Effectiveness of person-centred care after acute coronary syndrome in relation to educational level: Subgroup analysis of a two-armed randomised controlled trial

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ABSTRACT

Aim: The aim of this study was to evaluate the effects of person-centred care (PCC) after acute coronary syndrome (ACS) in relation to educational level of participants.

Method: 199 Patients < 75 years with ACS were randomised to PCC plus usual care or usual care alone and followed for 6 months from hospital to outpatient care and primary care. For the PCC group, patients and health care professionals co-created a PCC health plan reflecting both perspectives, which induced a continued collaboration in person-centred teams at each health care level. A composite score of changes that included general self-efficacy assessment, return to work or previous activity level, re-hospitalisation or death was used as outcome measure.

Results: In the group of patients without postsecondary education (n = 90) the composite score showed a significant improvement in favour of the PCC intervention (n = 40) vs. usual care (n = 50) at six months (35.0%, n = 14 vs. 16.0%, n = 8; odds ratio (OR) = 2.8, 95% confidence interval (CI): 1.0–7.7, P = 0.041). In patients with postsecondary education (n = 109), a non-significant difference in favour of the PCC intervention (n = 54) vs. usual care (n = 55) was observed in the composite score (13.0%, n = 7 vs 3.6%, n = 2; OR = 3.9, 95% CI: 0.8–19.9, P = 0.097).

Conclusion: A PCC approach, which stresses the necessity of a patient–health care professional partnership, is beneficial in patients with low education after an ACS event. Because these patients have been identified as a vulnerable group in cardiac rehabilitation, we suggest that PCC can be integrated into conventional cardiac rehabilitation programmes to improve both equity in uptake and health outcomes.

Trial registration: Swedish registry, Researchweb.org, ID NR 65 791

1. Introduction

Low socioeconomic status is a well-known risk factor for recurrent myocardial infarction (MI) and cardiac death in western societies [1]. The mortality rate after MI is higher in persons with lower education and income [2] and they also have a higher cardiac risk severity in comparison with those with a higher income and education [3].

After a MI, negative lifestyle behaviours (e.g., smoking, use of alcohol and less exercise) are more common among socioeconomically disadvantaged patients. Moreover, such patients are less responsive to accomplish healthy lifestyle changes post-MI than those with a higher socioeconomic status [3]. Return to work is complicated and prolonged sick leave is common in cardiac populations [4,5]. Cardiac rehabilitation is a multifaceted intervention that includes psychosocial and educational counselling as well as exercise training, which are associated with a reduction in the risk of recurrent MI and mortality, as well as sustained improvements in health-related quality of life [6]. In patients with coronary heart disease, cardiac rehabilitation programmes have been

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[1] "This author takes responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation".

reported to yield a one-third reduction in cardiac mortality and recurrence of MI [7].

Unfortunately, motivating patients to fully participate and adhere to cardiac rehabilitation is a challenge. In most European countries more than 50% of eligible patients have been reluctant to participate [6]. Additionally, non-attenders are more likely to have a low socioeconomic status [8] and although there have been improvements in global health in past years, inequalities persist that increase differences in cardiac health [9]. Consequently, despite the benefits of cardiac rehabilitation, it remains heavily under-used [6]. To improve equity in uptake of cardiac rehabilitation more creative and dynamic ways of operating are needed.

A person-centred care (PCC) approach is gaining increased attention, probably because it engages the patient as an active partner with capacities and abilities to perform activities and achieve set goals [10]. PCC is in contrast to traditional cardiac rehabilitation programmes that have focused exclusively on the disease and driven by health care professionals [11]. PCC takes its point of departure in the patients' narratives and their expectations, resources and potential for self-care in combination with the professional caregiver's assessment of the condition [10]. Patients make decisions based on their beliefs and experiences [12], which implies that even though patients are diagnosed with the same disease, they will respond differently based on their respective illness. Therefore, PCC addresses self-efficacy, i.e. a person's belief in the ability to successfully execute the behaviours necessary to produce desired outcomes [12] instead of attempting to force patients towards certain activities.

