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The value of the physical examination in clinical practice: an international survey

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ABSTRACT

A structured online survey was used to establish the views of 2,684 practising clinicians of all ages in multiple countries about the value of the physical examination in the contemporary practice of internal medicine. 70% felt that physical examination was 'almost always valuable' in acute general medical referrals. 66% of trainees felt that they were never observed by a consultant when undertaking physical examination and 31% that consultants never demonstrated their use of the physical examination to them. Auscultation for pulmonary wheezes and crackles were the two signs most likely to be rated as frequently used and useful, with the character of the jugular venous waveform most likely to be rated as infrequently used and not useful. Physicians in contemporary hospital general medical practice continue to value the contribution of the physical examination to assessment of outpatients and inpatients, but, in the opinion of trainees, teaching and demonstration could be improved.

KEYWORDS: Bedside medicine, medical education, physical examination, physical signs

Introduction

Over the past 30 years, increasing use of technology has cast doubt on the value of physical examination in contemporary patient care.[1,2]

The perception that physical examination has limited value has developed despite the substantial literature demonstrating that many of its components possess diagnostic utility,[3,4] that it still contributes to diagnosis,[5] and that poorly performed or completely omitted physical examination contributes to clinical errors.[6] It is also argued, perhaps most importantly, that the act of physically examining a patient sits at the very heart of the clinical encounter and is vital in establishing a healthy therapeutic relationship with patients.[7] Critics of the physical examination cite its variable reproducibility and the utility of more sensitive bedside tools, such as point of care ultrasound, in place of traditional methods.[2,8]

Amid this uncertainty, there is little published information describing clinicians' opinions about the value of physical examination in contemporary clinical practice. Similarly, although some understanding of the comparative value of different components of the physical examination can be inferred from diagnostic utility studies,[3] clinicians' opinions about the relative value of different physical examination signs or manouevres (PESM) have never been formally explored. We therefore surveyed secondary care clinicians practising general internal medicine about the value of physical examination in their own day-to-day practice.

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Methods

Eligibility to participate

Clinicians of any level of experience that were involved in the care of adult patients referred to acute hospital admitting services or general medical outpatient clinics at the time of the survey or within the previous 2 years were eligible to participate.

Questionnaire

The questionnaire was designed by two authors, then modified following feedback from a small-scale pilot in 20 clinicians, with minor changes to language and ordering of questions.

Survey content

The final survey can be found in supplementary file S1.

The first part (Questions 1–9) established basic demographic information, the second (Questions 10–17) asked general questions regarding physical examination and its teaching, and the third (Questions 18–21) contained specific questions about a series of 58 specific PESMs selected to cover the broad variety that may be used in general internal medical practice and most commonly represented in textbooks of physical examination. Of these, 19 PESMs related to the nervous system, 11 to the cardiovascular system, nine to the abdomen and gastrointestinal tract, nine to the respiratory system, three each

to locomotor and endocrine systems and four to other aspects of physical examination.

Participants were asked to consider each question in the context of their general internal medicine work rather than any specialty work and to classify each PESM in relation to the frequency of their own use (relatively infrequent or relatively frequent) and the value they attributed to the PESM when used (useful or not useful).

An open text box could be used for any additional comments.

Ethical approval

Ethical approval was received from University College London and the Royal College of Physicians of Ireland.

Dissemination of the study questionnaire

The study was primarily promoted by a single email invitation to affiliates of royal colleges of physicians in the UK, Ireland, Australia and New Zealand, the Society for Acute Medicine and to trainees around the world who had sat the MRCP(UK) examination (11,347 direct invitations). The survey was also advertised in general form within e-bulletins circulated by the UK colleges of physicians. The survey was open from 1 January 2014 until 31 March 2014 and hosted online by a commercial company (SurveyMonkey).

