

# A randomised controlled trial of joint consultations with general practitioners and cardiologists in primary care

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## SUMMARY

**Background:** Joint consultation sessions of a small group of general practitioners (GPs) and a specialist in orthopaedics proved to be an effective way of decreasing the referral rate of orthopaedic patients. Cardiac complaints comprise an important category of health problems with high referral rates.

**Aims:** To study the effects of joint consultation on the quality of care and referrals for patients with cardiac complaints.

**Design of study:** Randomised controlled trial.

**Setting:** Forty-nine GPs participated in 16 consultation groups, each with one of 13 cardiologists, in monthly joint consultations over a period of about 18 months.

**Method:** The GPs selected patients about whom they were uncertain, and those needing urgent referral were excluded. Patients were randomly assigned to joint consultation or to usual care. After a follow-up period all patients had a joint consultation for outcome assessment. Referral data were provided by two regional health insurance companies and questionnaires were given to the patients, GPs, and cardiologists to gauge their opinion of the trial.

**Results:** One hundred and forty-eight patients in the intervention group and 158 patients in the control group fulfilled the whole protocol. The quality of care was similar in both groups. In the intervention group, 34% of the patients were referred, compared with 55% in the control group ( $P = 0.001$ ), and fewer patients underwent further diagnostic procedures (7% compared with 16%,  $P = 0.013$ ). Referrals to cardiology as a proportion of all referrals decreased in the practices of the participating GPs, compared with their reference districts ( $P = 0.024$ ).

**Conclusion:** Joint consultation is an effective method that provides a quality of care that at least equals usual care and that contributes to a better selection of patients who need specialist care.

**Keywords:** joint consultation; primary care; cardiologist; referral rate.

## Introduction

In the Netherlands, the general practitioner (GP) plays an important role as a gatekeeper to specialist care.<sup>1,2</sup> Evaluation has shown, however, that up to 30% of referrals are unnecessary, often because of inappropriate diagnostic procedures.<sup>3-5</sup> Cardiac complaints and disorders comprise an important category of health problems for patients, GPs and cardiologists.<sup>6</sup> In about 40% of referrals to cardiology, diagnostic uncertainty was the reason given for referral.<sup>6,7</sup> Joint consultation sessions were effective in diagnostic assessment and decreased the referral rate for orthopaedic disorders.<sup>8</sup> Further studies using this method in other clinical fields have been encouraged;<sup>9</sup> a randomised controlled trial was therefore conducted to study the effect of joint consultations on cardiac patients, with regard to the quality of care and the referral rate. In addition, the patients' opinions of the trial were investigated as well as those of the GPs and the cardiologists.

## Method

### Patients

Patients with cardiac problems about whom the GP felt uncertain, and patients with suspected cardiac disease, were eligible for selection. There was no age limit and patients with acute disorders needing urgent referral were excluded. Selected patients were randomly assigned to either the intervention group that went into the joint consultation or the control group that received usual care (Figure 1), which may have included continued management by the GP, a phone call by the GP to a cardiologist to gain some advice, or a referral to specialist care. All patients gave written informed consent.

### Joint consultation: the intervention

In this project, which was carried out in five southern districts (the reference districts) of the Netherlands, 49 GPs participated in 16 consultation groups, together with 13 cardiologists. Each group had a fixed composition of three to five GPs and one cardiologist. Some cardiologists attended more than one group. The participating GPs responded to a written invitation to all GPs in the districts. They had different reasons for participating; some had a specific interest in cardiology and others admitted that they found cardiology difficult.

The patients in the intervention group were invited to attend a joint consultation session, in which the aim of the cardiologist was to advise the GP. During a period of about 18 months these sessions could be held monthly in the

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**HOW THIS FITS IN***What do we know?*

Joint consultation sessions of a group of GPs and a specialist in orthopaedics have proved to be an effective way of decreasing the referral rate of orthopaedic patients.

