Article

Health records as the basis of clinical coding: Is the quality adequate? A qualitative study of medical coders' perceptions

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Abstract

Background: Health records are the basis of clinical coding. In Portugal, relevant diagnoses and procedures are abstracted and categorised using an internationally accepted classification system and the resulting codes, together with the administrative data, are then grouped into diagnosis-related groups (DRGs). Hospital reimbursement is partially calculated from the DRGs. Moreover, the administrative database generated with these data is widely used in research and epidemiology, among other purposes. **Objective:** To explore the perceptions of medical coders (medical doctors) regarding possible problems with health records that may affect the quality of coded data. **Method:** A qualitative design using four focus groups sessions with 10 medical coders was undertaken between October and November 2017. The convenience sample was obtained from four public hospitals in Portugal. Questions related to problems with the coding process were developed from the literature and authors' expertise. The focus groups sessions were taped, transcribed and analysed to elicit themes. **Results:** There are several problems, identified by the focus groups, in health records that influence the coded data: the lack of or unclear documented information; the variability in diagnosis description; "copy & paste"; and the lack of solutions to solve these problems. **Conclusion and implications:** The use of standards in health records, audits and physician awareness could increase the quality of health records, contributing to improvements in the quality of coded data, and in the fulfilment of its purposes (e.g. more accurate payments and more reliable research).

Introduction

Health records, both electronic and paper based, represent a source of information about the patient's health status, diseases, disease progression, procedures, treatment effectiveness and quality of healthcare (Ayatollahi et al., 2014; Miller and Sim, 2004). In Portugal, both types of health records coexist. Health records are not just meant for clinical purposes. The information contained in the records from inpatients and outpatients is systematically abstracted, coded and grouped into diagnosis-related groups, generating an administrative database used for reimbursement and further reused for research (Freitas

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et al., 2012; Pinho et al., 2015; Santos et al., 2016, 2017; Sousa-Pinto et al., 2018).

Clinical coding is the process of transforming the information about diseases or procedures recorded in the health records into numeric or alphanumeric codes, that is, it categorises health records information (Tatham, 2008). In Portugal, the International Classification of Diseases – Ninth Revision – Clinical Modification (ICD-9-CM) was used until the end of 2016 when the International Classification of Diseases – Tenth Revision – Clinical Modification/Procedure Classification System (ICD-10-CM/PCS) was introduced. Unlike some other countries, the Portuguese medical coders are medical doctors. They are trained at the Escola Nacional de Saúde Pública – National School of Public Health, through a course conducted in partnership with the *Administração Central do Sistema de Saúde* (ACSS) – Health System Central Administration. For continual training, three annual training actions (one in the north, one in the centre and one in the south of the country) are carried out by *Associação dos Médicos Auditores e Codificadores Clínicos* (AMACC) – Association of Clinical Coding and Auditing Physicians – and monthly seminars are organised by the Department of Community Medicine, Information and Health Decision Sciences (MEDCIDS), at the Faculty of Medicine of the University of Porto.

Health records are the basis of clinical coding. Hence, the quality of documented information affects the quality of coded data. If the documentation of healthcare is poor, the assigned clinical codes will not be the most appropriate (Southern et al., 2016). The specificity of the information recorded is also an important factor in clinical coding, that is, for the coding to be performed with the maximum accuracy, the necessary information should all be present in the health records (DeAlmeida et al., 2014; Kurusz, 2015; Santos et al., 2008). Variations in the description of diagnosis by clinicians, lack of clarity in records, lack of legibility, incomplete documentation, use of synonyms and abbreviations and lack of communication between health professionals and medical coders are hindrances to good clinical coding (Farzandipour et al., 2010; McKenzie et al., 2004; O'Malley et al., 2005; Santos et al., 2008; Tang et al., 2017). All of these problems contribute to the lack of data quality in health records.

The aim of this exploratory study was to investigate the perceptions of medical coders regarding possible problems with health records that may affect the quality of the coded data.

Methods

Data analysis and reporting were conducted in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Tong et al., 2007) (see Appendix 1).

Research design

We conducted four focus group sessions, in October and November 2017, to ascertain medical coders' perceptions of coding problems, including problems with health records, which may impact coding quality.

