Do doctors and patients agree on cardiovascular-risk management recommendations post-consultation?
The INTERMEDE study

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ABSTRACT

Background
Understanding interactions between patients and GPs may be important for optimising communication during consultations and improving health promotion, notably in the management of cardiovascular risk factors.

Aim
To explore the agreement between physicians and patients on the management of cardiovascular risk factors, and whether potential disagreement is linked to the patient's educational level.

Design of study
INTERMEDE is a cross-sectional study with data collection occurring at GPs' offices over a 2-week period in October 2007 in France.

Method
Data were collected from both patients and doctors respectively via pre- and post-consultation questionnaires that were 'mirrored', meaning that GPs and patients were presented with the same questions.

Results
The sample consisted of 585 eligible patients (61% females) and 27 GPs. Agreement between patients and GPs was better for tangible aspects of the consultation, such as measuring blood pressure ($\kappa = 0.84$, standard deviation [SD] = 0.04), compared to abstract elements, like advising the patient on nutrition ($\kappa = 0.36$, SD = 0.04), and on exercise ($\kappa = 0.56$, SD = 0.04). Patients' age was closely related to level of education: half of those without any qualification were older than 65 years. The statistical association between education and agreement between physicians and patients disappeared after adjustment for age, but a trend remained.

Conclusion
This study reveals misunderstandings between patients and GPs on the content of the consultation, especially for health-promotion outcomes. Taking patients' social characteristics into account, notably age and educational level, could improve mutual understanding between patients and GPs, and therefore, the quality of care.

Keywords
cardiovascular diseases; communication; counselling; healthcare disparities; education; patients; physician–patient relations; physicians; socioeconomic factors.

INTRODUCTION

Understanding interactions between patients and GPs is potentially important for optimising communication during consultations and improving health promotion, notably in the management of cardiovascular risk factors.[1-3] Little is known of the role played by these interactions in the maintenance or production of health disparities.[4-6]

The objective of this study was to explore the concordance between GPs and patients' declarations on the management of cardiovascular risk factors, and to explore whether potential disagreement was linked to patients' educational level.

METHOD

Study design
The design and methods of the INTERMEDE study's quantitative phase (Figure 1) have been described in detail elsewhere.[7]

Briefly, answers to questions on management of cardiovascular risk factors (obesity, arterial

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hypertension, sedentary lifestyle, poor diet, alcohol and tobacco consumption) were collected from 'mirrored questionnaires', whereby patients and their GPs were asked the same questions respectively and independently after the consultation, in a sample of volunteer GPs and their patients (Appendix 1). Physicians were not advised to enquire about cardiovascular risk factors.

Educational level was used to measure socioeconomic status in three categories: A-level+ (≥12 years' education); up to GCSE (general certificate of secondary education; 6–11 years' education); and no qualification (<6 years' education).

Statistical analysis
Agreement between patients and GPs about what happened during consultations was analysed using the kappa statistic κ.[8] The cluster effect of several patients sharing the same physician was taken into account by carrying out a multilevel logistic regression analysis, adjusting for age and sex.[9] Analyses were conducted using Stata 10 statistical software.

Ethics
All data were anonymised, and the study received approval from the French Data Protection Authority (CNIL).

RESULTS
Quantitative sample
The sample consisted of 585 eligible patients and 27 GPs (Figure 2). Patient characteristics are described in Table 1. No difference was observed in educational level between the sexes; however, there was an association between age and education, where 48.7% of patients without any diploma were aged over 65 years. GP characteristics are described in Table 2.

Agreement between physicians and patients
Overall, concordance varied widely by topic (Appendix 2). Physician non-response to questions about the assessment of patients' physical activity level, and patients' cigarette and alcohol consumption were high (18.7%, 14.4%, and 39.7% respectively).

Agreement between physicians and patients and patients' educational levels
The bivariate analyses (Appendix 2) showed that as patients' level of education decreased, there was a significant decrease in agreement between patients and their GPs about information given by the GP during the consultation (blood pressure, glycaemia, weight). A similar gradient was observed for whether advice was given on nutrition, weight loss, and

physical activity, with the poorest agreement for patients without any qualification. Among the discordant pairs, physicians were likely to declare having advised their patients on nutrition (67%), when the patients claimed the opposite (33%).

