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|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2018-024151 |
| Article Type: | Research |
| Date Submitted by the Author: | 11-May-2018 |
| Complete List of Authors: | Schröder, Sara Lena; Martin Luther University Halle-Wittenberg, Germany, Institute of Medical Sociology<br>Fink, Astrid; Martin Luther University Halle-Wittenberg, Institute of Medical Sociology<br>Richter, Matthias; Martin Luther University Halle-Wittenberg, Institute of Medical Sociology |
| Keywords: | health services research, socioeconomic status, Coronary heart disease < CARDIOLOGY, QUALITATIVE RESEARCH, healthcare inequalities, health services accessibility |
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# Identifying causes for socioeconomic differences in the treatment of coronary heart disease: a qualitative study from the perspective of elderly patients

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Word count: 4087

# Abstract

**Objectives -** Socioeconomic status (SES) is associated with treatment of coronary heart disease (CHD) to the disadvantage of deprived patients, but little is known regarding the reasons for socioeconomic inequalities in healthcare. This qualitative study provides an in-depth insight into socioeconomic differences in patient´s experiences with treatment of CHD to understand the underlying causes for socioeconomic differences.

**Design** - Longitudinal qualitative study using in-depth semi-structured interviews to explore patient´s experiences with treatment. We analysed the transcripts of the records according to qualitative content analysis, and identified differences between high and low SES by comparing and contrasting the narratives.

**Setting** - University hospital in Halle (Saale), Germany.

**Participants** - 41 elderly patients (aged 59-80) who suffered CHD.

**Results -** Three major themes characterize the socioeconomic differences in the patient´s experiences with treatment: (1) information: patients with high SES had greater knowledge about treatment and could use medical records as sources of information; (2) illness perception: patients with low SES focused on improving symptoms and survival, while patients with high SES focused on physical performance and disease management; and (3) perceived role in healthcare: patients with low SES tended to delegate responsibility to healthcare professionals.

**Conclusions -** Information, the patient's perceived role in health care, and illness perception may mediate the association between SES and treatment of CHD. These factors should be considered in quantitative studies to better understand the disparities in treatment and mortality. We suggest that improving patient-physician-communication and patient knowledge could change their understanding of CHD and their perceived role in healthcare and reduce inequalities in CHD treatment.

**Trial registration number -** DRKS00007839.

**Keywords**: coronary heart disease, socioeconomic status, healthcare inequalities, qualitative research, health services accessibility

**Strengths and Limitations**

- Less is known about the underlying causes of socioeconomic inequalities in CHD treatment.
- The longitudinal design enables us to gather information of the patients experiences along the entire pathway of treatment of CHD.
- We undertook a comparative analysis to explore differences in patient´s perspectives and experiences with treatment.
- As most patients were treated according to guidelines, we cannot conclude if there are socioeconomic differences in treatment of CHD in Germany.
- Only minor issues in each phase of treatment were found to differ according to SES, but altogether these show a consistent image of differences in the patient´s perspectives with CHD treatment.

**Funding**

This work was supported by the Wilhelm Roux Programme of the Medical Faculty of Martin Luther University, Halle-Wittenberg with grant number FKZ: 28/40.

**Competing Interests**

The authors declare that they have no competing interests.

**Authors contribution:**

SLS wrote the initial draft of this manuscript, collected data and analysed the transcripts. MR and AF conceptualized and designed the project, helped interpreting the data, and critically reviewed the manuscript. All authors have read and approved the final version of the manuscript.

## Data Sharing Statement

Participants of this study were guaranteed that only the study research team would have access to the interviews and transcripts thus data are not available for sharing.

## Ethics approval

Ethical Review Committee of the Medical Faculty of Martin Luther University, Halle-Wittenberg

# Introduction

Cardiovascular diseases remain the leading cause of death worldwide.[1–3] Treatment of coronary heart disease (CHD), including revascularization, rehabilitation and long-term medication, aims to improve disease-related quality of life, including exercise capacity, to prevent further cardiac events and reduce mortality. Socioeconomic inequalities in the incidence and mortality of CHD, to the disadvantage of patients with low socioeconomic status (SES), have been well explored.[4–6] Therefore, patients of low SES have a greater need for treatment. Access to treatment is aimed to be on the basis of need rather than of gender, residence or SES, and guidelines have been established to reduce inequalities in healthcare.[7] But several studies showed strong socioeconomic differences in CHD treatment, to the disadvantage of patients with low SES.[8]

How inequalities in healthcare arise is complex and largely unknown. As socioeconomic differences in treatment are provable independent of the underlying healthcare system, they may be attributable to reasons other than financial affordability of healthcare costs.[8] This is particularly the case in countries such as Germany, where individuals have statutory health insurance and very low out-of-pocket payments. In cardiac rehabilitation, a recent study found that comorbidities, self-efficacy, anxiety and depression, cohabitation, commute, disease severity or type of treatment do not significantly mediate the association of SES with attendance and participation.[9] But generally health literacy and communication between physician and patient are discussed to explain healthcare inequalities, as they are strongly associated with SES.[10–12] Although there is no clear evidence regarding whether an increase in treatment rates reduced socioeconomic disparities in treatment access,[13, 14] studies found that socioeconomic inequalities in CHD treatment can be partly explained by different distances to hospitals with on-site cardiac facilities.[15, 16]

Using quantitative data, these studies remain at a descriptive level, and cannot explain the underlying causes and determinants of socioeconomic inequalities in CHD treatment and how these factors lead to inequalities in healthcare. Taking the patients' individual needs and perceptions into account is helpful to reveal new explanatory approaches from the patient's perspective and explore how socioeconomic differences arise. Qualitative research aims to understand healthcare interactions from the patient's perspective and can help identify the underlying causes. To our knowledge, there are only two qualitative study exploring socioeconomic differences in the treatment of CHD. Manderbacka analysed differences in healthcare encounters and found that doctor-centred decision making was more common in low-SES patients.[17] Pedersen et al. found that concerning barriers to cardiac rehabilitation, only low SES patients felt excluded due to their divergent health beliefs.[18] To gather scientific evidence on the underlying causes for socioeconomic differences, we aimed to identify socioeconomic differences in the patient's perspective and their experiences with the entire pathway of CHD treatment as these might be possible factors and mechanisms that may lead to inequalities in CHD treatment.

## Material and methods

### Study design

We conducted an exploratory qualitative longitudinal study of elderly CHD patients to examine socioeconomic differences in access, utilization and quality of treatment.[19] A purposive sampling strategy was used to select patients with a confirmed diagnosis of CHD at a university hospital in Germany. Between November 2014 and April 2015, a study nurse contacted patients aged 59-80 who were hospitalized with CHD, informed them through a flyer and explained the purpose of the study. We approached 96 eligible patients during hospitalization and asked them to attend an interview to share their experiences with CHD treatment. Participation was voluntary, the patients received no incentives, and 35 patients refused to participate. Maximum variation was used to assure that men and women with different SES and different CHD severities were represented to cover a broad spectrum of treatment experience. Patients were enrolled in the study after providing written informed consent until theoretical saturation was reached. In total, 48 interviews were conducted in the hospital. After 6 months, we contacted the participants again and asked them to participate in a follow-up interview. Nine patients refused to participate due to their disease burden, death, lack of interest or failure to respond to the invitation letter. Thirty-nine follow-up interviews were conducted between June and October 2015. The study was approved by the Ethics Review Committee of the Medical Faculty at the Martin Luther University, Halle-Wittenberg.

## Data collection

We conducted in-depth interviews to explore patients' perspectives on their heart disease and their personal experiences with the treatment they received. SLS conducted two preliminary interviews that were used to further develop the semi-structured interview guides (S1 pdf). We began the baseline interviews with a broad general question about the medical history. More detailed questions were asked individually based on each patient's narrative. The patient's basic sociodemographic data were obtained with a short standardized questionnaire following the baseline interview, and the interviewer subsequently wrote a field note for each interview.

Baseline interviews took place in a private room of the hospital, and follow-up interviews were held either at the patient's home or at the medical facility, depending on the patient's choice. Two employees of the Institute of Medical Sociology (IMS) conducted the interviews face-to-face: SLS (female) is a research associate and an economist who has conducted qualitative health research since 2009 and conducted most of the interviews; Nils Bormann (male) is a medical student assistant and an economist who was trained prior to conducting the interviews. The interviewers introduced themselves as members of the IMS not working in the department of cardiology. Each baseline interview included only the patient and one or both interviewers. In some follow-up interviews, family members were present at the patient's request. The interviews lasted an average of 35 minutes at baseline and 42 minutes at follow-up and were audiotaped with the interviewee's permission.

SES was defined by educational level and occupation based on the German epidemiological standards.[20] Education was measured by level of schooling and academic qualifications and was classified on an 8-point scale. Occupation was measured by the last occupational group the patient belonged to and classified according to job autonomy on a 5-point scale.[21] A composite index of SES was derived using a sum score of both items, which can range between 2 and 13. Index values between 2 and 7 were rated "low SES", and values between 8 and 13 were rated "high SES".