Statistical methods and analysis

a) Respondents included in the analysis

A total of 3,706 physicians (32.7% overall response rate) returned the online questionnaire. However, 130 respondents did not fulfil the primary eligibility question and were excluded from the analysis. Questions 18 to 21 asked about each of the 58 PESM and analysis was restricted to the 2,684 physicians who answered at least 50 of these questions.

b) PESM utility scale

A simple scoring system based on possible combinations of responses to questions about each PESM was devised to provide a metric of each respondent's overall perception of the value of physical examination and compare the relative value of different PESM across multiple respondents. In this system, the combination of 'relatively infrequent: not useful' scored 1; 'relatively frequent: not useful' scored 2; 'relatively infrequent: useful' scored 3 and 'relatively frequent: useful' scored 4.

c) Statistical analysis

Statistical analyses were carried out with IBM SPSS 22.0. Inferential statistics included Pearson correlations, t-tests, one-way ANOVA and multiple regression. In view of the large sample size and the exploratory nature of some of the analyses, the alpha level was set at $p = 0.001$ to reduce the likelihood of type 1 errors. The PESM scores for physicians in different specialties were compared using oneway ANOVA, with an alpha of $p<0.001$. Post hoc comparisons used the Ryan-Einot-Gabriel-Welsch (REGW) range, also with an alpha of $p<0.001$.

Results

Table 1 summarises the demographics of the 2,684 respondents included in the analysis. Location of clinical experience was

Table 1. Demographics of 2,684 respondents who met the criteria for inclusion in the study

Characteristic	n (%)
Sex (NA*=25)	
Female	921 (34.6)
Male	1,738 (65.4)
Current clinical position	
Consultant or other career grade	1,222 (45.5)
Training grade	1,387 (51.7)
Retired	25 (0.9)
Not currently working	50 (1.9)
Country of primary medical qualification	
UK	982 (36.6)
European Economic Area (excluding UK)	261 (9.7)
Rest of the world	1,441 (53.7)
Has MRCP(UK) or similar	
No	1,239 (46.2)
Yes	1,445 (53.8)
Is an MRCP(UK) or similar examiner (NA=16)	
No	2,135 (80.0)
Yes	533 (20.0)
Country of general medical experience (NA=17)	
UK	1,225 (45.9)
European Economic Area (EEA, excluding UK and Ireland)	234 (8.8)
Other non-EEA/UK	1,208 (45.3)
> Ireland	207 (7.7)
> Australia	199 (7.4)
> Sudan	141 (5.3)
> Pakistan	130 (4.8)
> India	120 (4.5)
> USA	13 (0.5)
> Other	398 (14)
Year of primary medical qualification (NA=4)	
Pre-1980	236 (8.8)
1980–1989	331(12.4)
1990–1999	491 (18.3)
2000–2012	1,622 (60.5)
Median year of primary medical qualification	2002
Interquartile range of year of primary medical qualification	1992–2007
Specialty (n=2,681)	
General medicine	482 (18)
Geriatric medicine	396 (14.8)
Acute medicine	240 (9)
Diabetes and/or endocrinology	221 (8)
Cardiology	191 (7)
Gastroenterology and hepatology	179 (7)
Respiratory medicine	165 (6)
Nephrology	128 (5)
Neurology	67 (2.5)
Others/multiple/not specified	599 (22.3)

*Some respondents did not answer (NA) all questions

Table 2. Respondents' views on the general value and practice of physical examination