*What does this paper add?*

Monthly joint consultations of GPs and specialists in cardiology resulted in a reduction of referrals. Joint consultation is an effective method of care that should be extended to other specialties.

surgery of one of the GPs, and in each session three to four patients could be discussed. These patients were present at the session so they could be questioned and examined by the cardiologist or the GPs.

All patients went into a follow-up joint consultation after one year, where the intervention group patients met a different cardiologist to the one at the original consultation.

**Randomisation**

After selection by the GP the randomisation procedure took

place using the envelope method. After randomisation the patients were fully informed about the procedure used within the group to which they had been assigned, but they were not informed about the existence of the other trial arm. This approach was necessary to achieve sufficient internal validity.<sup>10-12</sup> This pre-randomisation design was approved by the Ethical Committee of the University Hospital Maastricht.

**Measurements and variables**

At inclusion, all patients and GPs completed questionnaires about the complaints and diagnoses. The intervention group patients, their GPs and cardiologists completed questionnaires once again after the joint consultation, and all did so after the follow-up consultation.

The Heart Patients' Psychological Questionnaire (HPPQ),<sup>13</sup> was part of the patients' questionnaires. It measures indicators of 'quality of life', for which the categories 'wellbeing', 'disability', and 'despondency' were used. The HPPQ has also been validated for non-cardiac patients.<sup>14</sup> All complaints and disorders were classified according to the International Classification of Primary Care (ICPC).<sup>15</sup> A review of patients who died during the project was performed by a cardiologist, to see whether the cause of death could be related to a lack of or delay in care.