## Data analysis

SLS analysed the pseudonymized interview transcripts inductively with codes and themes derived from the data. Five transcripts were double-coded by two additional members of the qualitative research working group at the IMS, who also participated in the discussion and evaluation of the data. The working group was composed of researchers with different backgrounds, namely, sociology, health care research, economics, nursing and educational science. In the present analysis, we excluded 7 patients whose treatment experiences had been overshadowed by other heart diseases with little relation to CHD throughout the narratives. Of the remaining 41 baseline interviews included in this analysis, 17 patients had been diagnosed with CHD up to one year prior to the baseline interview. Therefore, we included their follow-up interviews, as they had not gone through the entire treatment pathway at baseline. The narratives were coded inductively and analysed in accordance with qualitative content analysis.[22] We identified socioeconomic differences by comparing and contrasting the patients' narratives and identified SES-specific patient perspectives and treatment experiences. We used MAXQDA 11 software to assist with the data management and analyses.

### Patient Involvement

By exploring patient´s experiences with treatment in this study with an exploratory design, the patient's preferences and priorities led the data collection during the interviews and as well due to an inductive approach throughout data analysis. The participants did not provide feedback on their transcripts or the findings, but interested patients received a summary of the main results.

## Results

This analysis was based on the transcripts of 41 baseline and 17 follow-up interviews. The baseline characteristics of the 41 patients are shown in Table 1. The mean patient age was 69.7 years, and the study population at baseline comprised 15 (37%) women and 26 (63%) men. The low-SES group comprised 23 (56%) patients, and the high-SES group comprised 18 (44%) patients.

Treatment of CHD was reported as a complex process with the involvement of many providers. The majority of patients reported treatment according to guidelines. After being diagnosed with CHD through coronary angiography (CAG), coronary arteries were widened with PCI, CABG or ballooning, and the hospital organized the referral to inpatient CR. Patients generally reported that they regularly visit their general practitioner (GP), who prescribes the medication as recommended from the hospital. Furthermore, patients had regular appointments with a resident cardiologist. Only a few patients (from both SES groups) reported having problems with treatment at the hospital, secondary preventive drugs, attending regular follow-ups or participating in CR. However, we found differences according to SES in the patients' individual perceptions and perspectives on access, utilization and quality of treatment. Pseudonymized quotes reflective of the themes are presented for patients of high and low SES at various treatment stages.

## Treatment at the hospital

Most patients reported a history of revascularization with balloon dilatation, stents, or coronary artery bypass graft surgery, and some patients reported that a second CAG was scheduled and conducted in a timely manner, e.g., to protect the patient's circulatory system. However, only low-SES patients reported that this second CAG was performed to implant stents following a diagnostic-only CAG without mentioning any reason. Whereas many patients of both low and high SES rated it important for hospital staff to be friendly, attentive and caring, predominantly low-SES patients mentioned aspects of being taken seriously either positively (e.g., taking preferences seriously, being asked how one feels) or negatively (e.g., discussions about but not with oneself, no conversations at all). While assessing the quality of treatment, some low-SES patients complained about being discharged with open wounds after CABG. Generally, while assessing the quality of treatment, low-SES patients tended to focus on symptom improvement, eliminating the need for visits to the doctor or improving survival, whereas high-SES patients predominantly aimed to improve physical performance.

> "Well, but then it came up with the heart and I myself had the feeling that it is probably the only thing that really gets you back on your feet. I was really feeling sluggish. So. I did indeed make an effort to try to walk again quickly and to/ I really did, but somehow in the end the energy was lacking." (Mr. Lehmann, 63 years, high-SES)

> “Well, in the hope that everything stays the same. Let´s say that you are well. Well, getting around with it quite well, with no complications arising. As I said, that one may reach a slightly older age, not just until retirement, but perhaps even a bit longer.” (Mr. Lange, 60 years, low-SES)

Knowledge of different treatment options became apparent mainly in patients with high SES. However, an information deficit was found in some narratives, e.g., patients reporting that they did not know the outcome of medical investigations, were unaware of the treatment that had been performed or rated the medical reports incomprehensible. An information deficit became apparent mainly in low-SES patients, although this was not always experienced with a perceived greater need for information.

> “For this there are, that’s at least what has been explained to me, the clogged coronary arteries can be expanded by implanting stents, if you know what these are, incorporating these small tubes that eliminate the narrowed areas. Or if that is not feasible, which can happen as well that a vessel ruptures or something like that, then (...) it is done surgically. Then bypasses are produced from other parts of the body and incorporated.” (Mr. Wagner, 75 years, high-SES)

> “Yes, it has been explained to me, but I didn´t get it. First of all, I sometimes didn´t understand it, because he expressed himself in such a professional manner. The nurses already started laughing, because I/ and then I thought: ‘No, you better give up. You better read through it next time´” (Mrs. Schubert, 80 years, low-SES)

We found paternalistic and shared decision making in both SES groups, but paternalistic decisions were found to be more unquestioned in low-SES patients, whereas high-SES patients understood the reasons why decisions were made. When decisions have been made jointly, we found that high-SES patients were involved more actively in decision-making, whereas low-SES patients saw themselves as only responsible for responding (agree or disagree) to a recommendation given.

> "With this I entirely relied on the physicians. In fact, I didn´t really thought about it. When they said: ´This´, then we do this. They do ask indeed: ´Mr. Zimmermann, do you agree?´ I mean, when I go to the hospital, I let myself be treated, but this is not meant to be negative in any way. But I rely on the physicians. [...] They are the professionals. I would never pretend to be the wise guy, as I know people who do so, not physicians, but private persons, who dictate people what to do." (Mr. Zimmermann, 76 years, low-SES)

> "Today quite a few medical exams have been conducted with me. Now you have to wait, but I guess it won´t change anything about this final decision. The requirement to me to decide this." (Mr. Hartmann, 69 years, high-SES)

**Cardiac rehabilitation**

Some patients assessed the time between hospital discharge and beginning of inpatient CR. In doing so, only high-SES patients focused on individual demands for disease management, whereas only low-SES patients reported they could not participate in therapeutic CR treatments due to their recent coronary artery bypass surgery. Additionally, we found that while assessing the quality of CR, high-SES patients tended to place an emphasis on physical performance improvement, as well as increased knowledge about necessary behaviour changes and their heart disease in general, whereas in the narratives of low-SES patients, the conduction of regular examinations, such as daily blood pressure measurement, was more important.

> "Over there I primarily learned through lectures and, as I said before, through meetings about what the issue of a heart attack means, how it emerges and so on. This improved much of my understanding. Previously, before you have something like that you don´t care about it. So, concerning this matter one was educated quite well." (Mr. Jung, 67 years, high-SES)

> "Indeed, in rehabilitation it was great. Well, there was/ every morning you had to go to the presentation, weighing, measuring blood pressure and stuff like that." (Mrs. Koch, 62 years, low-SES)

### Treatment with drugs

Although specific drugs, agents or trade names were rarely mentioned throughout the narratives, access to and utilization of any secondary prevention drugs were fairly high in both SES groups. However, we found that with respect to medication preferences, some low-SES patients highlighted the importance that involved physicians appropriately coordinate the selection of prescribed drugs, while some stated they generally did not like to take drugs. However, one high-SES patient reported that he prefers to take combination medication.

> "Or, for example, if there are changes in medication, it is very important. With prothrombin time and everything; you need to be always in good hands. Not that one says this way and the other one says that way. That´s bad." (Mr. Köhler, 66 years, low-SES)

> "I have to take many drugs; they upset the stomach and everything. I had to take 17 or 18 different pills. Well, and then I recognized, I read about it, there is a patch and so on and using that you can come off of 5 drugs at once. The patches are indeed very expensive and the doctor immediately said ´no and no and no´ and so on. Now I have this patch and I am feeling fine." (Mr. Richter, 66 years, high-SES)

### Ambulatory aftercare

Some patients in the low-SES group mentioned undergoing regular check-ups every month with their GP to assess prothrombin time (Quick-test). While rating the quality of GPs, mainly low-SES patients mentioned the importance of thorough medical examinations and doctor availability. Some mainly low-SES patients complained about the GP examining or referring patients only on demand or the GP not helping them make an appointment with a cardiologist. Some predominantly low-SES patients reported that they see themselves as responsible for retention of their medical record. However, some patients, mainly with high SES, mentioned obtaining or inquiring for a recommendation from the GP regarding a particular specialist or hospital.

> "But, I wasn´t correctly/ At first I didn´t know something like that existed. Then I asked my doctor. I say: ´Don´t one has to go to any follow-up?´ - ´Well, I could forward you

> there, but you better try to make an appointment yourself´." (Mrs. Körtig, 59 years, low-SES)

> "In one consultation it was like, ´To whom should I go?´ And then he said, 'I have a number of colleagues here that I can recommend to you´ And then I say, ´Alright, then make an appointment for me' And that´s how I came to Mrs. Dr. Alpha." (Mr. Winkler, 72 years, high-SES)

In addition, the patient's experiences with access to and utilization of regular check-ups at a resident cardiologist varied according to SES. Some low-SES patients perceived appointments with specialists as generally unnecessary or expected instructions from physicians about the necessity of appointments due to their own uncertainty. Some mainly high-SES patients used medical reports as sources of information for follow-up care.