Question						Correlation with PESM utility scale*
Q10. How valuable is physical examination in the assessment of general medical referrals?	**Almost never valuable**	**Occasionally valuable**	**Frequently valuable**	**Almost always valuable**	–	–
Acute referrals (n=2,647)	0.6%	4.3%	25.5%	69.7%	–	0.306
Outpatient referrals (n=2,522)	1.0%	15.5%	39.8%	43.8%	–	0.371
Q11. What proportion of medical referrals require physical examination of any sort?	**0–24%**	**25–59%**	**50–74%**	**75–100%**	–	–
Acute referrals (n=2,654)	0.6%	2.9%	11.1%	85.3%	–	0.161
Outpatient referrals (n=2,523)	1.4%	8.7%	27.4%	62.5%	–	0.259
Q12. What proportion of medical referrals require a traditional, comprehensive, systematic physical examination?	**0–24%**	**25–59%**	**50–74%**	**75–100%**	–	–
Acute referrals (n=2,652)	7.2%	13.6%	29.9%	49.3%	–	0.319
Outpatient referrals (n=2,518)	12.4%	22.5%	34.8%	30.3%	–	0.412
Q13. In comparison to the history, how valuable is physical examination in the assessment of general medical referrals?	**Much less valuable**	**Slightly less valuable**	**About the same value**	**Slightly more valuable**	**Much more valuable**	–
Acute referrals (n=2,656)	7.4%	20.6%	39.3%	14.4%	18.2%	0.354
Outpatient referrals (n=2,525)	13.2%	26.3%	35.2%	11.9%	13.4%	0.398
Q14. In your experience of acute post receiving ward rounds what proportion of patients are actually examined by the consultant or other senior clinical decision maker, other than by taking the pulse? (n=2,666)	**0–24%**	**25–29%**	**50–74%**	**75–100%**		
	12.0%	20.0%	32.4%	32.3%	–	0.186
Q15. On how many occasions per week are the physical examination skills of the average FY/CMT level trainee directly observed by a consultant? (n=2,645)	**0**	**1–2**	**3–4**	**5–8**	**>8**	
All respondents	31.3%	44.3%	17%	5.7%	1.7%	0.261
Trainees	66%	28%	5%	1%	0%	
Consultants	27%	51%	17%	5%	1%	
Q16. On how many occasions per week does a consultant demonstrate their technique in any component of the physical examination to FY/CMT level trainees? (n=2,647)	**0**	**1–2**	**3–4**	**5–8**	**>8**	
All respondents	17.1%	47.0%	19.1%	8.1%	8.7%	0.143
Trainees	31%	47%	9%	6%	7%	
Consultants	8%	44%	20%	11%	17%	
Q17. How do the physical examination skills of current graduates from your own country of training compare with those of your own peer group at the point of graduation? (n=2,652)	**Much poorer**	**A littler poorer**	**About the same**	**A little better**	**Much better**	
	12.6%	28.1%	44.3%	10.3%	4.6%	0.062

*All correlations significant at p<0.001
CMT = core medical trainee; FY = foundation trainee; PESM = physical examination signs or manouevres

in 66 different countries and 84.6% (2,270) had their clinical experience in the same broad region (UK, European Economic Area, rest of the world) as that in which they had obtained their primary medical qualification.

The role of the physical examination

Questions 10 to 17 asked about the general value of physical examination in clinical practice and the teaching and observation of physical examination skills. Table 2 shows the results and the overall correlations with the PESM utility scale for questions 10–17.

Frequency of use and perceived usefulness of individual PESMs

Distribution of scores on PESM utility scale
The total PESM utility score for any single respondent could vary from a maximum of 232 (58×4) to a minimum of 58 (58×1). The distribution of scores was approximately normally distributed. Three respondents scored 58 (the minimum) and 29 scored 232 (the maximum).

Classification of PESMs
Table 3 summarises the percentages of respondents who felt each PESM was used frequently or infrequently, was useful or not useful, and the four possible combinations of frequently/infrequently and useful/not useful. The PESMs are ranked in relation to the descending order of frequency of use.

Frequency of use
Of 14 PESMs in the top quartile of frequency of use, seven (50%) involved the use of the stethoscope. Ten of the top quartile for frequency of use were also in the top quartile for usefulness. Three of four PESMs relevant to assessment of the eye were among the 15 PESMs in the lowest quartile of frequency of use, with assessment of visual fields the only ocular PESM in a higher quartile, and with visualisation of the retinae also in the lowest quartile for usefulness.