Associations with education level disappeared with the introduction of patients' age into the model (Table 3). No interaction term was statistically significant, and the multilevel analysis revealed no significant physician-level effect.

DISCUSSION
Summary of main findings
The research aim was to explore facets of the patient–physician interaction, which may generate

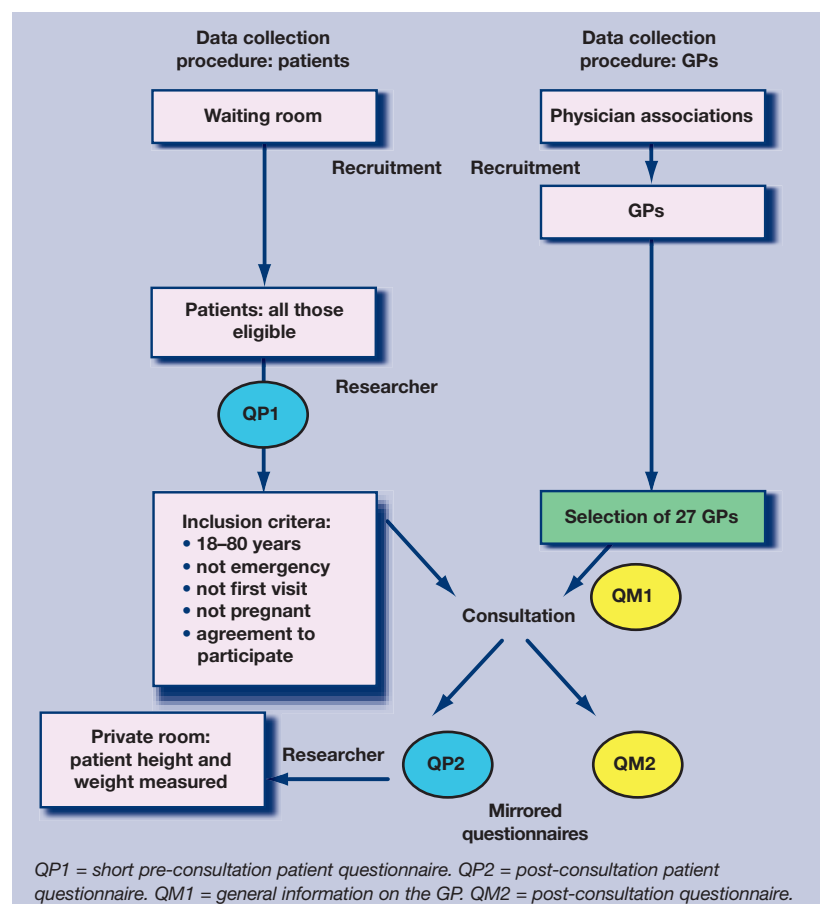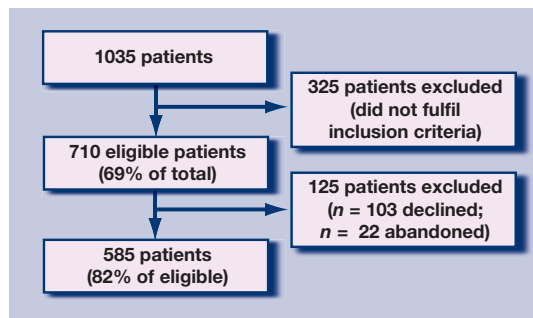*Figure 1. Diagram of quantitative data-collection procedure.*

QP1 = short pre-consultation patient questionnaire. QP2 = post-consultation patient questionnaire. QM1 = general information on the GP. QM2 = post-consultation questionnaire.

Figure 2. Diagram of quantitative patients' sample.

physical activity. This highlights that some facets of the management of cardiovascular risk factors appear to be dealt with more comfortably by both patients and GPs, whereas others are characterised by lack of clarity and misunderstanding.

Patients' age played a significant role in the concordance between physicians and patients, and was closely related to the level of education, with older patients having the lowest level of education. Although adjusting for age in the multivariate model deleted a statistical association between education and agreement/disagreement between patients and GPs, a trend across educational categories still remained. It is likely, therefore, that both age and educational level play a role in determining concordance between patients and GPs, whereby mutual comprehension may be affected when the patient is older and/or has a low education level. This could potentially lead to misunderstandings between patients and GPs and, consequently, to the quality of care being compromised.

health disparities, notably concerning the management of cardiovascular risk factors in the context of primary care. The agreement between patients and their GPs was better for tangible aspects of the consultation, such as measurements and physical examinations undertaken (auscultation, measuring blood pressure and weight) and information given, compared to more abstract dimensions, such as counselling and assessing patients' physical activity and alcohol intake.