Sample

Convenience samples of medical coders were involved in this study. Contact details were obtained through participation in meetings and through researchers' contact lists, which allowed the collection of 54 medical coders' email addresses from four public hospitals. These four hospitals represent an accessible sample of the 105 existing hospitals, including public and those in public–private partnerships (INE, 2017). The four hospitals were from three different cities. The only inclusion criterion for study participation was to have had experience in clinical coding.

Medical coders were invited by email to complete a short questionnaire about their demographic characteristics, experience in clinical coding and availability to participate in a focus group. Twenty-one replies were received and a new email was then sent to these participants in order to determine the most suitable date for conducting the focus groups. Eleven medical coders, belonging to the four hospitals, showed interest in participating. A third email was sent to inform each participant about the date of the focus group session and, 3 days before the session, another reminder was sent by email. One of the eleven medical coders was not able to attend any of the sessions.

Data collection

The interview guide was developed based on problems already identified in the scientific literature (Bajaj et al., 2007; DeAlmeida et al., 2014; Farzandipour et al., 2010; Haghighi et al., 2014; Lucyk et al., 2017; O'Malley et al., 2005; Tang et al., 2017) and on the researchers' expertise (questions concerning health records in Box 1). During the sessions, an interview guide was followed, but other issues arose. The focus group sessions were held in the Faculty of Medicine of the University of Porto, Portugal. The duration of the focus groups sessions ranged from 1 hour and 15 minutes to 1 hour and 50 minutes. Before starting the sessions, all participants received written and oral information about the study and signed an informed consent document allowing the recording and use of data, as well as were assured of the anonymity and confidentiality of the collected data. The four focus groups were conducted with two groups of five medical coders. Each group was submitted to two different interview guides, with different questions. In one session in each group there was a participant who was unable to attend.

Data analysis

Sessions were recorded on audio files with a mobile phone, using the *Dictaphone* software. Microsoft Word was used to transcribe all the recordings. A clean transcript was produced: repetitions, false starts and possible errors were removed from the text to become clearer and friendlier for the reader. Recordings were deleted after that process. Through thematic content analysis, all the information

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Box 1. Focus group questions (concerning health records)

1. Health records are the basis of clinical coding; how do you classify their quality?
2. What questions related to health records may affect the quality of clinical coding?
3. How do you think the quality of health records could be improved?
4. Is there any relation between the involvement of all health professionals in the coding process and the quality of the coded data? If so, which one? If not, why?
5. What is your opinion about the abbreviations used?
6. Is there any relation between the variations in the descriptions of the diagnoses made by health professionals and the quality of the coded data? If so, which one? If not, why?
7. Regarding access to the health records for coding, how do you quantify the degree of difficulty?

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Table 1. Characteristics of the focus groups' participants (*n* = 10).

Characteristics		*n*
Age (years)	30–39	1
	40–49	2
	50–59	4
	>59	3
Experience in clinical coding (years)	<1	1
	1–5	2
	6–9	4
	10–19	1
	>19	2
Gender	Female	8
	Male	2
Work modality (clinical coding)	Full-time	3
	Part-time	7

discussed was grouped by themes and subthemes related to the aims of the study (Bardin, 2011). Results were analysed by the authors. One author grouped the information and these data were subsequently validated by consensus with the other authors.

Results

Ten medical coders participated in the focus groups. Most of the participants were female (8 of 10) and worked part-time in clinical coding (7 of 10). The median age was 55 years (SD = 12 years) and the median coding experience was 9 years (range = 0.5–28 years) (See Table 1).

Four themes emerged from factors raised by medical coders as influencing health records' quality and, consequently, the quality of coded data: (i) incomplete/unclear documentation in health records [incomplete/missing discharge note (document with a discharge summary); incomplete/missing surgical report; use of abbreviations and acronyms]; (ii) variability in health records (variations in diagnosis description by different health professionals); (iii) paper health records (PHRs) and electronic health records (EHRs) (access to EHRs); and (iv) possible solutions to problems with health records (health records standards; health records audits). For each result, one or more examples from the focus group have been presented, with a code assigned to each participant and hospital at the end of the quotations in brackets.