Usefulness
Of the sixteen PESMs in the highest quartile for usefulness, six (38%) related to the nervous system. The assessment of the character of the jugular venous waveform was rated as useful by only 51.3% of respondents, but assessment of jugular venous pressure was similarly rated by 81%. Table 3 also shows the various combinations of frequently/infrequently and useful/not useful. Of the 56 PESMs, 31 (55.0%) were classified as frequently used and useful by more than half of respondents and nine (16%) as infrequently used but nevertheless still useful.

Table 4 summarises 10 PESMs that were ranked highest in frequency of use, usefulness and each of the four combinations of frequent/infrequent and useful/not useful.

Auscultation of the chest for wheezes and crackles were the PESM most commonly classified as frequent and useful (95 and 94.1%, respectively). Assessment of visual acuity and evaluation of the optic disc by funduscopy were the most commonly classified as infrequently used and useful (54.8 and 54.7%, respectively).

The PESM most commonly classified as infrequently used and not useful (37.9%) was assessment of the character of the jugular venous waveform. PESM that were most commonly classified as frequently used but not useful were conjunctival pallor (21.6%), followed by auscultation to determine the cause of a cardiac murmur (15.6%) and abdominal palpation and percussion to assess the size of the kidneys (15.1%).

Which clinicians find physical examination most useful?

Physicians varied in their perception of the role of physical examination, as can be inferred from Table 2, questions 10–13, and in their perception of the utility of the various PESMs, as seen in Table 2, questions 14–17.

We carried out exploratory analyses of the relationship between the PESM utility scale scores and the demographic measures (Table 1) and the attitude measures (Table 2).

Demographic measures

Of the demographic measures in Table 1, there were no significant effects of sex, current level of practice, MRCP(UK) PACES or equivalent examiner status and year of primary medical qualification; neither was there any correlation with the time spent completing the questionnaire.

However, there were significant effects of country of primary medical qualification ($F\ [2,2680] = 55.94$, $p<0.001$; UK 180.7, EEA 181.4, rest of world 190.5); country of clinical experience ($F\ [2,2663] = 26.9$, $p<0.001$; means UK 182.9, EEA 183.0, rest of world 189.7), and having attained the MRCP(UK) or equivalent ($F\ [2,681] = 4.55$, $p<0.001$; with diploma = 184.1, without diploma = 188.3).

No significant differences were found between specialties.

General attitudes to physical examination

Table 2 shows the answers to questions 10 to 17, regarding general attitudes to physical examination, correlated with each physician's score on the PESM utility score as shown in the final column. All are significant with $p<0.001$.

Free text comments

A total of 461 respondents provided additional free-text comments, which were independently evaluated by two authors. 19% were general comments about the content, methodology or importance of the study. 81% were comments regarding the relative importance of physical examination, of which three-quarters were regarded as in support of physical examination and one-quarter as not supportive of physical examination in current practice. A selection of quotations from each group are available online as supplementary file S2.

Discussion

This study informs the debate about the value of physical examination by collating the views of a large number of secondary care physicians in contemporary practice around the world. Previous studies have been small, or set in the context of the annual adult screening physical examination in primary care in the USA.[9,10]

Table 3. Frequency of use and perceived usefulness of physical examination signs or manoeuvres*,†