Discordances between patients and physicians were most salient for facets of the consultation relating to physical activity and nutrition, while, in contrast, there was a good level of concordance on whether advice was given on alcohol and cigarette consumption. Thus, the management of hypertension, and alcohol and cigarette consumption were discussed more readily and understood by both parties during a typical consultation, in contrast to issues of nutrition and

Strengths and limitations of the study
To the authors' knowledge, this study is original in its design and contributes to understanding what goes on during a consultation between patients and GPs.

Potential bias and limitations of study design have been described and discussed in detail elsewhere.[7] While κ is the most commonly used statistic for measuring the agreement between two or more observers, the limitations of this statistic are well known,[10] explaining why a multiple regression was carried out in the second step of the analyses.

Comparison with existing literature
This study brings to light misunderstandings between patients and GPs in the content of the consultation, especially with regard to prevention. A study of three general practices in England revealed how patients' and doctors' perceptions of the content of the consultation differed according to the patients' social class.[11] Doctors perceived that they listened, examined, and gave advice less often to patients in the lowest social class compared to those in the upper social classes, and gave explanations more often to males than females. Taira *et al* showed that physicians were more likely to discuss diet and exercise with high-income patients than those from a low-income group; however, they were more likely to discuss smoking with low-income patients.[12]

A rich international literature highlights that a patient's inclination to participate in medical decision making, notably on cardiovascular disease management, varies by characteristics, such as age and education, but also by sex, coping style, and severity of condition.[13–18] This emphasises the

Table 1. Patient characteristics.

Patient characteristics	Males, % (*n*)	Females, % (*n*)	*P*-value
	38.8 (227)	61.2 (358)	
Region			
Pays de la Loire	38.2 (66)	61.9 (107)	
Ile de France	36.0 (77)	64.0 (137)	
Midi-Pyrénées	42.4 (84)	57.6 (114)	NS
Age, years			
18–34	24.8 (56)	22.9 (82)	
35–49	22.6 (51)	31.0 (111)	
50–59	27.0 (61)	16.2 (58)	
≥60	25.7 (58)	29.9 (107)	<0.05
Educational level, years of education			
A-level and higher (≥12 years)	43.0 (92)	47.6 (165)	
Up to GCSE (6–11 years)	39.3 (84)	30.3 (105)	
No qualification (<6 years)	17.8 (38)	22.2 (77)	NS
BMI,[a] kg/m²			
<18.5	0.9 (2)	3.7 (13)	
18.6–24.9	41.2 (93)	50.6 (176)	
25.0–29.9	42.0 (95)	26.4 (92)	
≥30.0	15.9 (36)	19.3 (67)	<0.005

[a]Anthropometric measures such as body weight and height were measured in a private room by the researcher; body mass index (BMI) was then computed as body weight divided by reported height squared (kg/m²). GCSE = general certificate of secondary education. NS = not significant.

importance of a shared identity between patients and physicians that improves patients' trust, satisfaction, and observance, facilitating more positive healthcare interactions.[19,20] Likewise, the way in which a physician perceives a patient (for example, intelligent, compliant) affects how they treat them during the consultation.[21–25] If, as evidence suggests, the patient–physician relationship does affect a patient's healthcare trajectory, how they are treated, and their compliance with treatments could, in turn, lead to health disparities that will permeate across the healthcare system.

Implications for clinical practice and future research

Taking age and educational level into account during a consultation in general practice could improve the mutual comprehension between physicians and their

Table 2. GP characteristics.