> "As I said, I had to wait a very long time for this 24-hour ECG. Then it was done. She [cardiologist] wrote her report, my GP got it and nothing else came of it. [...] I mean, if there would have been something acute, surely something would have come up, but it still was, that it is not/" (Mr. Köhler, 66 years, low-SES)

> "I guess that I will have to go to my GP for follow up and he does further. [...] That is my current state. But I am not sure yet, because I have not received the medical report yet. I am still waiting for it." (Mr. Schäfer, 71 years, high-SES)

**Underlying causes of socioeconomic differences in CHD treatment**

While comparing the patients' experiences across the healthcare sectors, 3 major themes (Fig 1) emerged to characterize differences and may be the underlying reasons for socioeconomic inequalities in CHD treatment, namely, information, a patient's individual illness perception and a their perceived role in health care.

First, the narratives suggest that low-SES patients are less informed about their treatment than high-SES patients, which became apparent, e.g., through their lack of knowledge regarding the treatment that was performed, as well as their lack of knowledge about the reasons for or outcomes of medical investigations. However, high-SES patients knew about different treatment options. Whereas high-SES patients used medical reports as sources of information, low-SES patients missed conversations at the hospital or rated the reports as incomprehensible. While most patients rated the healthcare system (especially hospitals) as overloaded, some made the connection that patients are given far too little information and are required to actively request information because of excessive work demands on health workers due to the healthcare system economization.

> “And as well, someone who is cognitively not that fit anymore, one does not understand at all what you are told. And that is sometimes not so nice. Well, but probably that´s just our system, that is/ which is not working, I think”. (Mrs. Koch, 62 years, low-SES)

Second, we found differences in patients’ illness perceptions. Whereas low-SES patients seemed to understand CHD through putting emphasis on symptoms and medical parameters measured through medical examinations, high-SES patients focused on physical performance and disease management, which requires knowledge about CHD.

Finally, we found differences in the patient's perceived role in their health care. Low-SES patients tended to delegate responsibility for treatment, which became apparent, e.g., by the patients not questioning the reasons for what and why something (diagnostic-only CAG, discharge with open wounds) is done, assuming healthcare professionals responsible that patients are being taken seriously,  not perceiving a need to obtain information although lacking information, not being as involved in decision making, relying on physicians to coordinate care (referrals, medication), seeing themselves as responsible only for retention of medical records and having a tendency to have general views rather than opinions. However, high-SES patients seem to feel more responsible for treatment, e.g., focusing more strongly on disease management, having increased healthcare knowledge, making informed choices or actively involving their GP.

# Discussion

In this study, we found 3 major themes where the patients' experiences with CHD treatment differed between patients of high and low SES: information, the patient's individual perception of CHD and their perceived role in health care. Regarding information patients with high SES had greater knowledge about treatment and could use medical records as sources of information. Regarding illness perception patients with low SES focused on improving symptoms and survival, while patients with high SES focused on physical performance and disease management. Regarding the patient´s perceived role in healthcare patients with low SES tended to delegate responsibility to healthcare professionals.

First, we found that low-SES patients seem to lack knowledge about treatment compared with high-SES patients, get less information and have problems understanding the information provided to them. This is in accordance with previous studies, which found that patients of low SES are given less information in healthcare,[10, 23] and are therefore less informed, e.g., about glaucoma treatment[24]. Studies found that lack of information and knowledge results in low utilization, especially in low-SES patients.[25–27] Studies showed that patients are given little information by health professionals and therefore wide information gaps exist for all CHD patients.[28, 29] Second, illness perception differs as we found that low-SES patients seem to focus more strongly on symptoms, survival and good results of physical check-ups in their illness perception, while high-SES patients tend to focus on physical performance and disease management. The latter reveals more knowledge about CHD, and studies found that lack of knowledge regarding CHD is associated with both low SES and adherence.[30–34] Thereby we confirm the findings of another study that low SES, but not high-SES, patients felt excluded due to their divergent health beliefs.[18] This becomes particular relevant as focusing on and improving physical performance are important for reducing cardiovascular mortality and inequalities in AMI mortality, independently of inequalities in access to healthcare.[35] Finally, the perceived role in health care differed according to SES: high-SES patients tended to assume responsibility for treatment, whereas low-SES patients showed a tendency to hand over responsibility. This latter finding was characterized by "putting up with everything needed" and expecting to be told that "everything is fine", with no further need to see a physician. Different responsibilities are becoming apparent through decision making between physician and patient, as a study found that high-SES patients perceive their involvement as participating in the decision making after exploring other options, whereas low-SES patients see themselves only being responsible for agreeing or disagreeing with the recommendation made.[36] Therefore we confirm another study, which found that inequalities might be caused by the fact that shared decision making is more common in high-SES patients.[17] Previous studies showed that engaged patients who actively participate in treatment have good compliance.[37]

Although we provide novel insights into the underlying causes of socioeconomic differences in treatment, there are several limitations. We recruited elderly patients in a university hospital setting in a large city in the eastern part of Germany. Therefore, these results may not reflect the experiences of younger patients or patients living in other regions. Importantly, data were generated in a country with statutory health insurance. Therefore, financial concerns may better explain socioeconomic differences in treatment in other countries without universal healthcare systems. Additionally, only a few patients reported problems with access to and utilization of treatment, and throughout the narratives, only minor perspectives were found to differ according to SES. However, consideration of these aspects together led us to an understanding of the underlying causes of socioeconomic inequalities, based on the words of the patients studied. Finally, especially when assessing physician-patient communication, it has to be considered that we only analysed the patients' perspectives and viewpoints.

Given that CHD is the leading cause of death worldwide, the generation of hypotheses regarding the potential factors and mechanisms underlying the socioeconomic differences in CHD treatment is essential for explaining and reducing these inequalities. The level of information and knowledge, perceived role in health care and assumption of responsibility, as well as individual illness perception should be considered in further quantitative studies as mediating factors between SES and treatment. We conclude that improvement in patient-provider communication might be the key to reducing healthcare inequalities, as it may increase knowledge about treatment, improve the understanding of CHD and empower patients to assume responsibility in treatment, which can improve engagement in treatment and utilization.

## Acknowledgments

We acknowledge the patients who participated in this study and shared their healthcare experiences with us. We thank the staff at the Department of Cardiology at the University Hospital in Halle for their assistance with screening patients for this stud. Finally we thank Niels Bormann (NB) for assisting with data collection, and the members of the qualitative research working group at the IMS, who helped with coding, discussing and evaluating the data.

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# Tables

Table 1. Characteristics of the patients at baseline (n = 41).

| **Characteristics** | **Overall patients** | **Low-SES patients** | **High-SES patients** |
|---|---|---|---|
| Total | 41 | 23 | 18 |
| Age, mean | 69.7 | 69.7 | 69.6 |
| Male | 26 | 10 | 16 |
| Female | 15 | 13 | 2 |
| Publicly insured | 41 | 23 | 18 |
| One-vessel disease | 13 | 8 | 5 |
| Two-vessel disease | 11 | 6 | 5 |
| Three-vessel disease | 17 | 9 | 8 |
| CHD diagnosed for up to 1 year | 20 | 13 | 7 |
| CHD diagnosed longer than 1 year ago | 21 | 10 | 11 |

CHD, coronary heart disease; SES, socioeconomic status

## Figure legends

**Fig 1.** Three themes characterizing socioeconomic differences in the patients' experiences with coronary heart disease treatment.

## Supporting information

S1 Appendix. Interview guides.