Physical examination sign or manoeuvre	n	Useful %	Frequent %	Infrequent and not useful %	Frequent and not useful %	Infrequent and useful %	Frequent and useful %
Auscultation for pulmonary wheezes	2,677	**97.3**	**96.7**	*0.4*	*2.0*	*2.6*	**95.0**
Auscultation for presence of pulmonary crackles	2,671	**96.5**	**96.2**	*0.5*	*2.6*	*2.8*	**94.1**
Palpation of the abdomen for tenderness	2,675	**96.0**	**93.6**	*0.7*	*3.0*	*5.4*	**90.9**
Muscular power	2,674	**94.3**	**80.3**	*1.3*	*4.1*	*18.2*	**76.4**
Cerebellar function	2,680	**94.0**	59.4	*2.5*	*3.3*	38.0	56.1
Palpation of an artery to determine cardiac rate	2,672	**93.6**	**91.1**	*1.8*	*4.3*	*6.7*	**87.3**
Evaluation of gait	2,669	**93.4**	58.5	*3.6*	*2.5*	37.6	56.3
Level of consciousness using a rating scale (eg GCS)	2,670	**93.2**	**80.7**	*2.3*	*4.0*	*16.6*	**77.1**
Auscultation to determine if a cardiac murmur is present	2,677	**93.0**	**93.0**	*1.0*	*5.7*	*5.8*	**87.5**
Auscultation for pulmonary air entry	2,676	**92.5**	**92.3**	*2.7*	*4.5*	*4.8*	**88.0**
Plantar responses	2,671	**90.8**	**81.0**	*2.9*	*5.8*	*15.7*	**75.6**
Percussion of the chest for abnormal dullness	2,674	**90.6**	**75.6**	*3.7*	*5.4*	*20.4*	**70.5**
Tendon reflexes	2,672	**90.6**	**73.2**	*3.0*	*6.0*	*23.4*	**67.6**
External ocular movements	2,673	**90.5**	59.2	*4.6*	*4.5*	35.9	55.0
Lymphadenopathy	2,667	**90.2**	60.3	*3.9*	*5.2*	35.4	55.4
Palpation of abdomen for masses	2,678	**90.1**	**89.8**	*1.5*	*8.2*	*8.4*	**81.9**
Abdominal palpation and percussion to assess the presence of ascites	2,670	**89.7**	**68.2**	*4.4*	*5.4*	*27.0*	63.1
Pupillary responses	2,671	**89.6**	59.5	*5.2*	*4.8*	35.1	55.0
Assessment of speech	2,672	**89.5**	57.0	*6.2*	*3.9*	36.6	53.3
Muscular tone	2,672	**88.2**	**66.3**	*5.4*	*6.0*	*28.0*	60.6
Postural blood pressure for volume status	2,678	**88.2**	54.4	*6.8*	*4.8*	38.7	49.7
Abdominal palpation and percussion to assess the size of the liver	2,674	**87.9**	**79.5**	*4.1*	*7.7*	*16.0*	**72.2**
Evaluation of cutaneous rash	2,671	**87.7**	58.8	*5.7*	*6.2*	35.2	52.9
Abdominal auscultation for the presence of bowel sounds	2,677	**87.6**	**73.7**	*4.9*	*7.2*	*21.2*	**66.6**
Visual fields	2,675	**87.2**	40.1	*8.0*	*4.6*	51.8	35.7
Peripheral sensation	2,674	**86.9**	54.2	*6.9*	*5.9*	38.7	48.5
Auscultation of character of breath sounds	2,674	**86.5**	**88.5**	*4.3*	*8.9*	*6.9*	**80.0**
Evaluation of joints for impaired range of movement	2,673	**85.2**	42.3	*10.6*	*3.8*	47.0	38.6
Evaluation of the knee joint	2,673	**84.7**	35.1	*10.7*	*4.3*	54.1	*30.9*
Cognitive function using a rating scale (eg AMT)	2,663	**84.2**	58.9	*9.8*	*5.3*	*30.8*	54.1
Auscultation of the heart sounds	2,679	**84.0**	**83.3**	*5.4*	*10.4*	*11.1*	**73.0**
Examination of the thyroid gland	2,676	**83.3**	41.9	*12.3*	*4.1*	45.7	37.9
Auscultation to determine the character of pulmonary crackles	2,679	**81.9**	**84.3**	*6.9*	*11.1*	*8.6*	**73.4**
Postural stability by Romberg's test	2,675	**81.7**	37.2	*13.0*	*5.1*	49.7	*32.3*