A PCC approach has been shown to be effective in terms of increasing self-efficacy after acute coronary syndrome (ACS) [13,14]. The collective experience of PCC, however, is still limited [15], including knowledge of responsiveness in relation to socio-demographic factors. Further, little is known today of the effects of PCC on perceived self-efficacy with regard to such factors. To find relevant and suitable alternative approaches to improve uptake of cardiac rehabilitation and that also attract patients with lower sociodemographic status, we designed a study to evaluate the effects of a PCC intervention after ACS [13]. The aim of the current study was therefore to evaluate the effects of PCC after ACS in relation to educational level.

2. Methods

2.1. Study design

The study was a two-arm randomised intervention delivered across three health care levels (during hospitalisation, in specialised outpatient care and in primary care) as previously reported [13]. Participants were randomised to either a control group receiving usual care or a group receiving the PCC intervention in addition to usual care.

2.2. Setting and participants

Totally, 3982 patients were screened. A cohort of 252 patients with ACS was recruited from two hospital sites within the Sahlgrenska University Hospital, Gothenburg, Sweden during June 2011–February 2014. After discharge, follow-up was performed at specialised outpatient clinics and primary care units within the region of Gothenburg. Of the 252 patients eligible for randomisation, 53 were later excluded according to protocol or withdrew leaving 94 patients in the PCC intervention arm and 105 in the control arm, with no apparent differences in baseline characteristics [13].

2.3. Patients

Patients <75 years admitted to the designated coronary care units were screened for symptoms suggested of ACS. To ensure that the PCC intervention could be introduced to each patient during the initial hospitalisation, patients were qualified to participate if they were provisionally diagnosed with ACS (I200, I209 or I21) within a 72-h period after admission. Exclusion criteria were age ≥75 years, currently listed at a private primary care centre or at a primary care centre in another region, no permanent address, planned heart surgery such as coronary artery bypass grafting (CABG), cognitive impairment, alcohol or drug abuse, survival expectancy <1 year or currently participating in a conflicting study. Patients received oral and written information about the study and those consenting to participate were randomised to either the PCC group or the control group. The Regional Ethical Review Board approved the study (DNr 275-11) and the investigation conforms to the principles outlined in the Declaration of Helsinki.

2.4. Usual care and the PCC intervention

Patients allocated to the control group were followed by a usual care procedure [16], including two cardiac check-up visits at the outpatient clinic, one with a registered nurse (RN) after 2–3 weeks and one with a physician after 6 weeks. When patients were deemed medically stable, they were followed up at their ordinary public primary care centre. For controls, additional medication and rehabilitation were scheduled by the primary care physician and, where appropriate, with other professionals (i.e. RNs, physiotherapists) as and when a need arose. Medical referrals and discharge notes were shared by health care professionals at the units but not necessarily with the patients.

Health care professionals involved in the PCC intervention within the hospital, specialised outpatient clinics and designated primary care units were specially trained in PCC through lectures, seminars and workshops. In the intervention clinics, health care was organised as PCC teams (patient, physician and RN) throughout the continuum of care. To share experiences and maintain a continuing application of PCC four follow-up educational meetings of three hours each were organised during the study period. The staffing was stable at the intervention clinic, although the staff in the PCC team at one primary care unit was replaced during the study period.

Thus, patients in the intervention group participated in a PCC intervention emphasising the patient as a partner across the three health care levels. First, a thoroughly performed dialogue at admission to hospital (within the first 24 h after randomisation) laid the foundation for co-creation of a PCC health plan between the patient and health care professionals. A shared decision making process for a PCC health implementation plan was performed involving the patient, physician and RN. In addition, they considered the medical status of the patient and a probable date for discharge. The PCC health plan served as a basis for a discussion about the patient's general medical condition and was eventually revised collaboratively (e.g., follow-up actions needed to achieve the formulated goals or a new goal orientation). These plans addressed each patient's resources, possibilities and obstacles to achieve agreed priorities and post-discharge goals, including the need of support from family, friends and health care professionals. Every 48 h, patients re-evaluated their symptoms, where the current rating was followed up and documented in the patient's PCC health plan together with the staff. Moreover, referrals and discharge notes were shared by health care professionals and the patient. Follow-up visits at the outpatient clinics and primary care units were scheduled together with the PCC team after 4 and 8 weeks, respectively. If necessary, additional visits with the PCC team were conducted at the discretion of the patient and PCC team.