Data about the referrals in the study population were

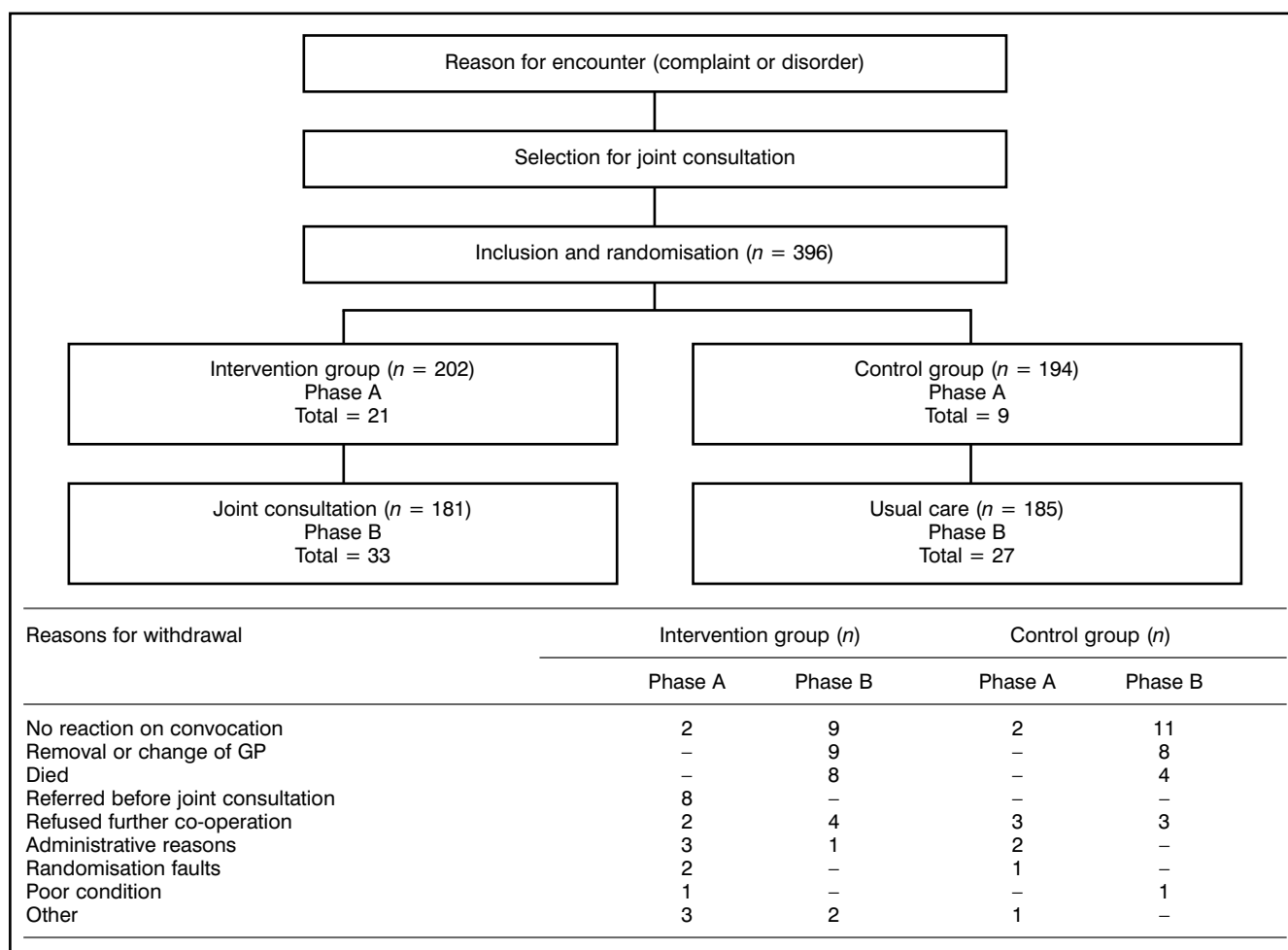


Figure 1. Profile of the joint consultation project.

obtained from the GPs' questionnaires, and data on all referrals in the participating practices and their reference districts were provided by two large regional health insurance companies. Independent variables were the patient's sex and age; characteristics of their complaint (type, duration, severity), and the reasons for the patient's selection. Patient effect variables to assess the quality of care were: the general state of health; the degree of wellbeing; patterns of complaints at follow-up; the severity of the patient's condition; and the degree of anxiety in the patient. Care effect variables were: the number of diagnostic actions by the GP; the number of referrals to cardiologists; changes of diagnosis in the study period; and the judgement of the cardiologist about the management until the follow-up consultation.

### Statistics

It was expected that about 35% of the patients in the control group would be referred by their GP. To detect a reduction of 20% of this expected proportion a sample size of at least 135 patients per group was required ( $\alpha = 0.05$ ,  $\beta = 0.10$ ). As a withdrawal rate of 25% was expected, 175 patients per group were included.

Data management and analysis were carried out using SPSS. Between group comparisons for continuous and discrete variables were carried out using the student *t*-test and the  $\chi^2$  test respectively. The paired *t*-test was chosen for analysis of the referral data because we had a set of paired data of referrals (1997, compared with 1994) in the reference districts. Testing in all cases was two-sided and the significance level was 0.05.

## Results

### Baseline data

The GPs selected 396 patients, of whom 306 completed the entire protocol: 148 in the intervention group and 158 in the control group. The GPs attended seven joint consultation sessions on average (range = 2–13 sessions). The withdrawal rate was 23%, with similar reasons given in both groups (Figure 1). During the project, eight patients died in the intervention group and four in the control group. In the intervention group, two of these patients were under the care of a cardiologist. Of the remaining six, in two cases death was not owing to cardiac illness. The difference between the intervention and control groups was not statistically different and — maybe more importantly, according to the review — none of the deaths in the intervention group were caused by a lack of or delay in care.

The mean age of the patients in the intervention group was 58 years (SD = 21.10 years, range = 0–97 years) and in the control group was also 58 years (SD = 19.71 years, range = 0–87 years). In both groups some babies were included because of the diagnostic uncertainty of heart murmurs.

At baseline, the relevant clinical variables and the GPs' reasons for selecting patients were similarly distributed in both groups (Table 1). Diagnostic uncertainty, rather than therapeutic uncertainty ( $P < 0.001$ ), was the main reason given by GPs for selecting patients, and they chose patients who had very diverse reasons for attending their GP and

with a similar distribution in both groups. Chest pain was the most important category and was present in 24% of the patients selected.