Table 3. ***(Continued)***

Physical examination sign or manoeuvre	n	Useful %	Frequent %	Infrequent and not useful %	Frequent and not useful %	Infrequent and useful %	Frequent and useful %
Assessment of the eyes for thyroid eye disease	2,674	**81.7**	35.3	*14.5*	*3.4*	50.0	*32.0*
Swallowing	2,670	**81.0**	34.2	*14.5*	*4.1*	51.0	*30.3*
Jugular venous pressure	2,672	**80.5**	61.6	*10.7*	*8.5*	*27.4*	53.4
Evaluation of joints for synovitis	2,669	**79.6**	*31.9*	*15.6*	*4.3*	52.3	*27.8*
Abdominal palpation and percussion to assess size of the spleen	2,673	**78.4**	61.8	*12.1*	*9.2*	*25.9*	52.9
Evaluation of the optic disc	2,676	**78.3**	*28.5*	*16.7*	*4.8*	54.7	*23.8*
Visual acuity	2,672	**76.6**	*26.6*	*18.5*	*4.6*	54.8	*22.2*
Auscultation to determine the cause of a cardiac murmur	2,672	**76.1**	**77.6**	*8.0*	*15.6*	*14.1*	62.4
Capillary refill time	2,672	**75.3**	50.8	*16.4*	*8.0*	*32.6*	43.1
Thyroid status	2,674	**74.1**	37.1	*18.6*	*7.0*	44.2	*30.2*
Evaluation of the retinae	2,670	**73.4**	*25.4*	*21.3*	*4.8*	53.1	*20.7*
Rectal examination to assess the prostate gland	2,679	**71.9**	*28.1*	*21.7*	*6.2*	50.1	*21.9*
Palpation of the trachea	2,675	**70.9**	38.5	*20.5*	*8.4*	40.9	*30.2*
Palpation of artery pulse to determine character of the pulse	2,674	**70.6**	64.9	*17.1*	*12.1*	*17.8*	53.1
Abdominal auscultation to assess the character of bowel sounds	2,672	**68.7**	59.6	*18.2*	*12.7*	*21.9*	47.1
Skin turgor	2,671	**66.3**	56.9	*20.9*	*12.5*	*22.0*	44.6
Central cyanosis	2,670	64.2	47.9	*24.8*	*10.7*	*27.1*	37.4
Hearing	2,673	62.2	*19.3*	33.1	*4.5*	47.5	*14.9*
Praecordial palpation for the location and character of the apical impulse	2,675	62.0	45.3	*27.1*	*10.7*	*27.5*	34.7
Praecordial palpation to detect thrills or heaves	2,671	61.5	41.9	*27.5*	*10.7*	*30.4*	*31.3*
Chest expansion	2,671	60.4	33.7	*31.5*	*7.9*	34.7	*26.0*
Conjunctival pallor	2,673	53.0	59.6	*25.2*	*21.6*	*15.0*	38.2
Character of the jugular venous waveform	2,667	51.3	34.6	37.9	*10.4*	*27.3*	*24.4*
Abdominal palpation and percussion to assess the size of the kidneys	2,674	49.8	39.0	34.9	*15.1*	*26.0*	*24.0*
Summary statistics		**%**	**%**	**%**	**%**	**%**	**%**
Minimum		49.8	19.3	0.4	2.0	2.6	14.9
2.5 percentile		52.0	25.9	0.6	2.5	3.7	21.2
25 percentile		74.4	39.3	4.0	4.4	16.9	32.1
Median		84.5	59.1	8.0	5.6	27.8	53.0
75 percentile		90.2	77.1	17.9	8.5	40.4	69.8
97.5 percentile		96.3	95.1	34.1	15.4	54.4	92.7
Maximum		97.3	96.7	37.9	21.6	54.8	95.0

*The signs are ranked in descending order of perceived usefulness as defined in the Useful % column.
†As a further visual guide, percentages in each column over two thirds (>66%) are shown **in bold** and percentages under one third (<33%) are shown in *italics*.
AMT = abbreviated mental test; GCS = Glasgow Coma Scale