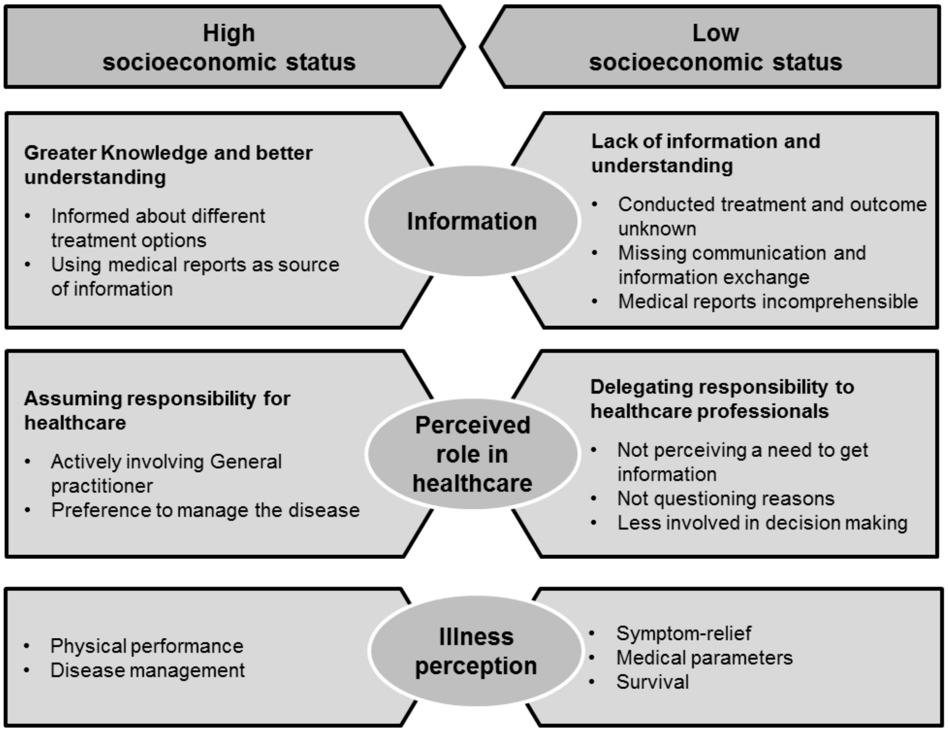

Fig 1. Three themes characterizing socioeconomic differences in the patients' experiences with coronary heart disease treatment.

174x164mm (150 x 150 DPI)

## Interview Guide Baseline

| Key question | Concrete supplementary questions |
|---|---|
| Please begin by telling me about the medical history of your heart disease starting from the first symptoms until this hospital stay. | - Have you ever been to a general practitioner/ cardiologist/ in a rehabilitation clinic before because of your heart disease?<br>  - How was your disease diagnosed?<br>  - Why are you currently in hospital? |
| Which positive and negative experiences have you made, concerning the care you have received? | - Can you think of any other positive or negative experience you have made with the hospital or office-based physicians?<br>- Was there anything you were particularly satisfied with?<br>- Was there anything you were unsatisfied with?<br>- Have you experienced any problems with the further processing of the treatment?<br>- How have you experienced talking with your physicians?<br>- How was a decision reached about what treatment you were to receive? |
| How would you describe the quality of your treatment? | - How satisfied are you with your treatment?<br>- Do you think that everyone in Germany is able to receive good treatment? Why do you think that is? |
| How do you manage your heart disease right now? | - What will happen next?<br>- What medical care do you expect to receive in the next months?<br>- What hopes do you have for your health in the future?<br>- Is there something else you would like to tell me? |

**Questions aimed at maintaining the conversational flow:**

- Please tell me exactly how things went with…
- Could you perhaps give me a few more details?
- What happened next? / And after that?
- What else comes into your mind?
- What do you associate with …?

## Interview Guide Follow Up

| Key question | Concrete supplementary questions |
|---|---|
| Please begin by telling me how the treatment of your heart disease has progressed after our last conversation. | - Which doctors have you seen meanwhile, e.g. general practitioner (GP)/ cardiologist?<br>- Have you been in a rehabilitation clinic or do you attend a heart training group?<br>- What exactly has been done by each of the physicians (GP, cardiologist, hospital, rehabilitation)?<br>  - Which tasks of medical care have been taken care of by which doctor?<br>  - Who prescribes you heart drugs? |
| What positive and negative experiences have you made, concerning the treatment and care you have received? | - Can you think of any other experiences you have had with the GP/ cardiologist/ rehabilitation clinic?<br>- Was there anything you were particularly satisfied or not satisfied with?<br>- How does the cooperation between GP, specialists and the doctors at the hospital work?<br>- Have you experienced any problems with the postoperative management and any further treatment after you have been discharged from hospital?<br>- Have you had to actively arrange yourself to the further treatment?<br>- Have you ever changed your GP or cardiologist and what have been the particular reasons? |
| Last time we talked about your expectations of your medical care – to what extend were they fulfilled? | - Have your expectations changed during the course of treatment? |
| What kind of influence does your heart disease have on your everyday life? | - What kind of heart disease/s do you have?<br>- How far is your everyday life constrained by your heart disease, and which tasks can´t be managed by yourself anymore?<br>- Who assists you in coping with the disease?<br>- What do you personally contribute to a better health? |
| What will happen next? | - What hopes do you have for your future health?<br>- Is there something else you would like to tell me? |

**Questions aimed at maintaining the conversational flow:**

- Please tell me exactly how things went with…
- Could you perhaps give me a few more details?
- What happened next? / And after that?
- What else comes into your mind?
- What do you associate with …?

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| ***No. Item*** | ***Guide questions/description*** | ***Page*** |
|---|---|---|
| **Domain 1: Research team and reflexivity** | | |
| *Personal Characteristics* | | |
| 1. Interviewer/facilitator | Which author/s conducted the interview or focus group? | 7 |
| 2. Credentials | What were the researcher's credentials? E.g. PhD, MD | 1/7 |
| 3. Occupation | What was their occupation at the time of the study? | 1/7 |
| 4. Gender | Was the researcher male or female? | 7 |
| 5. Experience and training | What experience or training did the researcher have? | 7 |
| *Relationship with participants* | | |
| 6. Relationship established | Was a relationship established prior to study commencement? | 6-7 |
| 7. Participant knowledge of the interviewer | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | 7 |
| 8. Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | 7 |
| **Domain 2: study design** | | |
| *Theoretical framework* | | |
| 9. Methodological orientation and Theory | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | 8 |
| *Participant selection* | | |
| 10. Sampling | How were participants selected? e.g. purposive, convenience, consecutive, snowball | 6 |
| 11. Method of approach | How were participants approached? e.g. face-to-face, telephone, mail, email | 6 |
| 12. Sample size | How many participants were in the study? | 6/8 |
| 13. Non-participation | How many people refused to participate or dropped out? Reasons? | 6 |
| *Setting* | | |
| 14. Setting of data collection | Where was the data collected? e.g. home, clinic, workplace | 7 |
| 15. Presence of non-participants | Was anyone else present besides the participants and researchers? | 7 |
| 16. Description of sample | What are the important characteristics of the sample? e.g. demographic data, date | 8/ Table 1 |
| *Data collection* | | |
| 17. Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | 7/ Appendix S1 |
| 18. Repeat interviews | Were repeat interviews carried out? If yes, how many? | 6-7 |
| 19. Audio/visual recording | Did the research use audio or visual recording to collect the data? | 7 |
| 20. Field notes | Were field notes made during and/or after the interview or focus group? | 7 |
| 21. Duration | What was the duration of the interviews or focus group? | |

| ***No. Item*** | ***Guide questions/description*** | ***Page*** |
|---|---|---|
| 22. Data saturation | Was data saturation discussed? | 6 |
| 23. Transcripts returned | Were transcripts returned to participants for comment and/or correction? | 8 |
| **Domain 3: analysis and findings** | | |
| *Data analysis* | | |
| 24. Number of data coders | How many data coders coded the data? | 8 |
| 25. Description of the coding tree | Did authors provide a description of the coding tree? | No |
| 26. Derivation of themes | Were themes identified in advance or derived from the data? | 8 |
| 27. Software | What software, if applicable, was used to manage the data? | 8 |
| 28. Participant checking | Did participants provide feedback on the findings? | 8 |
| *Reporting* | | |
| 29. Quotations presented | Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number | 9-14 |
| 30. Data and findings consistent | Was there consistency between the data presented and the findings? | yes |
| 31. Clarity of major themes | Were major themes clearly presented in the findings? | 13-14 |
| 32. Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | 9-13 |

BMJ Open

# Socioeconomic differences in experiences with treatment of coronary heart disease: a qualitative study from the perspective of elderly patients

| | |
|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2018-024151.R1 |
| Article Type: | Research |
| Date Submitted by the Author: | 26-Jul-2018 |
| Complete List of Authors: | Schröder, Sara Lena; Martin Luther University Halle-Wittenberg, Germany, Institute of Medical Sociology<br>Fink, Astrid; Martin Luther University Halle-Wittenberg, Institute of Medical Sociology<br>Richter, Matthias; Martin Luther University Halle-Wittenberg, Institute of Medical Sociology |
| <b>Primary Subject Heading</b>: | Health services research |
| Secondary Subject Heading: | Cardiovascular medicine, Public health, Qualitative research |
| Keywords: | health services research, socioeconomic status, Coronary heart disease < CARDIOLOGY, QUALITATIVE RESEARCH, healthcare inequalities, health services accessibility |
| | |

# Socioeconomic differences in experiences with treatment of coronary heart disease: a qualitative study from the perspective of elderly patients

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Word count: **4761**

## Abstract

**Objectives**: This qualitative study aims to analyse socioeconomic differences in patients' experiences along the treatment pathway for coronary heart disease (CHD).

**Design**: A longitudinal qualitative study using in-depth semi-structured interviews to explore patients' experiences with treatment was conducted. We analysed the transcripts of the records according to qualitative content analysis and identified differences between patients with lower and higher socioeconomic status (SES) by comparing and contrasting the narratives.