2.5. Outcome measures and background characteristics

The primary endpoint was a composite of changes [17] combining self-reported general self-efficacy with return to work or previous activity level and clinical outcomes such as re-hospitalisation or death. *The General Self-Efficacy Scale* (GSES) is a 10-item psychometric scale designed to assess the strength in personal beliefs to cope with and adapt to a variety of daily challenges. The 10 items are rated on a 4-point scale (1 = not at all true, 2 = barely true, 3 = moderately true, 4 = exactly true). The scale relates to how a person's actions are responsible for successful outcomes in achieving set goals, dealing efficiently with unexpected events, handling unforeseen situations and finding solutions to problems [18]. An increase of 4.6 units in the GSES represents a minimal clinically important difference [19].

The Saltin-Grimby Physical Activity Level Scale was used to determine return to previous activity level among those not working. The scale is a self-reported measure of physical activity on a 4-point scale (1 = sedentary, 2 = moderate, 3 = demanding or 4 = strenuous) [20] validated in CVD patients [21]. At 6 months after discharge, each patient was assessed as improved, unchanged or deteriorated. To be classified as improved required improvement in the GSES with ≥5 units, return to work or previous activity level (improved from step 1 or at least unchanged from step 2) and no re-hospitalisation or death. A decrease in the GSES with ≥5 units or re-admission for unexpected cardiovascular reasons or death represented a deteriorated condition. Otherwise, patients were considered as unchanged. Patients were dichotomised into two categories: improved vs. unchanged/deteriorated.

Background characteristics included patients' level of education based on self-reported highest attained level at baseline (none = 1, compulsory school = 2, secondary school = 3, vocational college = 4, or university = 5), dichotomised into those without post-secondary education (1–3) and those with post-secondary education (4–5).

2.6. Statistical analysis

Descriptive statistics were used to characterise the study groups. Between group differences in baseline characteristic, stratified by educational level, were tested using Fisher's exact test. The non-parametric Kendall's tau coefficient was used to measure the correlation between the GSES and educational level. Logistic regressions were performed to calculate odds ratios (ORs) for an improved composite score as a consequence of the intervention with 95% confidence intervals (CIs) by educational level. The difference in proportions between groups by allocation and educational level as regards fulfilling or not fulfilling composite score parameters was tested using a two-tailed z-test and illustrated graphically by Euler diagrams [22]. All statistical tests were two-sided with a significance level of $P \le 0.05$. Statistical analyses were performed using SPSS version 23.

Table 1
Baseline characteristics.

	Low education		P-value	High education		P-value
	Control (n = 50)	Intervention (n = 40)		Control (n = 55)	Intervention (n = 54)	
Age in years, mean(SD)	59.7(10.4)	58.6(9.6)	.591	62.8(7.0)	61.9(8.8)	.545
General self-efficacy, mean(SD)	29.2(5.1)	28.0(7.1)	.326	31.3(5.8)	30.6(5.3)	.558
Female, n(%)	20(40.0)	12(30.0)	.380	12(21.8)	11(20.4)	1.000
Employed, n(%)	28(56.0)	22(55.0)	1.000	32(58.2)	32(59.3)	1.000
Education level 1–3, n(%)			.973			
None	1(2.0)	1(2.5)				
Compulsory	21(42.0)	16(40.0)				
Secondary school	28(56.0)	23(57.5)				
Education level 4–5, n(%)						.154
Vocational college				14(25.5)	21(38.9)	
University				41(74.5)	33(61.1)	
Income, n(%)			.715			.537
Low	10(20.0)	9(22.5)		3(5.5)	6(11.1)	
Lower-middle	9(18.0)	6(15.0)		11(20.0)	7(13.0)	
Upper-middle	13(26.0)	15(37.5)		17(30.9)	20(37.0)	
High	12(24.0)	6(15.0)		18(32.7)	18(33.3)	
Missing	6(12.0)	4(10.0)		6(10.9)	3(5.6)	
Indexed events, n(%)			.564			.924
STEMI	9(18.0)	11(27.5)		15(27.3)	13(24.1)	
NSTEMI	27(54.0)	16(40.0)		24(43.6)	22(40.7)	
Unstable angina	14(28.0)	13(32.5)		16(29.1)	19(35.2)	

STEMI = ST elevation myocardial infarction; NSTEMI = non-ST elevation myocardial infarction.