Table 4. The 'top ten' physical examination signs or manoeuvres ranked in descending order for frequency of use, perceived usefulness and the four combinations of frequent/infrequent and useful/not useful

Rank	Frequent (% respondents)	Useful (% respondents)	Infrequent and not useful (% respondents)	Frequent and not useful (% respondents)	Infrequent and useful (% respondents)	Frequent and useful (% respondents)
1	Auscultation for pulmonary wheezes (96.7)	Auscultation for pulmonary wheezes (97.3)	Character of the jugular venous waveform (37.9)	Conjunctival pallor (21.6)	Visual acuity (54.8)	Auscultation for pulmonary wheezes (95)
2	Auscultation for presence of pulmonary crackles (96.2)	Auscultation for presence of pulmonary crackles (96.5)	Abdominal palpation and percussion to assess the size of the kidneys (34.9)	Auscultation to determine the cause of a cardiac murmur (15.6)	Evaluation of the optic disc (54.7)	Auscultation for presence of pulmonary crackles (94.1)
3	Palpation of the abdomen for tenderness (93.6)	Palpation of the abdomen for tenderness (96.0)	Hearing (33.1)	Abdominal palpation and percussion to assess the size of the kidneys (15.1)	Evaluation of the knee joint (54.1)	Palpation of the abdomen for tenderness (90.9)
4	Auscultation to determine if a cardiac murmur is present (93.0)	Muscular power (94.3)	Chest expansion (31.5)	Abdominal auscultation to assess the character of bowel sounds (12.7)	Evaluation of the retinae (53.1)	Auscultation of pulmonary air entry (88.0)
5	Auscultation for pulmonary air entry (92.3)	Cerebellar function (94)	Praecordial palpation to detect thrills or heaves (27.5)	Skin turgor (12.5)	Evaluation of joints for synovitis (52.3)	Auscultation to determine if a cardiac murmur is present (87.5)
6	Palpation of an artery to determine cardiac rate (91.1)	Palpation of an artery to determine cardiac rate (93.6)	Praecordial palpation for the location and character of the apical impulse (27.1)	Palpation of artery to determine character of the pulse (12.1)	Visual fields (51.8)	Palpation of an artery to determine cardiac rate (87.3)
7	Palpation of abdomen for masses (89.8)	Evaluation of gait (93.4)	Conjunctival pallor (25.2)	Auscultation to determine the character of pulmonary crackles (11.1)	Swallowing (51.0)	Palpation of abdomen for masses (81.9)
8	Auscultation of character of breath sounds (88.5)	Level of consciousness using a rating scale (eg GCS) (93.2)	Central cyanosis (24.8)	Praecordial palpation to detect thrills or heaves (10.7)	Rectal examination to assess the prostate gland (50.1)	Auscultation of character of breath sounds (80.0)
9	Auscultation to determine the character of pulmonary crackles (84.3)	Auscultation to determine if a cardiac murmur is present (93)	Rectal examination to assess the prostate gland (21.7)	Praecordial palpation for the location and character of the apical impulse (10.7)	Assessment of the eyes for thyroid eye disease (50.0)	Level of consciousness using a rating scale (eg GCS) (77.1)
10	Auscultation of the heart sounds (83.3)	Auscultation for pulmonary air entry (92.5)	Evaluation of the retinae (21.3)	Central cyanosis (10.7)	Postural stability by Rombergs test (49.0)	Muscular power (76.4)

GCS = Glasgow Coma Scale

There is no agreed means by which the 'value' of physical examination in general or of any specific PESM might be defined. Most evidence regarding physical examination defines value only in relation to statistical measures of diagnostic accuracy, which relate the presence or absence of specific physical findings to the presence or absence of specific diagnoses.[3] Such statistical measures are highly context- and operator-dependent and in real-life clinical practice, perception of value may also relate to immediacy of availability, cost effectiveness, and contact it provides with patients.[11,12]