Incomplete/unclear documentation in health records

Participants stated that the absence of any element of the record and the lack of organisation were the main obstacles to good coding: "There is no good coding, neither good nor bad, that is to say, there is no full coding if there is no correct and complete health record of the episode, whether of hospitalisation or whatever" (Participant 7 (P7), Hospital 2 (H2)); "There are services that record discharge notes in various locations . . . and we have to open a lot of directories, and sometimes we do not find them [the discharge notes]" (P5, H1). Participants also identified the anaesthesia report, the surgical report, the admission and discharge notes, the pathology report and the nursing records as being the most important documents for coding: "What is standard now is that the admission and the discharge notes, the progress notes, the surgical report, the pathology report, the anaesthesia report and some nursing records, with the bedsores, all this is already included . . . however, even so, we are having difficulties" (P7, H2). However, as discussed in the following subthemes, these important documents were not consistently present in all records.

Incomplete/missing discharge note. Although the discharge note is a document required by law, participants stated that "there are services that do not fill a discharge note yet" (P2, H1). Its existence varies with specialty and hospital: "Discharge notes, in general, are good" (P1, H3); "Sometimes they don't exist. Physicians only write daily progress notes" (P4, H1); "In outpatient surgery episodes, discharge notes rarely exist, and this also causes lack of information" (P10, H1). Additionally, it was discussed that in some services, there are quite extensive notes, in which exams are transcribed but diagnosis may not be specified: "What I find worse are discharge notes; I think most people don't know what a discharge note is. Either they transcribe exams in full, . . . and sometimes when we get to the end of the record, after reading it all, they don't state a diagnosis for us to code" (P5, H1); "There are two extremes: some are very exhaustive discharge notes, and others are descriptive but, often, not even affirmative in relation to diagnosis, with several things being left out. It is very difficult to assume them" (P8, H2). The discharge note was more often missing when patients died, or, there was a lack of completeness; often the record did not have a summary of the hospitalisation in order to abstract and code. This might have happened because the physician who wrote the discharge note may not have been the same physician who was responsible for the patient during hospitalisation. "Death notes almost do not exist" (P2, H1); "some days ago, I

received a death note about a patient hospitalised for three months, with three lines . . . This was on the admission note; [the doctor] wrote the pathologies and then said 'was admitted, something has gone wrong and died'" (P5, H1).

Incomplete/missing surgical report. In general, participants stated that there were, on occasions, no surgical reports, or they lacked completeness, which influenced coding. Once again, this seemed to vary from specialty to specialty. "We have no complete information in the surgical report, what was done to the patient, the patient's problems. This is the greatest difficulty" (P6, H1); "And they do not write the surgical report" (P2, H1); "(. . .) their surgical descriptions are good" (P5, H1), [referring to thoracic surgery]. In addition, one of the participants argued that the surgeon "is not defending himself, he is not defending the patient and he is prejudicing the hospital" (P7, H2), when the surgical report is absent or lacks completeness.

Use of abbreviations and acronyms. It was widely agreed that the use of acronyms and abbreviations was another negative aspect in health records, and that health professionals should not use them. Sometimes, physicians use acronyms that medical coders are not familiar with, which makes coding more difficult. For example, "FCP? In an obstetric record? I could not understand that it meant *Ferida Corrigida no Períneo (Perineum Laceration Repair)*" (P9, H1); "I am against abbreviations. I've always been. People have to write things (. . .)" (P2, H1); "Regarding abbreviations it is very difficult [to understand and code the records]." (P6, H1). One participant stated that the problem in coding abbreviations was the medical coder "thinking that it is one thing and, after all, it is another" (P3, H4), concluding that in this situation "it is better not to code if we are not sure" (P3, H4). Two other participants agreed with this statement (P2, H1; P4, H1).

Variability in health records

The quality of health records is affected by great variability in content, depending on the hospital, the specialty or, even, the professional: "Some [records] are bad, others are excessive, others have lack of information; I think there is no middle way" (P5, H1); "It depends on the provider" (P2, and (similar comment by) P5, H1); "I think it is different from hospital to hospital" (P8, H2); "and above all we also find that it is different, depending on the specialty of the episodes of care we are coding" (P6, H1). When questioned about the evolution of the quality of health records, even though the great majority affirmed that quality is improving, one of the participants disagreed: "But there is a positive evolution, no doubt" (P1, H3); "Actually, it is improving" (P2, H1); "But I think the tendency is to get worse" (P5, H1).