**Setting**: The University Hospital in Halle (Saale), Germany.

**Participants**: Fourty-one elderly patients (aged 59-80) who suffered from CHD.

**Results:** From various patient´s experiences along the pathway of care which were found to differ according to SES we derived three major themes: (1) information: patients with higher SES had greater knowledge about treatment and could use medical records as sources of information; (2) illness perception: patients with lower SES focused on improving symptoms and survival, while patients with higher SES focused on physical performance and disease management; and (3) perceived role in healthcare: patients with lower SES tended to delegate responsibility to healthcare professionals.

**Conclusions:** Differences in the patient´s knowledge about treatment, their perceived role in healthcare, and illness perception can be the factors and mechanisms that contribute to explain

socioeconomic inequalities in the treatment of CHD. These factors should be considered in quantitative studies to better understand the disparities in treatment and mortality. We suggest that improving patient-physician-communication and patient knowledge can change the patient´s understanding of CHD as well as their perceived role in healthcare and reduce inequalities in CHD treatment.

**Trial registration number:** DRKS00007839.

**Keywords**: coronary heart disease, socioeconomic status, healthcare inequalities, qualitative research, health services accessibility

**Strengths and Limitations**

- The longitudinal design enabled us to collect information regarding the patient's experiences along the treatment pathway for coronary heart disease from a first revascularization to aftercare.
- We performed a comparative analysis to explore differences between patients with lower and higher socioeconomic status regarding their perspectives and experiences with treatment.
- Generalizability in this study might be limited as we only recruited elderly patients in a large city in the eastern part of Germany; therefore, the results may not reflect the experiences of younger patients with coronary heart disease or those in countries without universal healthcare systems.

**Funding**

This work was supported by the Wilhelm Roux Programme of the Medical Faculty of Martin Luther University, Halle-Wittenberg with grant number FKZ: 28/40.

**Competing Interests**

The authors declare that they have no competing interests.

**Author Contributions:**

SLS wrote the initial draft of this manuscript, collected data and analysed the transcripts. MR and AF conceptualized and designed the project, helped interpreting the data, and critically reviewed the manuscript. All authors have read and approved the final version of the manuscript.

## Data Sharing Statement

Participants of this study were guaranteed that only the study research team would have access to the interviews and transcripts thus data are not available for sharing.

## Ethics Approval

Approval for the study was obtained from the Ethical Review Committee of the Medical Faculty of Martin Luther University, Halle-Wittenberg (No. 2014-95).

## Introduction

Coronary heart disease (CHD) remains the leading cause of death worldwide.[1–3] Treatment of CHD includes revascularization, rehabilitation and long-term medication and aims to improve disease-related quality of life, including exercise capacity, to prevent further cardiac events and reduce mortality. Socioeconomic inequalities in the incidence and mortality of CHD, to the disadvantage of patients with low socioeconomic status (SES), have been well explored.[4–6] Therefore, patients of low SES have a greater need for treatment. Access to treatment is aimed to be on the basis of need rather than of gender, residence or SES, and guidelines note the importance of reducing inequalities in healthcare.[7] However, several studies showed strong socioeconomic differences in CHD treatment, to the disadvantage of patients with low SES.[8]

How inequalities in healthcare arise is complex and largely unknown. As socioeconomic differences in treatment are provable regardless of the underlying healthcare system, they may be attributable to reasons other than financial affordability of healthcare costs.[8] This is particularly the case in countries such as Germany, where individuals have statutory health insurance and very low out-of-pocket payments. In cardiac rehabilitation, a recent study found that comorbidities, self-efficacy, anxiety and depression, cohabitation, commute, disease severity or type of treatment do not significantly mediate the association of SES with attendance and participation.[9] However, health literacy and communication between physician and patient are discussed to generally explain healthcare inequalities, as they are strongly associated with SES.[10–12]Although there is no clear evidence regarding whether an increase in treatment rates reduces socioeconomic disparities in access to treatment,[13, 14] Perelman et al. found that socioeconomic inequalities in CHD treatment can be partly explained by different distances to hospitals with on-site cardiac facilities.[15]

Therefore, the underlying causes and determinants of socioeconomic inequalities in CHD treatment are still not fully understood or analysed. Taking the patients' individual needs and perceptions into account is helpful to reveal new explanatory approaches from the patient's perspective and explore how socioeconomic differences might arise. Qualitative research aims to understand healthcare interactions from the patient's perspective and can help to identify the mechanisms that lead to inequalities in healthcare. To our knowledge, there are only two qualitative studies exploring socioeconomic differences in the treatment of CHD. Manderbacka analysed differences in healthcare encounters and found that doctor-centred decision making was more common in lower-SES patients.[16] Pedersen et al. found that concerning barriers to cardiac rehabilitation, only lower-SES patients felt excluded due to their divergent health beliefs.[17] To gather scientific evidence on the possible factors and mechanisms of socioeconomic inequalities in CHD treatment, we aimed to identify socioeconomic differences in the patient's perspective and their experiences with the treatment pathway for CHD in all sectors from therapy to aftercare.

## Material and methods

### Study design

Based on the methodology of grounded theory, we conducted an exploratory qualitative longitudinal study of elderly CHD patients to examine socioeconomic differences in access, utilization and quality of treatment.[18] A purposive sampling strategy was used to select patients with a confirmed diagnosis of CHD at a university hospital in Germany. Additionally, the patients had to fulfil the inclusion criteria of being between 60 and 80 years and having one additional principal or secondary diagnosis of stable angina pectoris, acute coronary syndrome or cardiac arrhythmia. Patients were excluded from the study if they had insufficient language skills to conduct an interview in German language or were moribund. Between November 2014 and April 2015, a study nurse contacted patients who were hospitalized in the department of cardiology, informed them through a flyer and explained the purpose of the study. We approached 96 eligible patients and asked them to attend an interview to share their experiences with CHD treatment. Participation was voluntary, the patients received no incentives, and 61 patients agreed to participate. Of those, we gradually chose 48 for an interview in accordance with maximum variation to assure that men and women with different SES and different CHD severities (number of atherosclerotic altered vessels, type of revascularization needed, and manifestations of angina pectoris or myocardial infarction) were represented who covered a broad spectrum of treatment experience. To achieve maximum variation, we also included one 59-year-old patient because of relevant experiences. Patients were only enrolled in the study after providing written informed consent. After 48 interviews theoretical saturation in terms of experiences with diagnosis and treatment of different CHD severities was reached. We stopped recruiting new interviewees when the experiences of new interviews were very similar to the narratives reported earlier by other patients, and no new categories emerged during inductive coding. After 6 months, we contacted the 48 participants again and asked them to participate in a follow-up interview. Eight patients refused to participate due to their disease burden, lack of interest, or failure to respond to the invitation letter, and one patient was no longer alive. The thirty-nine follow-up interviews were conducted between June and October 2015. The study was approved by the Ethics Review Committee of the Medical Faculty at the Martin Luther University, Halle-Wittenberg (No. 2014-95).

## Data collection

We conducted semi-structured interviews to explore the patients' perspectives on their heart disease and their personal experiences with the treatment they received. The interview guide (S1 Appendix) was developed according to Helfferich with key questions that evoke narrations, which were derived from the state of research.[19] To cover the same topics within each interview, these key questions were supplemented by specific questions, which were only asked if not mentioned by the patient himself. The key and supplementary questions were developed by a process of collecting, checking, sorting, and subsuming topics and questions of relevance in accordance with the research question and aim. SLS conducted two preliminary interviews that were used to further develop the semi-structured interview guides. We began the baseline interviews with a broad general question about the medical history. More detailed questions were asked individually based on each patient's narrative. All Interviews were conducted and analysed in German language. For the Quotations and interview guide presented in this manuscript we conducted a double-blind translation from German to English that was checked by a third person. The patient's basic sociodemographic data were obtained with a short, standardized questionnaire following the baseline interview, and the interviewer subsequently wrote a field note for each interview.

Baseline interviews were conducted in a private room of the hospital, and follow-up interviews were held either at the patient's home or at the medical facility, depending on the patient's choice. Two employees of the Institute of Medical Sociology (IMS) conducted the interviews face-to-face: SLS (female) is a research associate and an economist who has conducted qualitative health research since 2009 and conducted most of the interviews; Nils Bormann (male) is a medical student assistant and an economist who was trained prior to conducting the interviews. The interviewers introduced themselves as members of the IMS, not working in the department of cardiology. Each baseline interview included only the patient and one or both interviewers. In some follow up interviews, family members were present at the patient's request. The interviews lasted an average of 35 minutes at baseline and 42 minutes at follow-up and were audiotaped with the interviewee's permission.

SES was defined by educational level and occupation based on the German epidemiological standards.[20] Education was measured by level of schooling and academic qualifications and was classified on an 8-point scale. Occupation was measured by the last occupational group the patient belonged to and classified according to job autonomy on a 5-point scale.[21] A composite index of SES was derived using a sum score of both items, which ranged between 2 and 13. Index values between 2 and 7 were rated "lower SES", and values between 8 and 13 were rated "higher SES".