In this study, the value of physical examination was based on two parameters – how frequently a PESM is used and the importance a clinician places on the PESM when they do use it, which we entitled 'usefulness'. Distinguishing frequency of

use from usefulness is important as clinical experience, and the results of this study, suggest that some infrequently used PESM do have value. Low frequency of use of a PESM could also reflect the low prevalence of a disease or condition (eg examination of the fundus for papilloedema) or even poor access to the necessary equipment (eg the ophthalmoscope).[13]

The wide range of frequency of use identified suggests that the 58 PESMs selected are reasonably representative of those used in contemporary practice. Cardiorespiratory disease dominates inpatient and outpatient practice in internal medicine and may explain why seven of the ten most frequently performed PESMs relate to those systems.

No PESM was classified as not useful by significantly less than half of respondents, which could indicate respondent bias or the particular PESM studied. Neurological examination was strongly represented in those PESM most frequently classified as useful, perhaps reflecting the relative lack of easily accessible technology other than imaging to assess the possible presence or nature of nervous system disease and more limited access to such imaging in some settings.

The diagnostic accuracy of some of the 58 PESMs has been studied, but we have not attempted to formally correlate results from such studies with the opinions of clinicians in this study, largely because of the heterogeneous way in which diagnostic accuracy is reported.[11] The PESM characterised as most useful in this study (pulmonary wheeze) is not the most highly accurate or reliable PESM in the diagnostic accuracy literature, and the least useful (abdominal palpation and percussion to assess the size of the kidneys) has never been systematically studied.[3]

Physicians who qualified or were working in the UK found physical examination less valuable than those who qualified or were working elsewhere. The survey did not gather information regarding ease of access to technological aids to diagnosis, but the large number of respondents from countries outside the UK where the access to technology could be expected to be at least as good, makes access an unlikely explanation. It is of interest that younger clinicians, and those in training grades, found physical examination more valuable than older or fully trained colleagues, despite some evidence to suggest that the skills of younger clinicians may be declining.[14]

The discordant views of trainees and their trainers about the frequency that each observes the other undertaking physical examination are of interest. If direct observation, feedback and deliberate practice are central to the acquisition of competence,[15] this study supports others that suggest that demonstration of physical examination by trainers and observation of trainees could be greatly improved in the workplace.[16] The current emphasis in the UK on simulation in training is welcome, but must be matched by initiatives that promote bedside teaching.

Limitations

The study has several limitations. Most of the participants came from medical educational systems that place importance on the summative assessment of physical examination at postgraduate level. This may have introduced bias and it would be of interest to reproduce the study in a setting where there is less emphasis on summative assessment of clinical skills, for example the USA.

The questionnaire was advertised to over 10,000 individuals. Although the response rate could be regarded as low, it should be seen in the context of web-based surveys in general and the marketing analysis provided indicated that the opening rate was higher than is the case in other similar surveys. However, those who did respond may have expressed views that were not wholly representative of the physician community. In addition, although clinicians were asked to base their responses on their general medical experience, those with organ specialty roles may have favoured PESM from within their own specialty.

Conclusions

Overall, these results strongly suggest that physical examination remains important in the day-to-day practice of internal medicine in secondary care settings. The novel and simple ranking of PESM according to their frequency and usefulness used in this study may assist educators in focusing on the teaching and assessment those of highest perceived value in clinical curricula[9] and provide clinical researchers with a focus for future studies of diagnostic accuracy, either of physical examination alone or in comparison to or in conjunction with other diagnostic modalities, that, if combined with cost effectiveness data, might inform future diagnostic strategies.[17] ■

Conflicts of interest

The authors have no conflicts of interest to declare.

Author contributions

ATE conceived the study, designed the questionnaire and led the writing of the paper. ICM led the data analysis and contributed to the drafts at all stages. AP, KN, LV and JD contributed to the questionnaire design, early data analysis and drafts of the paper at all stages.

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