Variations in diagnosis description by different health professionals. Some participants agreed that there was variability in diagnosis description, relating this to the assertiveness of medical doctors. Moreover, this lack of

assertiveness/confidence could result in the lack of specificity. They also attributed these problems to the transcription of exams' results instead of interpreting them. "This is about the specificity of diagnosis" (P1, H3 and (similar comment by) P4, H1); "In [internal] medicine, there are colleagues who always document pneumonia, pseudomonas pneumonia . . . and others always document [only] respiratory infection. There are people who do not like to commit themselves with a diagnosis . . . and that depends on the doctor; there are doctors more assertive who clearly state the disease . . . " (P2, H1); "Sometimes, physicians write: aspiration pneumonia / nosocomial pneumonia/ tracheobronchitis" (P5, H1); "Often, the diagnosis is not written. For example, for some physicians it seems to be difficult to assume a sepsis by an E. Coli, and they do not specify the final diagnosis [specific infection or sepsis]" (P8, H2); "Computerised tomography refers to 'abdominal collections', and medical doctors only transcribe this finding [not the diagnosis, possibly an abscess]" (P5, H1).

PHRs compared to EHRs

All participants stated that they preferred EHRs because they did not have to "decipher doctors' handwriting" and because the EHR is more "standardised": "Doctor's handwriting. Absolutely. That is a fantastic advantage. For those who [have] code[d] for many years, it is a significant difference" (P2, H1). However, the impossibility of making explanatory drawings that could help in the surgical areas and "copy & paste" were problems associated with EHRs. "Copy & paste" is the origin of large transcriptions to the records without relevant information and leading to repeating errors from the first to the last daily progress note, complicating and slowing coding. "I think that [explanatory drawings] would help me in the thoracic surgery. If they would draw the exact schema, instead of making me dream up what they are doing . . . I would see it sooner" (P2, H1); "When there is 'copy & paste' of previous records, we begin to read, begin to code, and when we get to the end, (. . .), we sometimes realise that it was not new [but referred to a previous episode of care]" (P3, H4); "And if there's something wrong in a progress note, the error continues [being copied] up to the end" (P2, H1).

Access to EHRs. In general, participants indicated no difficulty in accessing EHRs: "and because we are lucky, as I work in Hospital 2, I have access to all clinical information" (P8, H2). However, there may be also some difficulties in the access to some record's documents, since a medical coder from one of those hospitals gave opposing information: "and we also do not have access to the anaesthesia sheet, that is, it is not annexed" (P6, H1); "It is all right there" (P9, H1).

Possible solutions to problems with health records

One of the participants reported how his/her hospital was trying to solve the problem of no existing discharge notes. According to the participant, the adopted measure fulfilled

its purpose (i.e. increase the number of discharge notes). "Presentation of discharge notes, sometimes, dragged on, I do not know for how long, . . . regardless of that, there were delays in presenting discharge notes . . . and today the computer system on the eighth day after discharge automatically closes [and blocks] the record" (P7, H2). Concerning the problem of using abbreviations and acronyms, another participant presented a possible solution already implemented in his/her hospital: "[We made] a list of abbreviations that were the official ones. If they were in that list, they could be used. It did not mean that people had to use them" (P3, H4). Another participant did not agree with this method and argued that it would not solve the problem: "then transfer the patient with these abbreviations to another hospital that does not know your list and everything is wrong in it" (P5, H1).

Some of the participants presented Google and *Portal da Codificação* (platform to support the activity of medical coders in Portugal) as resources to consult the meaning of some abbreviations and acronyms. One participant argued that these resources were useless when the abbreviations "are invented by the writer" (P5, H1). "Of course we can go to Google all the time and Google will tell us" (P6, H1); "(. . .) I consult [Portal da Codificação]" (P3, H4). Two participants suggested that health professionals and services should be penalised for lack of quality of health records. Some participants argued that health professionals and institutions did not care about records and did not acknowledge their own errors, and others argued that they were growingly concerned about having better records. "(. . .) and then the service would be penalised monetarily. Because people would then be more careful" (P5, H1); "People are too busy, and they do not want to have time to do it, and forget records" (P9, H1); "There is an effort, I think, at least I speak of my hospital, to have more complete records" (P1, H3). However, they argued that no great change would come from medical coders or health professionals; it must start from the entities with authority: "I think it can't be the medical coder to speak, I think it must be something that comes from above" (P9, H1).