GP characteristics	Males	Females
n	17	10
Age, years		
35–44	2	1
45–54	7	5
55–61	8	4
Fees		
Sector 1[a]	15	10
Sector 2[b]	2	0
Type of practice		
Individual	6	2
Group of GPs	9	5
Multidisciplinary (GPs and specialists)	2	3

[a]*standardised French National Health Service fee.*
[b]*physician variable fee.*

Table 3. Agreement between physicians and patients on the management of cardiovascular risk factors during the consultation. Multilevel logistic regression analysis.[a]

Educational level, years of education	OR (95% CI)	*P*-value	OR adjusted for patients' sex (95% CI)	*P*-value	OR adjusted for patients' sex and age (95% CI)	*P*-value
Information given to the patient						
High blood pressure						
A-level and higher, ≥12	2.9 (1.2 to 7.3)	0.023	2.9 (1.2 to 7.3)	0.021	1.6 (0.6 to 4.2)	0.383
Up to GCSE, 6–11	1.7 (0.7 to 4.2)	0.221	1.8 (0.7 to 4.3)	0.194	1.1 (0.4 to 2.9)	0.821
No qualification, <6	1.0		1.0		1.0	
Log likelihood, −121.0	−117.1		−116.8		−110.2	
Overweight						
A-level and higher, ≥12	2.8 (1.4 to 5.7)	0.005	2.8 (1.3 to 5.6)	0.006	1.9 (0.9 to 4.2)	0.094
Up to GCSE, 6–11	1.5 (0.8 to 2.9)	0.253	1.4 (0.7 to 2.8)	0.319	1.1 (0.5 to 2.3)	0.798
No qualification, <6	1.0		1.0		1.0	
Log likelihood, −186.3	−175.6		−174.5		−169.0	
Advice given to the patient						
Weight loss						
A-level and higher, ≥12	2.4 (1.8 to 5.0)	0.016	2.4 (1.2 to 4.9)	0.017	1.9 (0.9 to 4.1)	0.121
Up to GCSE, 6–11	1.4 (0.7 to 2.8)	0.383	1.3 (0.6 to 2.7)	0.452	1.1 (0.5 to 2.2)	0.878
No qualification, <6	1.0		1.0		1.0	
Log likelihood, −193.7	−182.9		−181.9		−179.8	
Nutrition						
A-level and higher, ≥12	2.6 (1.4 to 4.9)	0.002	2.6 (1.4 to 4.9)	0.002	1.8 (0.9 to 3.5)	0.097
Up to GCSE, 6–11	1.6 (0.9 to 3.0)	0.133	1.6 (0.9 to 3.1)	0.127	1.2 (0.6 to 2.3)	0.657
No qualification, <6	1.0		1.0		1.0	
Log likelihood, −241.7	−227.76		−227.7		−221.8	
Exercise						
A-level and higher, ≥12	1.8 (1.0 to 3.3)	0.051	1.6 (0.9 to 3.0)	0.1	1.1 (0.6 to 2.0)	0.837
Up to GCSE, 6–11	2.1 (1.1 to 4.0)	0.025	2.3 (1.2 to 4.4)	0.012	1.6 (0.8 to 3.2)	0.155
No qualification, <6	1.0		1.0		1.0	
Log likelihood, −256.0	−246.1		−245.9		−240.8	
Cigarette consumption						
A-level and higher, ≥12	0.7 (0.2 to 2.6)	0.564	0.7 (0.2 to 2.6)	0.567	1.2 (0.3 to 5.0)	0.802
Up to GCSE, 6–11	0.2 (0.1 to 0.8)	0.031	0.3 (0.1 to 0.9)	0.038	0.4 (0.1 to 1.6)	0.197
No qualification, <6	1.0		1.0		1.0	
Log likelihood, −126.9	−116.3		−113.1		−109.9	

[a]*A multivariate analysis was conducted for items statistically linked to the level of education (P<0.05). GCSE = general certificate of secondary education. OR = odds ratio.*

patients, and therefore the quality of care, notably in relation to management of cardiovascular risk factors. Future research on how best to advise patients on nutrition and exercise could be a first step.

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Appendix 1. Items explored through mirrored questionnaires.