3. Results

There were no significant differences for any of the baseline characteristics when the data were stratified by educational level (Table 1). Patients with lower education were slightly younger (59.2 vs. 62.3 years) and scored somewhat lower in the GSES (28.7 vs. 30.9) in comparison with their higher educated counterparts. A significant correlation was observed between GSES and educational level (t = 0.18; P = 0.001). In the group of patients without postsecondary education (n = 90) the composite score showed a significant improvement in favour of the PCC intervention (n = 40) vs. usual care (n = 50) at 6 months (35.0%, n = 14 vs. 16.0%, n = 8; OR = 2.8, 95% CI: 1.0–7.7; P = 0.041). Among patients with postsecondary education (n = 109), a difference (although non-significant) in favour of the PCC intervention (n = 54) vs. usual care (n = 55) was detected in the composite score (13.0%, n = 7 vs. 3.6%, n = 2; OR = 3.9, 95% CI: 0.8–19.9; P = 0.097) (Table 2).

A higher proportion of patients receiving the PCC intervention improved according to the composite score: 21 of 94 (22%) in the intervention group vs. 10 of 105 (10%) in the controls, p = 0.013. The same outcome applied for the GSES criteria (≥5-point improvement in the GSES): 23 of 94 (24%) vs. 14 of 105 (13%), p = 0.043. A higher proportion of individuals in the intervention group that fulfilled the criteria for GSES also fulfilled the other two criteria included in the composite score: 21 of 23 (91%) vs. 10 of 14 (71%), although the difference was not statistically significant (p = 0.11). This applied to 100% of the patients with low educational level that received the PCC intervention (Fig. 1), which can be compared with the corresponding figures for patients with high education that received the intervention (7 of 9, 78%)

Table 2
Endpoint.

	Control	Intervention	P-value	OR	95% CI
Low education, n(%)	8(16.0)	14(35.0)	**0.041**	2.827	1.043–7.660
High education, n(%)	2(3.6)	7(13.0)	0.097	3.947	0.781–19.939

Composite score at 6 months, dichotomised into improved vs. unchanged/deteriorated.
OR = odds ratio; CI = confidence interval.

(p = 0.06) or to the controls with a low educational level (8 of 11, 73%) (p = 0.04).

4. Discussion

We found that combining PCC with usual care after ACS compared with usual care alone resulted in a significantly improved composite score in patients with low education at the six-month follow-up, as assessed by the combination of better general self-efficacy, return to work or prior activity and no readmissions to hospital was necessary. Previously reported results have shown that general self-efficacy improved significantly in a PCC intervention group [13]. The present analysis shows that the PCC intervention was particularly effective in patients with low education. Thus, the overall result was driven by the changes among those with low sociodemographic status.

Our findings, performed across three health care levels, build on existing knowledge [15] supporting the benefits of PCC. Such interventions that apply a PCC approach emphasising the partnership between patients and health care professionals have shown significant effects in patients with chronic heart failure in reducing length of hospital stay [23] and patients' uncertainty about their disease and its treatment [24]. Further, PCC contributed to a better discharge process [25] and improved quality of life (QoL) [26]. In the Brannstrom and Boman (2014) study in patients with severe chronic heart failure the number of rehospitalisations was reduced [26]. In addition, patients' confidence to manage symptoms after ACS has been reported to increase [14].