## Data analysis

After constructing the main categories that originated from the research questions, SLS coded the pseudonymised interview transcripts in a data-driven approach (inductively) sentence by sentence with codes and themes derived from the data in accordance with qualitative content analysis.[22] The coding started simultaneously with the conducting of the interviews. Five contrasting transcripts were double-coded by two additional members of the qualitative research working group at the IMS, who also participated in the discussion and evaluation of the data. The working group was composed of researchers with different backgrounds, namely, sociology, healthcare research, economics, nursing and educational science. The emerging codes were organized into subcategories with the existing main categories. Afterwards, we identified socioeconomic differences by comparing and contrasting the codes of the frame between patients with lower and higher SES. Codes that were found only in one group constituted the origin of comparing and contrasting the narratives to identify SES-specific patient perspectives and experiences in each phase of treatment. Building on these results, we constructed overall major themes, which characterized the differences across the continuum of care. We used MAXQDA 11 software to assist with the data management and analyses. In the present analysis, we excluded 7 patients because neither CHD nor any CHD-indicative treatment was mentioned throughout their interviews as the narratives of treatment experiences had been overshadowed by other heart diseases. Additionally, to the 41 baseline interviews, we included the narratives of those 17 follow-up interviews in the current analysis, which provided important additional information to answer the research question. In total, we analysed 58 interviews from 41 patients.

## Patient involvement

By exploring patients' experiences with treatment in this study through an exploratory design, the patients' preferences and priorities led the data collection during the interviews and due to an inductive data-driven approach as well, throughout data analysis. The participants did not provide feedback on their transcripts or the findings.

## Results

This analysis was based on the transcripts of 58 interviews (41 baseline and 17 follow-up) with 41 patients. The baseline characteristics of the 41 patients are shown in Table 1. Throughout the narratives, treatment of CHD was reported as a complex process with the involvement of many providers. The majority of the patients reported utilizing treatment, e.g., revascularization at the hospital; inpatient cardiac rehabilitation; visiting their general practitioner (GP) regularly, who prescribes the medication as recommended from the hospital; and having regular appointments with a resident cardiologist. Only a few patients (from both SES groups) reported having problems with access to, utilization of or quality of treatment. However, we found differences according to SES in the patients' individual perceptions and perspectives on treatment, which are described separately hereafter subdivided into four sections: treatment at the hospital, rehabilitation, treatment with drugs and ambulatory aftercare. Quotations reflective of the differences are presented for patients of lower and higher SES at the various stages of treatment. Following, three major themes, which were derived from the sector-specific differences, are depicted: "information", the "patient's individual perception of CHD" and the "perceived role in healthcare". These themes might characterize the factors and mechanisms of socioeconomic differences in treatment across the continuum of care.

## Treatment at the hospital

With regard to revascularization, some patients reported that a second coronary angiography (CAG) was scheduled and conducted within a few days for different reasons. However, only lower-SES patients did not scrutinise or mention the reason when a diagnostic-only CAG was followed by a second CAG with stent implantation. Additionally, whereas many patients of both lower and higher SES rated it important for hospital staff to be friendly, attentive and caring, predominantly lower-SES patients mentioned aspects of being taken seriously either positively (e.g., taking preferences seriously, being asked how one feels) or negatively (e.g., discussions about but not with oneself, no conversations at all). While assessing the quality of treatment, some lower-SES patients complained about being discharged with open wounds after coronary artery bypass graft surgery. Generally, while assessing the quality of treatment, lower-SES patients tended to focus on symptom improvement, eliminating the need for visits to the doctor or improving survival, whereas higher-SES patients predominantly aimed to improve physical performance.

"Well, in the hope that everything stays the same. Let´s say that you are well. Well, getting around with it quite well, with no complications arising. As I said, that one may reach a slightly older age, not just until retirement, but perhaps even a bit longer." (Mr. Lange, 60 years, lower SES)

"Well, but then it came up with the heart and I myself had the feeling that it is probably the only thing that really gets you back on your feet. I was really feeling sluggish. So I did indeed make an effort to try to walk again quickly and to/ I really did, but somehow in the end the energy was lacking." (Mr. Lehmann, 63 years, higher SES)

Knowledge of different treatment options became apparent mainly in patients with high SES. However, an information deficit was found in some narratives, e.g., patients reporting that they did not know the outcome of medical examinations; they were unaware of the treatment that had been performed; or they rated the medical reports incomprehensible. An information deficit became apparent mainly in lower-SES patients, although this was not always experienced with a perceived greater need for information.

"Yes, it has been explained to me, but I didn´t get it. First of all, I sometimes didn´t understand it, because he expressed himself in such a professional manner. The nurses already started laughing, because I/ and then I thought: 'No, you better give up. You better read through it next time´" (Mrs. Schubert, 80 years, lower SES)

"For this there are, that's at least what has been explained to me, the clogged coronary arteries can be expanded by implanting stents, if you know what these are, incorporating these small tubes that eliminate the narrowed areas. Or if that is not feasible, which can happen as well that a vessel ruptures or something like that, then (...) it is done surgically. Then bypasses are produced from other parts of the body and incorporated." (Mr. Wagner, 75 years, higher SES)

We found paternalistic and shared decision making in both SES groups, but paternalistic decisions were found to be more unquestioned in lower-SES patients, whereas higher-SES patients understood the reasons why decisions were made. When decisions were made jointly, we found that higher-SES patients were involved more actively in decision making, whereas lower-SES patients thought of themselves as being only responsible for responding (agree or disagree) to a recommendation given.

"With this I entirely relied on the physicians. In fact, I didn´t really thought about it. When they said: ´This´, then we do this. They do ask indeed: ´Mr. Zimmermann, do you agree?´ I mean, when I go to the hospital, I let myself be treated, but this is not meant to be negative in any way. But I rely on the physicians. [...] They are the professionals. I would never pretend to be the wise guy, as I know people who do so, not physicians, but private persons, who dictate people what to do." (Mr. Zimmermann, 76 years, lower SES)

"Today, quite a few medical exams have been conducted with me. Now you have to wait, but I guess it won´t change anything about this final decision. The demand placed on me to decide this." (Mr. Hartmann, 69 years, higher SES)

**Cardiac rehabilitation**

Some patients reported whether the time interval between their discharge from hospital and the beginning of inpatient cardiac rehabilitation was either too long or too short for their individual needs. In doing so, only lower-SES patients reported they could not participate in therapeutic cardiac rehabilitation treatments due to their recent coronary artery bypass surgery, whereas only higher-SES patients focused their reasons on individual demands for disease management. Additionally, we found that while assessing the quality of cardiac rehabilitation, in the narratives of lower-SES patients, performing regular examinations, such as daily blood pressure measurement or electrocardiograms, was more important, whereas higher-SES patients tended to place an emphasis on physical performance improvement, as well as increased knowledge about necessary behaviour changes and their heart disease in general.

"Indeed, in rehabilitation it was great. Well, there was/ every morning you had to go to the presentation, weighing, measuring blood pressure and stuff like that." (Mrs. Koch, 62 years, lower SES)

"Over there I primarily learned through lectures and, as I said before, through meetings about what the issue of a heart attack means, how it emerges and so on. This improved much of my understanding. Previously, before you have something like that you don´t care about it. So, concerning this matter one was educated quite well." (Mr. Jung, 67 years, higher SES)

**Treatment with drugs**

Although specific drugs, agents or trade names were rarely mentioned throughout the narratives, access to and utilization of any medications were fairly high in both SES groups. However, we found that with respect to medication preferences, some lower-SES patients highlighted the importance that the involved physicians should appropriately coordinate the selection of prescribed drugs, while some stated they generally did not like to take drugs. However, one higher-SES patient reported that he prefers to take combination medication.

"Or, for example, if there are changes in medication, it is very important. With prothrombin time and everything; you need to be always in good hands. Not that one says this way and the other one says that way. That´s bad." (Mr. Köhler, 66 years, lower SES)

"I have to take many drugs; they upset the stomach and everything. I had to take 17 or 18 different pills. Well, and then I recognized, I read about it, there is a patch and so on and using that you can come off of 5 drugs at once. The patches are indeed very expensive and the doctor immediately said ´no and no and no´ and so on. Now I have this patch and I am feeling fine." (Mr. Richter, 66 years, higher SES)

**Ambulatory aftercare**

Some patients in the lower-SES group mentioned undergoing regular check-ups every month with their GP to assess prothrombin time (Quick-test). While rating the quality of GPs, mainly lower-SES patients mentioned the importance of thorough medical examinations and doctor availability. Some mainly lower-SES patients complained about the GP examining or referring patients only on demand or the GP not helping them make an appointment with a cardiologist. Some predominantly lower-SES patients reported that they see themselves as responsible for retention of their medical record. However, some patients, mainly with higher SES, mentioned obtaining or inquiring for a recommendation from the GP regarding a particular specialist or hospital.