Health records standards. Participants stated that health records' standardisation would solve some of the problems. Participants highlighted the importance of using the SOAP note (acronym for Subjective, Objective, Assessment, and Plan, which structure medical documentation) and stated that standardisation was not only important for clinical coding but also for providing care. "If there was a standard, a discharge note in an application, a standardised discharge note . . . maybe in the future it will be very important" (P7, H2); "Everything that follows a rule is easier for us to follow rather than each one proceeding in his/her own way" (P3, H4); "When I am called to a medical service to see a patient . . . , while I spend time reading diaries the patient may die; if otherwise I go directly to the patient I may lose important information about the patient's current event . . . the presence of a daily opinion of the doctor responsible for the patient, in the section A of SOAP, would facilitate patient care" (P5, H1).

Health records audits. Participants reported that, in the past, there had been internal reviews of health records, mainly with an educational purpose towards improved health records. One participant highlighted the need of relevant information for health records audits, particularly for clearly defined audit processes, as well as widely accepted official guidelines to standardise health records. "Always had an internal audit, someone to see, at least, the discharge note, review it and see if it was well done" (P3, H4); "At this time, we are trying again; we are going to do some audits of health records, we do not have many parameters (. . .); we also haven't got official guidelines to standardise health records" (P9, H1).

Discussion

It is widely believed that health records and their quality have great importance, not only for the medical coding activity but also for further uses of the databases generated by the coded data (e.g. research). However, in order to achieve these purposes fully, complete health records with high data quality is essential. In this focus group study, we identified several problems recognised by Portuguese medical coders, such as the lack of information in the documents (e.g. discharge note, surgical report), unclear documentation (e.g. use of abbreviations or acronyms), variability in health records (e.g. variations in diagnosis description) and the lack of solutions for these problems (e.g. lack of guidelines, decrease in health records audits).

Incomplete/unclear documentation in health records

It is known that the quality of the coded data is compromised when health records do not have sufficient quality (DeAlmeida et al., 2014; Kurusz, 2015; Santos et al., 2008; Southern et al., 2016), which was corroborated by the medical coders participating in this study. In addition to the problem of health record quality, participants mentioned that sometimes there was a lack of information in certain elements of the record, such as the discharge note, the most important document for coding.

While the basic information required in the discharge note has already been established (Diário da República, 2013), lack of information in the discharge note continued to be a problem presented by the medical coders. In a similar study, one medical coder estimated that discharge notes were missing in 80% of charts (Tang et al., 2017). Similarly, the information required in the surgery report was already established (ACSS, 2011), but lack of information in the surgery report continued to be a problem. Moreover, *Conselho Nacional de Auditoria e Qualidade* – National Council for Audit and Quality – also made recommendations about the necessary information for surgery health records (Conselho Nacional de Auditoria e Qualidade, 2016).

The use of abbreviations and acronyms was another problem highlighted by medical coders, which was also reported in a Canadian study involving medical coders (Lucyk et al., 2017). It has been observed that abbreviations

should be avoided to improve coding accuracy (Naran et al., 2014); medical coders are not always familiar with the large number of abbreviations used (Farzandipour et al., 2010). In Portugal, medical coders have always struggled to code abbreviations and only ignored them when they could not understand them at all; the proof of this is that the three pages of the *Portal da Codificação* with lists of abbreviations and their meanings found over the years in health records were the most frequently consulted on this platform. Nowadays, the *Portal da Codificação* is unavailable, which also does not help to solve this problem. The Joint Commission (JC), a private entity of the United States of America (USA) that provides hospitals' accreditation, requires that institutions use "standardised" abbreviations, advising the development of an approach to exclude possible ambiguities in use of the abbreviations (Joint Commission International, 2018). In Portugal, national health entities could promote a national index of abbreviations and acronyms, to which health professionals should adhere.