### Findings at first consultation and at the follow-up joint consultation

During the consultation the cardiologists agreed with 56% of the GPs' initial working diagnoses. The main diagnoses were: angina pectoris in 14% of the 148 patients, (paroxysmal) extrasystoles or tachycardia in 12%, valve disorders in 13%, atrial fibrillation in 7%, and heart failure in 5%.

In the intervention group, fewer electrocardiograms and x-rays were done ( $P = 0.013$  and  $P = 0.023$ , respectively, Table 2). Eighty-one per cent of patients in the intervention group believed that their complaint or problem had been dealt with 'appropriately' and 19% believed that it had been dealt with 'moderately', compared with 39% and 61% of the patients in the control group, respectively. Ninety-seven per cent of the patients said that they had been very happy with the joint consultation.

The follow-up period lasted 1.25 years on average and no differences were observed in patients' effect variables (Table 2). At follow-up there were no significant differences in the cardiologists' judgements about the diagnostic and therapeutic procedures carried out in both groups. Most GPs (76%) approved of the project, and 67% would have liked to continue participation in joint consultation sessions for patients with cardiac complaints; 87% said that they would also like to participate in joint consultations for patients with other complaints. Eighty-nine per cent of the cardiologists believed that the GPs and patients had benefited from the joint consultation, and 66% believed that they themselves had benefited.

### Referrals

Fewer patients in the intervention group were referred to a cardiologist (33% versus 52%,  $P = 0.001$ , Table 2). In the participating practices, the proportion of referrals to cardiology to the total number of referrals decreased between 1994 and 1997, compared with those not participating, in all districts ( $P = 0.024$ , Table 3). The difference in referral rates showed an average decrease of referrals to cardiology of six per 1000 patients in the GPs from the intervention group (a decrease of about 10%).

## Discussion

Joint consultations of GPs and cardiologists provide a quality of care equal to usual care for patients with cardiac complaints and disorders, despite a reduction in the number of investigations and referrals. After a follow-up period of more than a year on average, the cardiologists found that the management of the intervention group patients was as appropriate as that of the control group. For the patients who died, there was no indication that any of these cases was related to a delay or a lack of care resulting from the joint consultation.

Similar to the consultation project for orthopaedic complaints, a pre-randomisation design was used.<sup>8</sup> As the patients could not be blinded to the intervention, the study

Table 1. Baseline characteristics of the intervention and control groups

	Intervention group (%) <i>n</i> = 148	Control group (%) <i>n</i> = 158
Demographic data		
Male	37	46
Patients >40 years	79	79
Patients with anxiety	47	41
Characteristics of patients' complaints		
Main complaint lasting less than one month	20	25
Time elapsed since first visit to GP less than one month	63	61
GPs' reason for selecting patients <sup>a</sup>		
Uncertain about diagnosis	34	43
Uncertain about therapy	25	21
Uncertain about diagnosis and therapy	33	36
Preventive reasons	19	11

<sup>a</sup>GPs could fill in more than one category.

Table 2. Outcome after inclusion and after follow-up, regarding all effect variables in intervention and control group.

	Effect variable intervention group (%) <i>n</i> = 148	Control group (%) <i>n</i> = 158	
Further diagnostic procedures after inclusion			
Electrocardiography	7	16	<i>P</i> = 0.013; diff = 9%; 95% CI = 5.5–12.5
X-ray	1	5	<i>P</i> = 0.023; diff = 4%; 95% CI = 1.3–6.7
Referred (total)	33	52	<i>P</i> = 0.001; diff = 19%; 95% CI = 14.7–23.3
Directly after inclusion	23	35	
In follow-up period	10	17	
Patients' status after follow-up:			
Still had complaint	56	60	
Severe condition	6	4	
Patients with anxiety	12	16	
Health status: good (according to patients)	41	41	
Feeling of wellbeing (good) (from HPPQ)	27	34	
No feeling of disability (from:HPPQ)	35	36	
No feeling of despondency (from HPPQ)	23	24	
Diagnosis changed	25	35	

could be biased by selective withdrawal of patients assigned to the control group, who might insist on selection for joint consultation. Because internal validity could be harmed, and because usual care was available to the control group, this design was judged to be appropriate.<sup>11,12</sup>