"However, I wasn´t correctly/ At first I didn´t know something like that existed. Then, I asked my doctor. I say: ´Doesn´t one have to go to any follow up?´ - ´Well, I could forward you there, but you better try to make an appointment yourself´." (Mrs. Körtig, 59 years, lower SES)

"In one consultation it was like, ´To whom should I go?´ And then he said, 'I have a number of colleagues here that I can recommend to you´ And then I say, ´Alright, then make an appointment for me', and that´s how I came to Mrs. Dr. Alpha." (Mr. Winkler, 72 years, higher SES)

In addition, the patient's experiences with access to and utilization of regular check-ups at a resident cardiologist varied according to SES. Some lower-SES patients perceived appointments with specialists as generally unnecessary or expected instructions from physicians about the necessity of appointments due to their own uncertainty. Some mainly higher-SES patients used medical reports as sources of information for the need of follow-up care.

"As I said, I had to wait a very long time for this 24-hour ambulatory electrocardiogram. Then it was done. She [cardiologist] wrote her report, my GP got it and nothing else came of it. [...] I mean, if there would have been something acute, surely something would have come up, but it was still, that it is not/" (Mr. Köhler, 66 years, lower SES)

"I guess that I will have to go to my GP for follow up and he does further. [...] That is my current state. But I am not sure yet, because I have not received the medical report yet. I am still waiting for it." (Mr. Schäfer, 71 years, higher SES)

**Factors and mechanisms of socioeconomic differences in CHD treatment**

While comparing the differences in the patients' experiences according to SES across the pathway of care, three major themes (Fig. 1) emerged to characterize differences and may be the factors and mechanisms for socioeconomic inequalities in CHD treatment, namely, information, patient's individual illness perception and their perceived role in healthcare.

First, the narratives suggest that lower-SES patients are less informed about their treatment than higher-SES patients, which became apparent, e.g., through their lack of knowledge regarding the treatment that was performed, as well as their lack of knowledge about the reasons for or outcomes of medical examinations. However, higher-SES patients knew about different treatment options. Whereas lower-SES patients reported they missed conversations at the hospital or rated the reports as incomprehensible, higher-SES patients explained that they use medical reports as sources of information. While most patients rated the healthcare system (especially hospitals) as overloaded, some made the connection that patients are given far too little information and are required to actively request information because of excessive work demands on health workers due to the healthcare system economization.

“And as well, someone who is cognitively not that fit anymore, one does not understand at all what you are told. And that is sometimes not so nice. Well, but probably that´s just our system, that is/ which is not working, I think”. (Mrs. Koch, 62 years, lower SES)

“You need to directly address the physicians; they do not have the time as well. You can notice that during the doctor´s visits. Well, then it is clear. But otherwise you get an answer to any question; pleasant, polite, courteous.“ (Mr. Schäfer, 71 years, higher SES)

Second, we found differences in patients’ illness perceptions. Whereas lower-SES patients seemed to understand CHD through putting emphasis on symptoms and medical parameters measured through medical examinations, higher-SES patients focused on physical performance and disease management, which requires knowledge about CHD.

Finally, we found differences in the patient's perceived role in their healthcare. Lower-SES patients tended to delegate responsibility for treatment, which became apparent, e.g., by the patients not questioning the reasons for the decisions made, assuming that healthcare professionals are responsible for patients being taken seriously, not perceiving a need to obtain information even when lacking information, being less involved in decision making, relying on physicians to coordinate care (referrals, medication), viewing themselves as only responsible for the retention of medical records, and having a tendency to have general views rather than opinions. Contrastingly, higher-SES patients seem to feel more responsible for treatment, e.g., focusing more strongly on disease management, having increased healthcare knowledge, making informed choices or actively involving their GP.

## Discussion

In this study, we elaborated three major themes from the patients' experiences with CHD treatment that that were found to differ between patients of lower and higher SES: information, the patient's individual perception of CHD and their perceived role in healthcare. Regarding information, patients with higher SES had greater knowledge about treatment and could use medical records as sources of information. Regarding illness perception, patients with lower SES focused on improving symptoms and survival, while patients with higher SES focused on physical performance and disease management. Regarding the patient´s perceived role in healthcare, patients with lower SES tended to delegate responsibility to healthcare professionals.

First, we found that lower-SES patients seem to lack knowledge about treatment compared with higher-SES patients, obtain less information and have problems understanding the information provided to them. This is in accordance with previous studies, which found that knowledge about treatment was a barrier of utilization and access for lower-SES patients, e.g. to optimal oesophageal cancer care or reproductive healthcare.[23, 24] Especially in low-SES patients it is well known that lack of information and knowledge results in low utilization.[25, 26] This is probably due to the fact that patients of lower SES are generally given less information in healthcare.[10] Especially with regard to CHD, studies showed that patients are given little information by health professionals, and therefore, wide information gaps exist for all CHD patients.[27, 28] Second, illness perception differs, as we found that lower-SES patients seem to focus more strongly on symptoms, survival and good results of physical check-ups in their illness perception, while higher-SES patients tend to focus on physical performance and disease management. The latter reveals more knowledge about CHD, and studies found that lack of knowledge regarding CHD is associated with both low SES and adherence.[29–32] Therefore, we confirm the findings of another study that only lower SES patients felt excluded from cardiac rehabiltation due to their divergent health beliefs.[17] This becomes particularly relevant as focusing on and improving physical performance are important for reducing cardiovascular mortality and inequalities in AMI mortality, independently of inequalities in access to healthcare.[33] Finally, the perceived role in healthcare differed according to SES: higher-SES patients tended to assume responsibility for treatment, whereas lower-SES patients showed a tendency to relinquish responsibility. This latter finding was characterized by "putting up with everything needed" and expecting to be told that "everything is fine", with no further need to see a physician. Different responsibilities are becoming apparent through the decision making process between the physician and the patient, as a study found that high-SES patients perceive their involvement as participating in the decision making after exploring other options, whereas low-SES patients see themselves only being responsible for agreeing or disagreeing with the recommendation made.[34] Therefore, we confirm another study, which found that inequalities exist in the way that shared decision making is more common in high-SES patients.[16] However, the patient's assumed role is likely influenced by the physician, as a review found that physicians reported lower levels of facilitating shared decision making with patients who were rated to be unable or unwilling to participate in decision making from the physicians perspective or who showed limited awareness about their condition.[35]

Although we provide novel insights into the possible factors and mechanisms of socioeconomic differences in treatment, the study has several limitations. The generalizability might be limited as we only recruited elderly patients in the eastern part of Germany. Therefore, these results may not reflect the experiences of younger patients or those living in other regions. Importantly, data were generated in a country with statutory health insurance and financial concerns may better explain socioeconomic differences in treatment in other countries without universal healthcare systems. There might be transferability of some of our findings to settings of CHD treatment with similar organizational and economic contexts. We increased the rigour of the study by taking the consolidation criteria for reporting qualitative research (COREQ) into account during the research process.[36] Reflexivity was increased by using content analysis with a coding frame as well as coding the interviews and discussing the results with different researchers of a qualitative working group, and reporting on the process of interpretation within the results section of the manuscript. Only a few patients reported problems with access to and utilization of treatment. Throughout the narratives, only some experiences and viewpoints on treatment were found to differ according to SES. However, consideration of these aspects together led us to generate three data-driven major themes, which may elucidate the possible mechanisms of socioeconomic inequalities in treatment. But we did not find differences in treatment according to SES. Especially when assessing the patient's knowledge, information, illness perception and delegation of responsibility, it needs to be considered that we only analysed the patients' perspectives and viewpoints independently of the information that were given through communication by healthcare staff. Finally, as we operationalised SES dichotomously based on education and occupation, we simplified the continuum of social status. We did not collect data on income, as income presents a sensitive personal issue, especially in longitudinal studies, and for older people income is a less appropriate indicator for SES because it is highly affected by retirement and difficult to collect reliable information.[37]

Given that CHD is the leading cause of death worldwide, the generation of hypotheses regarding the potential factors underlying the socioeconomic differences in CHD treatment is essential for explaining and reducing these inequalities. The level of information and knowledge, individual illness perception and perceived role in healthcare can be the mechanisms that contribute to explain socioeconomic inequalities in CHD treatment and should be considered in further quantitative studies as mediating factors between SES and treatment. We conclude that improvement in patient-provider communication might be the key to reducing healthcare inequalities, as it may increase knowledge about treatment, improve the understanding of CHD, and empower patients to assume responsibility in treatment, which can improve engagement in treatment and utilization.

**Acknowledgments**

We acknowledge the patients who participated in this study and shared their healthcare experiences with us. We thank the staff at the Department of Cardiology at the University Hospital in Halle for their assistance with screening patients for this study. Finally, we thank Niels Bormann for assisting with data collection, and the members of the qualitative research working group at the IMS, who helped with coding, discussing and evaluating the data.