Variability in health records

In the view of the participants the quality of the health records varied among institutions and specialties, which may have been influenced by different perceptions of the importance of health records. The specificity of the information recorded was considered an important characteristic for clinical coding, but we concluded that the lack of specificity in the diagnosis is common. In our study, this lack of specificity was considered a consequence of the lack of assertiveness of some physicians who, instead of interpreting exam reports and making a diagnosis, only transcribed exam reports. In another study performed with medical coders, the lack of specificity in physician documentation was considered a major barrier to coding (Tang et al., 2017). This lack of specificity may result in greater difficulty in identifying the main diagnosis, or even in the impossibility of coding a diagnosis, because it is not documented by the physician (O'Malley et al., 2005; Tang et al., 2017). Despite the identified problems and the variability in health records, participants argued that there was a continuous improvement in their quality. This improvement may partly explain the increase of the number of coded secondary diagnoses, verified in Portuguese hospitals (Barros and Braun, 2017; Freitas et al., 2014).

PHRs compared to EHRs

Regarding format, and as described in the literature, it was also argued that the use of EHRs, allowing more structured data and eliminating the illegibility problem present in PHRs, has improved the quality of healthcare, the coding activity and the population health itself (Klein et al., 2012; Morrison et al., 2014; Robertson et al., 2015; Tang et al., 2017; Van Der Bij et al., 2017; Williams et al., 2017). On the other hand, one of the disadvantages attributed to the EHR is that it allows "copy & paste" of previous records, duplicating information and perpetuating possible errors. This functionality has appeared in the literature related to

saving time, increasing the efficiency of the process (Al Hadidi et al., 2017; Hartzband and Groopman, 2008; Heiman et al., 2014; Hirschtick, 2006; March et al., 2016; Shoolin et al., 2013). Transcriptions should be made in a conscious and responsible way by health professionals, taking advantage of the positive points for which "copy & paste" was created. This problem was also already addressed by AHIMA and JC, both highlighting the need to train and to educate on proper use of "copy & paste", to monitor its use, to evaluate associated errors and to institute corrective action as needed (AHIMA, 2014; Joint Commission International, 2015). In our study, participants also referred the drawback of EHRs not allowing explanatory drawings.

Possible solutions to problems with health records

Although the identified problems were similar to those already known in other countries (Bajaj et al., 2007; DeAlmeida et al., 2014; Haghighi et al., 2014; Lucyk et al., 2017; O'Malley et al., 2005; Tang et al., 2017), there is still a lack of investment in the necessary policies in Portugal. However, some institutions are starting to act in situ. The existence of official guidelines (with adequate monitoring/audits) to standardise the structure and content of health records is of major importance, complemented with the easy access and wide acceptance from medical doctors, with the ultimate aim of improving health record quality. The development of guidelines for documentation and clinical coding involving both medical coders and medical doctors, among other professionals, would be important (Resslar et al., 2018). Another solution for some of these problems could be the use of Systematized Nomenclature of Medicine – Clinical Terms (SNOMED-CT) in EHRs, a terminology that allows recording information in a standardised way, facilitating the clinical coding (SNOMED International, 2018; Spencer, 2016).

Audits of health records are also important to improve the practice of health professionals and to improve health records (Dinescu et al., 2011; Ivers et al., 2012; Klein et al., 2012; Thomas et al., 2008). Participants described that, in the past, internal reviews of health records were performed for educational purposes and contributed to the improvement of health records. Despite mandatory quarterly audits (Diário da República, 2013), participants described a decrease in the volume of these internal reviews, which might compromise the audits purposes. In other countries, such as USA and Australia, clinical documentation improvement programmes, which include people, processes and technology, were implemented to facilitate the accurate representation of a patient's clinical status, and this also allows that the recorded information fits the medical coders' needs (AHIMA, 2018; Breuer and Arquilla, 2011; Shepheard, 2018; Towers, 2013). Similarly, in Spain, a career of specialist in admission and clinical documentation was created in 2001, being responsible for clinical documentation and also clinical coding (Martín-Vegue, 2000). These careers do not exist in Portugal. The education and training for physicians on how to document in the

health records could be another important point to solve these problems. In fact, documentation tends to be more complete after the training of health professionals (Rowlands et al., 2016; Spellberg et al., 2013; Van Der Bij et al., 2017). The accreditation of hospitals is another factor that might improve health records as well as the quality of healthcare (Alkhenizan and Shaw, 2011; Schmaltz et al., 2011). In Portugal, the accreditation and certification of healthcare services are behindhand (SNS, 2017), which also does not help to solve the problems identified in this study.

