in 8 women and 1 in 9 men have used a blood pressure monitor.

**Limitations of this study**

The initial questionnaire was kept short to improve response rates, but this limited the definition of a self-test. Although the questionnaire was piloted for ease of completion and face validity, interviews with respondents from the first two practices indicated that the definition had sometimes been misinterpreted. The second questionnaire, which was sent to respondents to the initial questionnaire from the final four practices, provided a means of validating initially reported use. As a result, it became apparent that some use did involve a health professional. For example, the second questionnaire demonstrated that the high prevalence of the reported use of tests for blood in the stool in one of the final four practices related to a pilot of the bowel screening programme in that area, highlighting the confusion between a test done at home but recommended by a clinician and a self-test done outside a clinical setting without clinical input.

Validation was, however, only possible for people who returned a second questionnaire. The estimates of the prevalence of confirmed use that are based on responses to the second questionnaires will, therefore, represent a lowest estimate. An exploratory analysis has been used to indicate possible actual levels, but this depended on assuming that levels of use are similar among those who did consent and then respond to a second questionnaire and those who did not consent or did consent but did not respond.

The original definition on the initial questionnaire stated that ‘Self-tests are bought from shops or over the Internet’. Despite this, much of the subsequently validated use related to tests that had been accessed in other ways, for example using a friend’s or relative’s diabetes monitor. There may, therefore, have been other respondents to the initial questionnaire who had used tests without clinical involvement but who had not bought them and who, therefore, did not mark them on the initial questionnaire.

The self-tests listed on the initial questionnaire (Table 1) included several that are sensitive, for example for HIV-infection. Questionnaires were marked with a unique study number rather than the person’s name or address and the cover letter stated that answers would be confidential and only seen by the research team, but the cover letter also said that respondents could leave out any question that they felt unhappy about answering. Prevalence, particularly for some self-tests, may, therefore, have been underestimated because of respondents’ concerns about disclosing information about their use.

Three hundred and forty-one people were excluded before the initial mailing: 226 were excluded by their general practice and 115 lived with someone excluded by their general practice. General practitioners (GPs) were asked to exclude people who might be distressed by the questionnaire and they were given examples of severe mental illness, terminal illness and recent bereavement. The exact reason for exclusion was not stated for 160 people, but a range of reasons were given for excluding the remaining 66 people, for example frailty, dementia and terminal care. Although these exclusions may have lead to a slight underestimation of self-test use, it seems unlikely that the results have been greatly affected.

The sample size was based on the number of people needed to estimate a 10% prevalence of self-test use, and it was estimated that a sample of 4200 people including 420 self-test users would be sufficient. It was not, however, anticipated that validation would be required and this, combined with the lower estimate of the prevalence of self-test use meant that, even though the sample was larger, the number of people who had actually used a self-test was lower than planned. As a result, the numbers of people who had actually used individual self-tests were small, restricting age- and sex-specific analyses by test.

**Conclusions**

An appreciable minority of the population have self-tested for medical conditions, and the continued emphasis on self-care combined with increased marketing of home diagnostic devices and the rise in their availability via the internet mean that the prevalence of self-testing is likely to increase in the future. This is supported by the higher estimates of the use
of home blood pressure monitors in this study than a previous survey. Consideration should be given to undertaking further studies to understand why people self-test and to assess the impact of self-test use on individuals, the population and health services.

Contributors
A.R., S.W. and S.G. were responsible for the overall design of the study. A.R. designed the questionnaires with input from S.W. and S.G. A.R. conducted the analysis and prepared the report with input from all authors.

Ethics
Ethics for this study obtained from Solihull Local Research Ethics Committee, reference 05/Q2706/13.

Supplementary data
Supplementary data are available at the Journal of Public Health online.

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