The value of secondary prevention programmes during ACS recovery is well established [27], whereas incentives to accept and adhere to drug therapy [28] and to lifestyle recommendations have been shown to remain poor [29,30]. Low income and education level are associated with underuse of recommended drugs after ACS [31]. An unhealthy diet pattern [32], due to several factors [33], is common and low physical activity is associated with socioeconomic status in patients with coronary heart disease [34]. After ACS, lower return to work rates and increased probability for early retirement are associated with female sex, low education, basic occupation, co-morbidity and invasive procedures [4]. Long-term sickness absence after coronary revascularisation is common and associated with socioeconomic status, female sex, co-
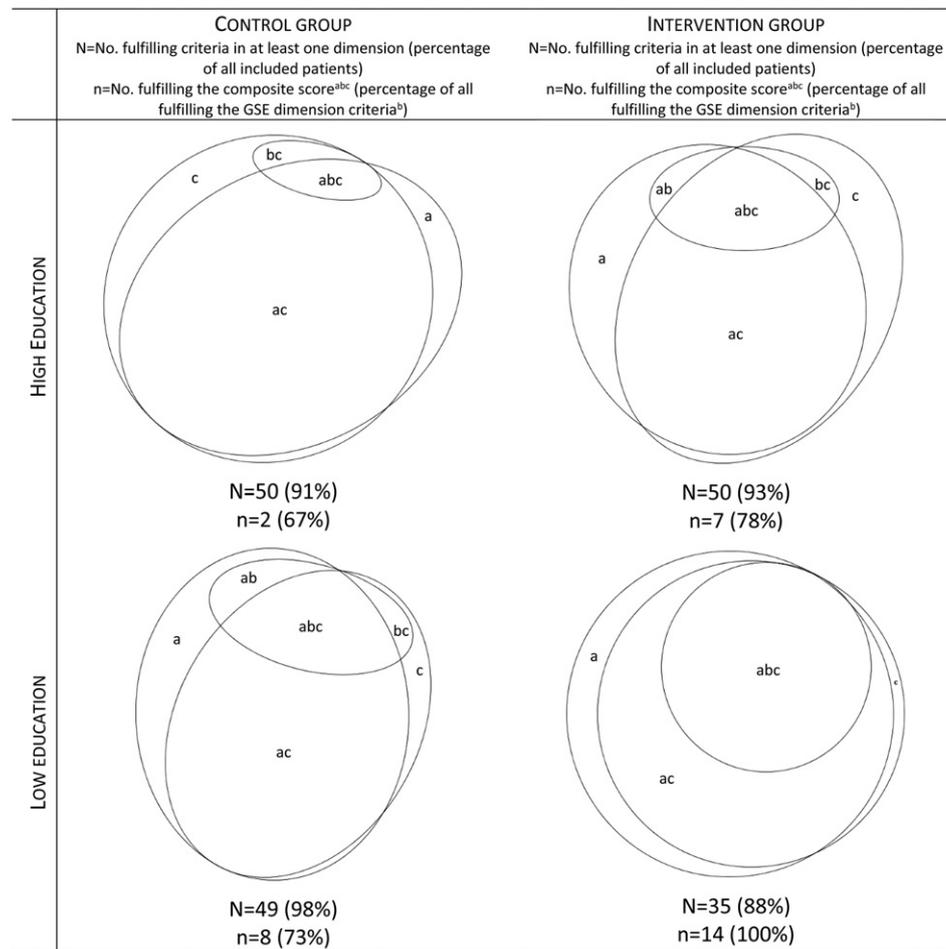
Fig. 1. Dimensions included in the composite score[abc] and the distribution of fulfilled criteria within each dimension by allocation group and educational level. The figure has within figure proportionality but not between figure proportionality. [a] No re-admission to hospital during 6 months after ACS. [b] Improvement with at least 5 points on the General Self-Efficacy Scale (GSES) from baseline to follow-up 6 months after ACS. [c] Return to work or previous activity level during the 6 months after ACS.

morbidity and sickness absence during the year before intervention [5]. The ethics on mutual respect and health care professionals´ taking time to carefully listen to the patients´ illness narrative is probably an important component in strengthening self-efficacy. We suspect that previous interventions aiming at adherence to prescribed treatment might be grounded in a "compliance" tradition rather than a partnership between health professionals and patients. High socioeconomic status and education are positive predictors of participation in cardiac rehabilitation [8], which may be explained by the higher self-confidence in the ability of wealthy people to take control of their health and well-being. Traditional cardiac rehabilitation does not meet the needs of the majority of patients that require secondary prevention or those most in need of risk factor reduction, such as older adults, women, ethnic groups and low-income populations. Consequently, alternative models uniquely tailored to each patient's individual wants and needs are called for [35].