Item	Patient questionnaire	GP questionnaire
Blood pressure measured during consultation	During this consultation, did the GP measure your blood pressure?	During this consultation, did you measure the patient's blood pressure?
Auscultation undertaken during consultation	During this consultation, did your GP listen to your heart or lungs (with a stethoscope)?	During this consultation, did you auscultate your patient?
Weight measured during consultation	During this consultation, did the GP measure your weight?	During this consultation, did you measure the patient's weight?
High blood pressure: information given to the patient	During this consultation, did the GP tell you that your blood pressure was high?	During this consultation, did you tell your your patient that the blood pressure was high?
Hypercholesterolaemia: information given to the patient	During this consultation, did the GP tell you that your cholesterol level was high?	During this consultation, did you tell your patient that the cholesterol level was high?
Hyperglycaemia: information given to the patient	During this consultation, did the GP tell you that your glucose level was high?	During this consultation, did you tell your patient that the glucose level was high?
Overweight: information given to the patient	During this consultation, did the GP tell you that your weight was high?	During this consultation, did you tell your patient that the weight was high?
Advice on exercise given	During this consultation, did the GP advise you to do more physical activity?	During this consultation, did you advise your patient to do more physical activity?
Advice on weight loss given	During this consultation, did the GP advise you to lose weight?	During this consultation, did you advise your patient to lose weight?
Advice on cigarette consumption given	During this consultation, did the GP advise you to reduce or to stop smoking?	During this consultation, did you advise your patient to reduce or to stop smoking?
Advice on alcohol consumption given	During this consultation, did the GP advise you to reduce or to stop your alcohol consumption?	During this consultation, did you advise your patient to reduce or to stop your alcohol consumption?
Advice on nutrition	During this consultation, did the GP give you advice on nutrition?	During this consultation, did you give your patient advice on nutrition?
Physical activity level assessed	Do you usually take part in sport or physical activity, such as gardening or walking?	Does your patient usually take part in sport or physical activity, such as gardening or walking?
Cigarette consumption assessed[a]	Do you smoke?	Does your patient smoke?
Alcohol consumption assessed[a]	How many standards glasses of alcohol do you usually drink per day?	How many standards glasses of alcohol does your patient usually drink per day?

[a]Answers to questions on cigarette and alcohol consumption were provided in two categories: respectively, regular and occasional smokers versus non-smokers; ≤2 standard glasses of alcohol per day versus >3 glasses per day.

Appendix 2. Agreement between physicians and patients on items concerning the management of cardiovascular risk factors during the consultation; relationship with educational level (bivariate analysis).

	Actions undertaken			Information assessed			Information given to the patient					Advice given to the patient			
	Blood pressure	Auscultation	Weight	Alcohol consumption	Cigarette consumption	Physical activity	High blood pressure	Hyperchol-esterolaemia	Hypergly-caemia	Overweight	Nutrition	Weight loss	Exercise	Alcohol consumption	Cigarette consumption
Agreement between GPs and patients															
% agreement	94.2	81.8	90.3	80.5	86.6	71.3	94.7	96.6	97.6	90.2	84.9	89.6	82.9	98.0	94.2
κ (SD)	0.84 (0.04)[a]	0.61 (0.04)[a]	0.81 (0.04)[a]	0.24 (0.05)[a]	0.65 (0.04)[a]	0.36 (0.04)[a]	0.66 (0.04)[a]	0.48 (0.04)[a]	0.49 (0.04)[a]	0.57 (0.04)[a]	0.36 (0.04)[a]	0.56 (0.04)[a]	0.34 (0.04)[a]	0.66 (0.04)[a]	0.63 (0.04)[a]
Educational level (years of education) and agreement between GPs and patients															
A-level and higher (≥12), % (n)	94.0 (249)	83.5 (249)	89.2 (249)	79.6 (142)	84.7 (216)	73.6 (201)	96.5 (255)	95.3 (255)	99.2 (254)	93.7 (255)	89.1 (257)	93.0 (257)	83.3 (257)	98.8 (257)	96.1 (257)
Up to GCSE (6–11), % (n)	92.3 (182)	79.1 (182)	92.8 (181)	75.5 (110)	84.7 (157)	71.1 (152)	94.2 (189)	97.4 (189)	97.4 (189)	88.9 (189)	84.0 (188)	88.4 (189)	86.2 (189)	95.7 (188)	90.0 (189)
No qualification (<6), % (n)	96.5 (113)	83.9 (112)	87.6 (115)	90.5 (84)	91.3 (103)	70.0 (100)	90.4 (115)	97.4 (115)	94.8 (115)	84.4 (155)	76.5 (117)	83.5 (115)	74.8 (115)	99.1 (115)	97.4 (115)
P-value	0.348	0.426	0.284	0.026	0.235	0.767	0.065	0.463	0.026	0.015	0.07	0.018	0.035	0.061	0.009

GCSE = general certificate of secondary education. SD = standard deviation. [a]P<0.001.