Randomisation at patient level was chosen to evaluate the specific contribution of the joint consultation, as compared with usual care by the same GPs. This approach may have resulted in a certain 'transfer' of those skills learnt in the joint consultation into usual care and therefore the difference in outcome may even have been underestimated. There were several reasons for choosing this procedure and the aim was to replicate the study of Vierhout, to compare the effects of joint consultation for different specialties.<sup>8</sup> Randomisation by practice would have led to more confounding factors that would have been a threat to the feasibility of the study and many more GPs would have had to participate. As far could be ascertained, no contamination took place.

We could not carry out a  $\chi^2$  test on the referral data because we did not know the total number of referrals of the participating GPs, or of their colleagues in the reference districts, because we only received the proportional referral data from the health insurance companies. The data were presented per district separately, because the referral data

showed differences of up to about 20% between the districts; this is a well-known phenomenon in Holland.

Although the differences are small considering the number of referrals saved per 1000 patients, the macro effect on population level might be more significant. Statements about cost effectiveness cannot be made because a detailed cost assessment was beyond the scope of the project. To provide a global impression of costs we used the simulation model for future analysis of coronary heart disease for medical procedures relating to the various stages of coronary heart disease, including the pre-clinical stages concerning patients with suspected coronary heart disease,<sup>16</sup> the largest category in our study. The cost of having patients treated by their GP is a quarter of that paid for patients treated by a cardiologist.

An alternative to joint consultation is direct access by GPs to specialist investigation methods.<sup>17-20</sup> In this way a reduction in the referral rate might also be achieved, as well as a better selection of patients who need specialist care. However, many patients are tested unnecessarily. Compared with this direct access approach method, the joint consultation method has some important advantages. Meeting the cardiologist and discussing his or her own patients increases the GP's expertise, which will also bene-

Table 3(a). The average number of cardiology referrals per 1000 patients of participating GPs versus those of the other GPs per reference district, 1994 compared with 1997.

	GPs in consultation group		GPs in district	
	1994	1997	1994	1997
District 1	42	39	48	47
District 2	51	39	46	48
District 3	37	36	46	47
District 4	45	49	49	53
District 5	53	58	47	57

Table 3(b). The average number of referrals to other specialties per 1000 patients of participating GPs versus those of the other GPs per reference district, 1994 compared with 1997.

	GPs in consultation group		GPs in district	
	1994	1997	1994	1997
District 1	433	441	482	461
District 2	528	498	549	585
District 3	398	411	472	471
District 4	470	472	552	554
District 5	454	482	451	502

Table 3(c). Proportion of cardiology referrals to the total number of referrals of participating GPs versus those of the other GPs per reference district separately, 1994 compared with 1997.

	GPs in consultation group		GPs in district	
	1994 (%)	1997 (%)	1994 (%)	1997 (%)
District 1	8.8	8.1	8.4	9.3
District 2	8.8	7.4	7.7	7.6
District 3	8.5	8.0	8.9	9.0
District 4	8.7	9.0	8.1	8.8
District 5	10.4	10.7	9.4	10.2

Paired t-test (two-tailed):  $P = 0.024$

fit other patients.<sup>21</sup> Moreover, in joint consultations, not only diagnostic but other problems, can be discussed. Almost all patients and the majority of GPs and cardiologists believed that the project was meaningful.

Despite the differences between orthopaedics and cardiology, the results of joint consultation showed a similar pattern, and other specialties could also participate in this system.<sup>8</sup> Furthermore, the joint consultation method can contribute to the development of new outpatient and shared care models that are needed to cope with the expected increase of cardiac problems in the near future.<sup>22,23</sup>

### Conclusion

We conclude that joint consultation is more efficient than usual care in achieving equally effective treatment for primary care patients with cardiac symptoms by means of a better selection of patients who need specialist investigation or treatment. Future studies in other specialties are recommended.

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