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## Tables

**Table 1.** Characteristics of the patients at baseline (n = 41).

| **Characteristics** | **Number in overall patients** | **Number in lower-SES patients** | **Number in higher-SES patients** |
|---|---|---|---|
| Total | 41 | 23 | 18 |
| Age, the mean | 69.7 | 69.7 | 69.6 |
| Male | 26 | 10 | 16 |
| Female | 15 | 13 | 2 |
| Publicly insured | 41 | 23 | 18 |
| One-vessel disease | 13 | 8 | 5 |
| Two-vessel disease | 11 | 6 | 5 |
| Three-vessel disease | 17 | 9 | 8 |
| CHD diagnosed for up to 1 year | 20 | 13 | 7 |
| CHD diagnosed longer than 1 year ago | 21 | 10 | 11 |

CHD, coronary heart disease; SES, socioeconomic status

## Figure legends

**Fig 1.** Three major themes derived from socioeconomic differences in patients' experiences with coronary heart disease treatment.

## Supporting information

S1 Appendix. Interview guides.

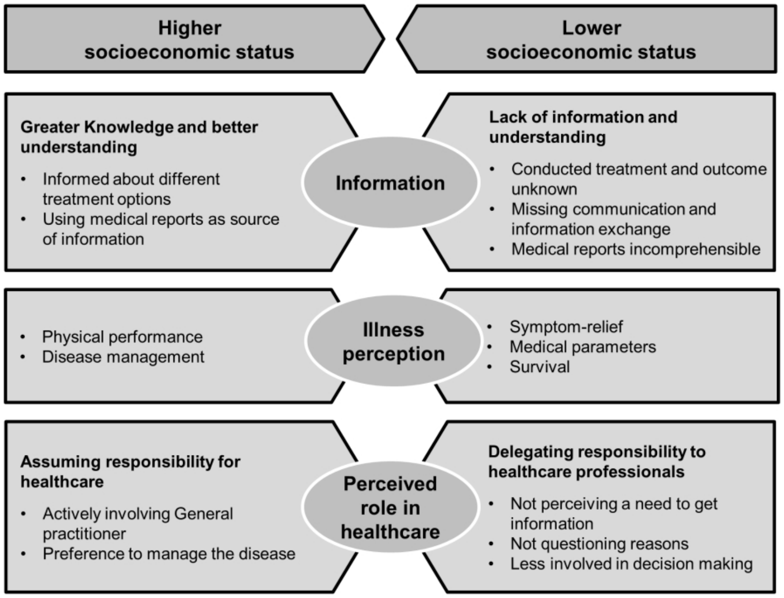

Fig 1. Three major themes derived from socioeconomic differences in patients' experiences with coronary heart disease treatment.

190x254mm (300 x 300 DPI)

## Interview Guide Baseline

| Key question | Concrete supplementary questions |
|---|---|
| Please begin by telling me about the medical history of your heart disease starting from the first symptoms until this hospital stay. | - Have you ever been to a general practitioner/ cardiologist/ in a rehabilitation clinic before because of your heart disease?<br>  - How was your disease diagnosed?<br>  - Why are you currently in hospital? |
| Which positive and negative experiences have you made, concerning the care you have received? | - Can you think of any other positive or negative experience you have made with the hospital or office-based physicians?<br>- Was there anything you were particularly satisfied with?<br>- Was there anything you were unsatisfied with?<br>- Have you experienced any problems with the further processing of the treatment?<br>- How have you experienced talking with your physicians?<br>- How was a decision reached about what treatment you were to receive? |
| How would you describe the quality of your treatment? | - How satisfied are you with your treatment?<br>- Do you think that everyone in Germany is able to receive good treatment? Why do you think that is? |
| How do you manage your heart disease right now? | - What will happen next?<br>- What medical care do you expect to receive in the next months?<br>- What hopes do you have for your health in the future?<br>- Is there something else you would like to tell me? |

**Questions aimed at maintaining the conversational flow:**

- Please tell me exactly how things went with…
- Could you perhaps give me a few more details?
- What happened next? / And after that?
- What else comes into your mind?
- What do you associate with …?

## Interview Guide Follow Up

| Key question | Concrete supplementary questions |
|---|---|
| Please begin by telling me how the treatment of your heart disease has progressed after our last conversation. | - Which doctors have you seen meanwhile, e.g. general practitioner (GP)/ cardiologist?<br>- Have you been in a rehabilitation clinic or do you attend a heart training group?<br>- What exactly has been done by each of the physicians (GP, cardiologist, hospital, rehabilitation)?<br>    - Which tasks of medical care have been taken care of by which doctor?<br>    - Who prescribes you heart drugs? |
| What positive and negative experiences have you made, concerning the treatment and care you have received? | - Can you think of any other experiences you have had with the GP/ cardiologist/ rehabilitation clinic?<br>- Was there anything you were particularly satisfied or not satisfied with?<br>- How does the cooperation between GP, specialists and the doctors at the hospital work?<br>- Have you experienced any problems with the postoperative management and any further treatment after you have been discharged from hospital?<br>- Have you had to actively arrange yourself to the further treatment?<br>- Have you ever changed your GP or cardiologist and what have been the particular reasons? |
| Last time we talked about your expectations of your medical care – to what extend were they fulfilled? | - Have your expectations changed during the course of treatment? |
| What kind of influence does your heart disease have on your everyday life? | - What kind of heart disease/s do you have?<br>- How far is your everyday life constrained by your heart disease, and which tasks can´t be managed by yourself anymore?<br>- Who assists you in coping with the disease?<br>- What do you personally contribute to a better health? |
| What will happen next? | - What hopes do you have for your future health?<br>- Is there something else you would like to tell me? |

**Questions aimed at maintaining the conversational flow:**

- Please tell me exactly how things went with…
- Could you perhaps give me a few more details?
- What happened next? / And after that?
- What else comes into your mind?
- What do you associate with …?

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

| ***No. Item*** | ***Guide questions/description*** | ***Page*** |
|---|---|---|
| **Domain 1: Research team and reflexivity** | | |
| *Personal Characteristics* | | |
| 1. Interviewer/facilitator | Which author/s conducted the interview or focus group? | 9 |
| 2. Credentials | What were the researcher's credentials? E.g. PhD, MD | 1/9 |
| 3. Occupation | What was their occupation at the time of the study? | 1/9 |
| 4. Gender | Was the researcher male or female? | 9 |
| 5. Experience and training | What experience or training did the researcher have? | 9 |
| *Relationship with participants* | | |
| 6. Relationship established | Was a relationship established prior to study commencement? | 9-10 |
| 7. Participant knowledge of the interviewer | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | 9-10 |
| 8. Interviewer characteristics | What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | 9-10 |
| **Domain 2: study design** | | |
| *Theoretical framework* | | |
| 9. Methodological orientation and Theory | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | 7 |
| *Participant selection* | | |
| 10. Sampling | How were participants selected? e.g. purposive, convenience, consecutive, snowball | 7 |
| 11. Method of approach | How were participants approached? e.g. face-to-face, telephone, mail, email | 8 |
| 12. Sample size | How many participants were in the study? | 8/11 |
| 13. Non-participation | How many people refused to participate or dropped out? Reasons? | 8 |
| *Setting* | | |
| 14. Setting of data collection | Where was the data collected? e.g. home, clinic, workplace | 9 |
| 15. Presence of non-participants | Was anyone else present besides the participants and researchers? | 10 |
| 16. Description of sample | What are the important characteristics of the sample? e.g. demographic data, date | Table 1 |
| *Data collection* | | |
| 17. Interview guide | Were questions, prompts, guides provided by the authors? Was it pilot tested? | 9/ S1 Appendix |
| 18. Repeat interviews | Were repeat interviews carried out? If yes, how many? | 8 |
| 19. Audio/visual recording | Did the research use audio or visual recording to collect the data? | 10 |
| 20. Field notes | Were field notes made during and/or after the interview or focus group? | 9 |
| 21. Duration | What was the duration of the interviews or focus group? | 10 |

| *No. Item* | *Guide questions/description* | *Page* |
|---|---|---|
| 22. Data saturation | Was data saturation discussed? | 8 |
| 23. Transcripts returned | Were transcripts returned to participants for comment and/or correction? | 11 |
| **Domain 3: analysis and findings** | | |
| *Data analysis* | | |
| 24. Number of data coders | How many data coders coded the data? | 10 |
| 25. Description of the coding tree | Did authors provide a description of the coding tree? | No |
| 26. Derivation of themes | Were themes identified in advance or derived from the data? | 10 |
| 27. Software | What software, if applicable, was used to manage the data? | 11 |
| 28. Participant checking | Did participants provide feedback on the findings? | 11 |
| *Reporting* | | |
| 29. Quotations presented | Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number | 13-18 |
| 30. Data and findings consistent | Was there consistency between the data presented and the findings? | yes |
| 31. Clarity of major themes | Were major themes clearly presented in the findings? | 17-19/ Figure 1 |
| 32. Clarity of minor themes | Is there a description of diverse cases or discussion of minor themes? | 11-17 |