The PCC approach [10] addressed in our study is based on philosophical underpinnings stressing the importance of knowing the patient and the person with capacities and abilities to perform activities and achieve set goals. Although it is difficult to ascertain if an effect were caused by a single component or a group of components included in an intervention [6], we submit that a central component in the current intervention is the partnership between patients and health care professionals based on the co-creation of a personal health plan. This approach employs resources identified in each patient's illness storey to tailor care in a way that directly addresses the patients' needs and preferences. In contrast to simply convince and increase patients' knowledge about the disease and that a given behaviour will lead to a beneficial outcome, PCC builds

on a partnership and factors related to patients' perception of their ability to manage their illness. In this study this approach was reflected by improved general self-efficacy, which has been shown to be a key component to enhance self-management [36]. For patients receiving the PCC intervention, and in particular those with low education, an improvement in the general self-efficacy dimension of the composite score was highly related with fulfilling all the criteria included in the composite score. This finding strengthens the assumption that improving general self-efficacy may have supported return to work or previous activity level and the avoidance of re-admission to hospital primarily in patients with low education.

Our study operationalised a person-centred ethic through an active partnership between the patients and health care professionals [10] and differentiated its effectiveness for level of education. Early identification of low educated and socially vulnerable patients and an adapted individualised programme based on concordance principles have been shown to overcome social inequities according to attendance and adherence in cardiac rehabilitation [37]. Long-term secondary prevention programmes after a coronary heart disease event in a cohort with low education have proven successful in terms of increasing QoL [38]. Our PCC approach added to usual care vs. usual care alone after ACS contributes to greater gains in patients with low education. Previous studies have reported that patients' socioeconomic level impacts the communication process between patients and health care professionals. Systematic reviews have shown that patients with a low socioeconomic status receive less positive feedback and a more controlling and instructing, and less participating, consultation. They also receive less information,

including guidelines, and fewer attempts towards partnership in comparison with patients with a high socioeconomic status [39,40]. We suggest that the present results are in line with ethical principles of PCC. We also propose that the results take into account each patient's perspective and replaces standardised information techniques that do not always allow for individual differences. Thus, it seems that this PCC approach attracts people with less education and can be incorporated into conventional cardiac rehabilitation programmes. In addition, the PCC approach can possibly transfer to other settings and conditions using similar programmes to foster concordance between patients and health care professionals and improve patient outcomes.

5. Study limitations

Our primary endpoint was a conservatory composite endpoint to assess not only general self-efficacy but also to include any important worsening that could have resulted in re-admission or the need for additional care. The relevance for such an endpoint is the value of combining patient experience and clinical outcomes. Composite scores have been shown to be particularly sensitive in differentiating treatment outcomes [17]. We defined improvement conservatively. Thus, patients could not present any worsening of clinical endpoints and had to present clinical improvement in a self-reported variable for the change to be considered an improvement. This stringent definition might explain why only a minority of our patients benefitted from the intervention. A significant correlation between general self-efficacy and educational level was observed. This may indicate that the highly educated patients were less likely to improve in the composite score because of higher baseline score in the GSES (range 10–40). A minimum improvement of 5 units was required to be classified as improved in the composite score. Thus, patients who scored >35 at baseline were unable to improve. On the other hand, some highly educated patients in fact improved in the composite score, and regardless it did not change the fact that significantly more patients with low education in the PCC group improved in comparison with low-educated controls. However, because this analysis is post-hoc, no firm conclusions can be drawn. The power in such analyses is low in general as is the chance of random findings [41].

6. Conclusions

We suggest that integrating PCC in conventional cardiac rehabilitation programmes will improve the health outcomes of patients, particularly in vulnerable patient groups such as those with a low educational level. Studies are also warranted to evaluate the budget impact and cost-effectiveness of PCC in cardiac rehabilitation.

Contributors

AF, KS and IE designed the study. AF and HG performed the analysis. The manuscript was drafted by AF with critical input from HG, IE and KS. All authors have made revisions on the drafts. The final version has been approved by all authors.

Ethical approval

This study was approved by the Regional Ethical Review Board at the University of Gothenburg, Sweden (DNr 275-11).

Conflict of interest

None.

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