Limitations

The sample of medical coders was constructed out of convenience, consisting of medical coders who participated voluntarily in the study and who worked in only four hospitals in the north of the country. Participants could not be selected randomly due to the low number of medical coders who showed willingness to participate, which may have produced a bias. Moreover, we were unable to collect data until saturation. Another limitation is the possibility of some competitiveness between medical coders belonging to different hospitals, compromising the exposure of the whole reality of each institution. This is related to a known limitation of focus groups (Morgan, 1996; Smithson, 2000). Some people are uncomfortable giving their opinion, a problem that can only be solved through individual interviews.

Conclusion

According to our participants, health professionals do not seem to be sensitised to the importance of health records in the coding activity. Incomplete, unclear and non-specific documentation in the health records not only hindered the coding process but also worsened the communication across health professionals. Moreover, these problems may have a negative impact for different coded data purposes. The use of more concise standards in the health records would result in higher quality records, contributing to the improvement in the coding activity and in the provision of care. There is a need for external audits to ensure that guidelines are followed, promoting the awareness of all health professionals to the importance of health records. Future research should be performed in order to gauge the degree of impact in hospital reimbursement, in clinical and health services research, as well as in health policy.

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Appendix 1

Table 1A. Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.

No. of items	Guide questions/description	
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the focus groups?	Vera Alonso (VA), Joana Ferreira (JF) and Isabel Lema (IL)
2. Credentials	What were the researcher's credentials?	VA – MSc; João Vasco Santos (JVS) – MD; Marta Pinto (MP) – PhD; JF – MSc; IL – BSc; Fernando Lopes (FL) – MD; Alberto Freitas (AF) – PhD
3. Occupation	What was their occupation at the time of the study?	VA – research fellow; JVS – medical doctor; MP – senior researcher; JF – research fellow; IL – research assistant; FL – coding educator; AF – senior researcher
4. Gender	Was the researcher male or female?	VA – female; JVS – male; MP – female; JF – female; IL – female; FL – male; AF – male
5. Experience and training	What experience or training did the research have?	JVS – experience in research reusing the coded data and medical background; MP – qualitative researcher with extensive experience of interview and focus group research; IL – experience in research reusing the coded data; FL – extensive experience in clinical coding; AF – extensive experience in research reusing the coded data
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	No
7. Participant knowledge of the interviewer	What did the participants know about the researcher?	Occupations and reasons for doing the research
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator?	Some researchers were integrated in a project that funded this research. Reasons for the research topic
Domain 2: Study design		
Theoretical framework		
9. Methodological orientation and theory	What methodological orientation was stated to underpin the study?	Thematic analysis

(continued)

Table 1A. (continued)

No. of items	Guide questions/description	
Participant selection		
10. Sampling	How were participants selected?	Convenience sampling
11. Method of approach	How were participants approached?	Email
12. Sample size	How many participants were in the study?	Ten participants
13. Non-participation	How many people refused to participate or dropped out? Reasons?	One of the medical coders was not able to attend any of the sessions, due to schedule incompatibility In one of the sessions of each group, there was a lack of one participant, due to last minute unexpected
14. Setting of data collection	Where was the data collected?	Presential – Faculty of Medicine of the University of Porto
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	No
16. Description of sample	What are the important characteristics of the sample?	Medical coders with some experience in clinical coding ((See characteristics of the focus groups' participants in Table 1)
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Yes, an interview guide with semi-structured questions was used; the content of the draft interview guide was discussed with the project group; no, it was not pilot tested
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	No
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Audio
20. Field notes	Were field notes made during and/or after the interview or focus group?	Yes, during the focus groups
21. Duration	What was the duration of the interviews or focus groups?	One hour and 15 minutes and one hour and 50 minutes
22. Data saturation	Was data saturation discussed?	No, due to the low number of coders who showed availability
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No
Domain 3: Analysis and findings		
Data analysis		
24. Number of data coders?	How many data coders coded the data?	One, VA. The coded data are after approved by all the other authors
25. Description of the coding tree	Did authors provide a description of the coding tree?	Yes
26. Derivation of themes	Were themes identified in advance or derived from the data?	Some themes were identified in advance according to the aim of the study, and some themes derived from the data
27. Software	What software, if applicable, was used to manage the data?	Not applicable
28. Participant checking	Did participants provide feedback on the findings?	Yes. We held a meeting with the participants to present the results and they have the opportunity to provide feedback on the findings
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified?	Yes
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?	Yes
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes