Original Article

Emergency physicians' experiences with defensive medicine and their motives for acting defensively – an interview study

TH Mikkelsen, M Brabrand, AF Christensen & MK Andersen

Abstract

Background: Defensive medicine (DM) has been increasingly studied in recent years. This study aims to investigate the understanding of DM and the motives for practicing DM among emergency physicians.

Methods: Focus group interviews.

Results: Themes identified: The understanding of DM, DM is a matter of self-confidence, DM or tests to ensure diagnosis and patient flow, DM due to confounding by availability, DM due to guidelines, Patient-initiated DM, Fear of complaints, DM in an emergency department setting.

Conclusion: This study shows that emergency physicians perform an abundance of diagnostic tests and investigations but only categorize few of them as DM. The many flow-mediating tests based on guidelines may, however, mask activities that individual physicians would possibly find defensive, if it was up to them to decide based on pure and simple anamnesis and clinical findings. It might be argued that flow optimization has overruled medical clinical reasoning in some ways, thereby introducing an inclination to conduct DM.

Keywords

Defensive medicine, emergency physicians, medical emergency departments

Key learning points

- Emergency physicians conduct many diagnostic tests and investigations but categorize only few as DM since they are conducted to ensure the flow of patients.
- Emergency physicians' experiences with defensive medicine and their motives for acting defensively – an interview study.

Thorbjørn Hougaard Mikkelsen
PhD, MSc (Soc.), Research Unit of General Practice, Department of Public Health, University of Southern Denmark, Odense, Denmark

Mikkel Brabrand
PhD, MD, Professor, Department of Emergency Medicine, Odense University Hospital, Odense, Denmark

Anne Friesgaard Christensen
MD, PhD, Department of Emergency Medicine, Lillebaelt Hospital, Kolding, Denmark

Merethe Kousgaard Andersen
PhD, MD, Assistant professor, Research Unit of General Practice, Department of Public Health, University of Southern Denmark, Odense, Denmark

Correspondence
Thorbjørn Hougaard Mikkelsen
Research Unit of General Practice, Department of Public Health, University of Southern Denmark, Odense, Denmark.
Email: thmikkelsen@health.sdu.dk

Defensive medicine (DM) was originally defined as physicians deviating from sound medical practice due to fear of liability claims and lawsuits,[1, 2] and DM has been associated with rising healthcare costs, over treatment - and increased use of diagnostics in patients.[3-5] Later studies have added other motives, such as avoidance of patient dissatisfaction and fear of overlooking a severe diagnosis.[3, 6] Denmark has a no-fault malpractice system;however, in recent years, there has been an increase in accusations and prosecutions against physicians.

Few studies have investigated the understanding of DM in the unique context of an emergency department. Emergency departments function differentlythan most other hospital departments with an increased focus on patient flow, rapid diagnostics, prognostication, disposition, and a large throughput/flow of patients. Therefore, this study aims to investigate the understanding of DM and the motives for practicing DM among hospital physicians working in an emergency department.

Methods

To investigate and triangulate the experiences and opinions among hospital physicians, we performed qualitative semi-structured focus group interviews[7-10] in two emergency departments in Denmark. The analysis was based on hermeneutic-phenomenological research methodology focusing on understanding and meaning.[10]

Setting

The Danish healthcare system is tax-financed, and general practitioners (GPs) and hospital services are free of charge at the point of use. Danish citizens can be admitted to an emergency department either by a referral by their own GP, or by ambulance when contacting the emergency number (112).

Recruitment and sample size

Two emergency departments were included in the study, one at a large university hospital (a level 1 trauma center) and one at a regional hospital (a level

2 trauma center). Through a local physician, we invited both residents and specialist physicians (board certified physicians). We attempted to achieve variation in age, gender, and experience, acknowledging that DM may have various motivations and expressions. To ensure that the junior physicians felt free to speak their mind and to allow possible differences to appear, we conducted separate focus group interviews (FGI) with junior physicians and senior physicians, one with each group at each site (four in total) between November 2019 and August 2021. The final purposive sample comprised 21 physicians: 9 specialist physicians (5 men and 4 women) and 12 residents (5 men and 7 women).

Data generation

The first author (THM), an experienced qualitative researcher moderated the first three FGIs. THM has neither professional knowledge of nor experience with DM. The last author (MKA) is a researcher within the field of DM in Danish general practice and a GP. MKA acted as co-moderator in the first three FGIs and moderated the last FGI. MB (professor in emergency medicine) was co-moderator in the last FGI. The interviews were conducted in local meeting facilities at the participating departments. The specialist physicians were interviewed in the morning, before or after their shift. Residents were interviewed during the last hour of the day shift. No remuneration was provided.

The FGIs began with an introduction to the explorative aim of the study, that is, to explore individual and shared understandings and experiences of DM in the participants' daily clinical practice. No definition was presented, instead the informants were asked to describe their conception of DM (see the semi-structured interview guide, which is also used in other studies[6] in the supplementary files). Recruitment continued until sufficient information power was achieved.[11]

Data analysis

Interviews were transcribed, coded, sorted, and managed inoNVivo a software for analysis of qualitative data. The FGIs were analyzed thematically inspired by hermeneutic-phenomenological analysis focusing on understanding and meaning[10] and phenomenally, with focus on the informants' experience and perception of things and events during the analysis, as well as well as going back and forth between the different parts and the whole interview ensuring that interpretations match the interview as a whole.[10] The first and last author (THM and MKA) conducted the analysis. Initially, all interviews were read several times to obtain an overviewrof the material before initiating the coding process. Subsequently, the text was coded in natural meaning units encapsulating the expressions and meanings expressed by the informants.[10] Based on the coded data material we created condensed themes were created.[10, 12] The quotes in the article are translated from Danish and are used to illustrate analytical findings.

Results

In the following, the themes identified in the analysis will be described and illustrated with quotes from the interviews. The following themes were identified:

Identified themes:

- The understanding of DM
- Lack of self-confidence
- DM or tests to ensure diagnosis and patient flow
- DM due to confounding by availability
- DM due to guidelines
- Patient initiated/mediated DM
- Fear of complaints
- DM in emergency department settings

The understanding of DM

The participants initially defined DM as unnecessary clinical investigations made to ensure and document the treatment, safeguarding the physician in not risking a complaint. As one resident said:

M1: You practice defensive medicine primarily to cover your back legally, without necessarily – of course you prioritize the patient's well-being – but probably also to cover your own back.

A specialist said:

I3: It's probably, how can you put it, clinically unnecessary examination(s) that you do for your own safety.

In this way, the physicians defined DM as unnecessary investigations or treatments made primarily to secure the physician.

Lack of self-confidence

As the quotes below demonstrate, the physicians sometimes find it difficult to distinguish DM from good clinical practice. For instance, the fear of overlooking a serious diagnosis is a driver for thorough investigation and may be mistaken for DM; but among the specialists, this is understood as good clinical work rather than DM:

I2: There are also things like... In any case, what personally haunts me a lot are these horrible individual stories, e.g., meningitis, we have these sporadic cases, … a patient who has been seen by three different independent physicians, comes in several times, and dies from it… and there is all kind of opportunities to miss the diagnosis if you don't investigate the patient thoroughly

…

I3: But I don't think that is necessarily defensive medicine.

I3: Men det synes jeg ikke nødvendigvis er defensiv medicin

In this way, the physicians' perception of DM is based on individual preferences and experiences that contribute to deciding the cut-off point between good clinical practice and DM defined as clinically unnecessary examination or treatment preformed for the physician's own safety.

How adept and self-confident they feel on the day are other aspects that seems to be influencing whether the physicians practice DM. As one resident said:

L1: Sometimes it depends on how you feel that day. If I have a good day and ... "I feel that I can do everything today, and everything has gone well for me", then you might also have more confidence in not acting so defensively ... But if you've had a day where things have gone wrong for one reason or another, or maybe it's just been unlucky, then you might have a greater tendency to act defensively. Because you want to protect yourself.

Another aspect is the recognition from colleagues. One specialist experienced that some defensive actions are based on the fear of being judged as a less good physician by their colleagues:

I?: I think we already talked about it, that DM is about someone coming after you, but I also think that it's about the colleagues looking over your shoulder. I don't want anyone I work with to think I'm not as good a physician as they are. ... It's not necessarily how it is, but there's just a concern about doing something others wouldn't have done. After all, everyone wants to, for the benefit of the patients, always deliver the best. But we cannot always do that, or not all of the time.

In this way, DM may be a complex medical behavior that is influenced by several factors: a fear of making errors, of receiving complaints, or of judgement from colleagues, as well as the physician's own state of mind.

DM or tests to ensure diagnosis and patient flow

The physicians working in an emergency department perform a lot of tests to assess the patients' status and establish a diagnosis, initiate treatment, and transfer to the right department. Among some of the residents this is perceived as DM. However, some of the specialists do not share this perception and do not feel burdened by DM. See relevant quotes in Figure 3 As two specialists said:

I4: I agree it (DM ed.) takes up nothing... But many tests are flow-mediated, i.e., made to finish the process quickly.

...

I2: There are two reasons for that (the many tests ed.). One is patient safety directly, the other is flow, and flow is extremely important in a large emergency department, because if you create the shock waves, i.e., where you stack the patients, and create crowding... then it has effects on all patients in the emergency department. So, this is the reason why we run automatisms and therefore carry out a sea of unnecessary blood tests.

In this way, the physicians acknowledge that as part of the initial diagnostic process, they conduct many tests that may seem unnecessary, but in fact their aim is to fucus not just on diagnosis but also on patient flow. For that reason, the many tests are not considered DM as they are part of the necessary flow in an emergency department.

DM due to confounding by availability

Some of the participating physicians described that they sometimes contact inhouse specialists to confer diagnosis, mostly because the specialists are available in the same hospital. One of the specialists calls this 'confounding by availability':

I4: It's confounding by availability, that is, we have the option, and then you do it. And it's a big-house problem, and you're afraid to take a stand on something that's outside your specialty, and I think that's largely defensive, that is, that you don't dare to trust your own intuition or on the findings you have made yourself. So, there are many specialty-specific diagnoses that all physicians state and do all the time, but because I work here, I can't allow myself to state the diagnosis myself, because it in a way sorts under another specialty.

In this way, the physicians in a large hospital with many specialties may send the patient for examination in other departments or contact physicians from other departments instead of making a diagnosis themselves.

DM due to guidelines

Some residents felt that guidelines sometimes instruct investigations that might be considered unnecessary. In some cases, this is also the case for specialists:

I1 (13:17): Often with chest pain patients I do/practice defensive medicine, where I e.g., order troponins. Also, among patients where I am actually 99.99% convinced that it is not something from the heart, but still, I take the troponins, where one might very well argue against from the start.

I5: It is also my impression that it is an institutional problem. Chest pain means intermediate risk patient and that automatically means troponins and everything. But it is also our own fault. We have decided to do it that way.

In this way, guidelines are sometimes considered to introduce what mainly the residents perceive as DM. However, as one resident said: guidelines protect the patient and secure the physician:

L1: These packages and the way of doing these things, also means that at 4 o'clock in the morning, when you've worked 15 hours straight, you can rely on a system that you're used to. You can't think in

the middle of the night, "should I take that X-ray, or shouldn't I take that X-ray", so you follow the steps in a package. Because that's what protects the patient, and that's what secures you.

Some participants mentioned that software issues may have introduced DM in cases where test results could not otherwise be documented in the patients' file. To solve this problem, the physician might decide to perform the clinically most relevant investigation initially and subsequently perform another investigation with the sole purpose of providing documentation of the patient's status in the medical record. This aspect is also described by a specialist as "medicine of ignorance" where the physicians to avoid legal claims, are obliged to perform chest X-ray rather than ultrasound, which would provide better knowledge of the patient's situation:

I3: We know that an emergency ultrasound… showing a consolidation, is actually more reliable than a chest X-ray. But the system doesn't know that, because they haven't got that knowledge yet... there's DM, and then there's medicine of ignorance.

In this way DM may also be a product of legal as well as software issues and ignorance towards new technologies.

Patient initiated/mediated DM

Some of the specialists described that they sometimes felt exposed to patient pressure for minor issues, e.g., an X-ray of an ankle, where they might accept making the X-ray to avoid that the patient continuing to seek hospital care or care in other parts of the healthcare sector. In this way, they conduct DM to reduce the time spent within healthcare as a whole because the X-ray is expected to keep the healthy patients, with no need for treatment, away from the rest of the healthcare services and hence save time among healthcare professionals:

I3: ... X-ray of an ankle joint when it is injured and it's 99 percent likely to be without a fracture.. But who'se time do you spend, right?... They'll keep contacting the healthcare system until they get their X-ray of their foot, because that's what they want ... if you don't get it from one doctor, you just look for the next one. I think the antibiotics for a sore throat are almost the same.

In this way, the physicians described sometimes giving in to patient-initiated DM to avoid the patient repeatedly contacting the hospital for further examinations. Nevertheless, most of the interviewed hospital physicians did not feel that they were conducting DM because of pressure from patients and relatives. As one resident said:

L1: I actually think that it is rare that I allow myself to be pressured into ordering a scan just to be safe, because then I think that I have the arguments and can stand up and say that, well, "medically speaking, there's no point in exposing yourself to rays because so-and-so".

In this way, the emergency hospital physicians do not think they perform much patient-initiated DM, and they often feel they can explain to the patient why a given investigation or treatment is not needed. Nevertheless, they point out X-rays as the mostly used defensive practice along with antibiotics, sometimes prescribed to avoid that patients continue to contact other healthcare professionals to achieve the investigation or treatment they want.

Fear of complaints

Most participants recognized the risk of complaints as described above but did not think that it influenced their daily work. One of the departments also told their physicians that they would cover their backs if they received any complaints as long as the physicians showed meticulousness in their clinical work:

"If you make an effort, and if you live up to the professional level that you have, then no one can expect anything else from you. Then we have your back, always. If there is a complaint, we stand behind you."

In addition, the participants explain how some complaints have been withdrawn after the patients had the opportunity to discuss their case and frustrations with the chief physician and how they perceivethis as reducing the number of formal complaints from patients and relatives. Nevertheless, physicians who have experienced a complaint are very affected by it. As one resident said:

K4: I had an adverse event about a month and a half after I had started in my internship. I was out of my mind, I was in Athens for a conference, and I was about to throw myself off the Acropolis and thought, I'm done as a physician, it's never going to be good. It didn't end in a complaint... But when I think back I think oh no, what would it have done to me if I had received a regular complaint, I don't think I would have ever become a physician.

A specialist explained the unpleasant feeling of receiving a complaint and also expressed regret regarding the very long processing time of the authorities for handling complaints, which result in a long period of uncertainty:

Informant 1: I think it affects me, I have a complaint ... which has not been decided ... it is not a problem to discuss it with my colleagues, and get their professional assessment… It's more that, it takes so long to get it settled and every time you get mail - in the e-box, and you do that regularly... (expletive deleted), has my authorization been revoked... (e-Boks is a Danish platform for secure, digital mail for individuals, companies, and authorities e.d.)

Even though the departments try to ease the pressure on the physicians, the fear of complaints and legal actions is likely to influence whether the physicians perform DM.

DM in emergency department settings

As stated above, practicing DM is often related to the physicians seniority and experience. The participating specialists express, that they do not tend to conduct DM. The residents, however, express awareness that they do conduct DM to document that they have tested and ruled out more diseases than they probably would if they were more experienced physicians.

As described above, DM is also a matter of context: Emergency departments perform several tests as a standard to ensure fast diagnosis and patient flow; therefore, practicing DM is not considered a frequent activity among the interviewed physicians in the emergency departments despite the many diagnostic tests. A concluding dialog at the end of one of the interviews among specialists illustrates this:

I4: I don't think I do much DM.

[widespread agreement]

I3: But I think that it is also specialty related. We are privileged by the fact that it is urgent, and it also goes fast. It's not like someone who's here for three months, where we'll see them again in a little while. They're here for four hours or something, and then they're boom, boom, boom, settled... It's not this, and that, and that, and that, and that, and then; "You can go home again".

I4: I agree. It doesn't take up anything.

The physicians in the emergency departments conduct many diagnostic tests to ensure quick diagnosis and flow of patients. While this may be considered DM in other parts of the health care sector, this is not the case among physicians in an emergency department.

Discussion

The participants define DM as unnecessary clinical investigations made to diagnose, confirm, and document care to ensure that the physician is not overlooking any diseases which may result in subsequent complaints. This is in line with the international literature, which defines DM as a medical behavior to avoid possible cases of malpractice or formal complaints.[4,13,14] This study shows that even though emergency physicians perform an abundance of tests and investigations, only few of these are perceived as DM whereas the majority are regarded as being mediated by the flow strategy in emergency departments.

Some of the residents explain that they feel that they sometimes conduct DM to follow guidelines, which is also reported in other studies.[13,14] In addition, guidelines are also acknowledged as an extra security for both the patient and the physician who is confirming or rejecting a diagnosis, especially after a long shift. Furthermore, the purpose of tests in emergency departments is to ensure quick diagnosis, patient safety, flow of patients, and to prevent crowding. This is in line with other studies showing that flow in emergency departments is important to patient safety, which allow for a different ordering pattern than elsewhere in healthcare.[13-15] In this way flow mediated medicine seems to focus on the outcome of medical interventions while the same actions considered individually might be perceived as DM if the focus is primarily on the process of medical practice as described elsewhere.[16]

Nevertheless, DM is not unknown in the acute care setting as also reported in other studies.[16-18] Some physicians experience recieving requests from patients for medical examinations and diagnostic tests, and even though they mostly dismiss such requests, they occasionally perform DM, for instance by ordering X-rays if they think it may be needed to satisfy the patient in the hope of avoiding further unnecessary contact with the healthcare system and giving the patients peace of mind. In addition, the participating physicians introduce the notion "confounding by availability" and a "big/large house issue" where patients in university hospitals are referred to other departments or how advice from specialist physicians from other departments is requested in situations where a trivial diagnosis might as well have been given by the emergency physician. Defensive referrals have been reported elsewhere among emergency physicians.[18,19] However, our results provide new aspects by showing that referrals sometimes occur mainly because the specialist is available in the university hospital, contrary to smaller hospitals where this is not a possibility. Therefore, it may questioned to what extent generalist physicians in emergency departments are disempowered rather than helped by the presence of specialists. If the latter is the case, it calls for educational and management support to strengthen the generalist role in emergency departments. This paradox may be relevant within most of the medical specialties, as the health care system experiences a heavy workload in these years due to the increase in specialization and tech.

Another interesting type of DM is is referred to as "medicine of ignorance" by one specialistand describes a situation in which a physician conducts sonography because, according to research and clinical knowledge, it is the best method to rule a diagnosis in or out. But because the ultrasound scan is not embedded in the guidelines or cannot be filed in the hospital software, an X-ray must be done, solely to ensure documentation.

Our results also reveal that DM can result from a lack of self-confidence and from the physician's state of mind. Further, the feeling of professional recognition from colleagues may influence the individual physician's need to act defensively. Similar findings were reported in a study on GPs' experiences with DM.[6] Thus, the support from colleagues and the hospital management seems to be an important mechanism to prevent DM. Fortunately the residents in our study expressed that they experience support from the management if patients complain. Moreover, other studies report that support from colleagues regarding medical errors is important and requested,[20-24] and that the risk of ill treatment from other actors constitutes a reason for not wishing to report adverse events.[25, 26] Such support may also be important in avoiding DM.

Finally, actions that would be considered DM if the physicians were only asked to do the number of tests indicated by the clinical findings may be masked in emergency departments sincephysicians in such departments conduct many tests in the diagnostic process to ensure that flow. Hence, potential DM may be obscured since to tests and investigations in emergency departments are based on guidelines and not (only) clinical findings.

Strengths and weaknesses

A limitation of this study is that it focusses only on emergency departments and does not describe hospital physicians' experiences with DM in general. However, our data are based on FGIs with specialists and residents from a large university hospital and a medium-large hospital and are considered to comprise the experiences of emergency physicians in general. It is a strength that the participating physicians were requested by their leading physician to participate in the interviews. Hence, participation by selection may have been minimized.

Conclusion

This study shows that emergency physicians perform an abundance of diagnostic tests and investigations but only categorize few of them as DM. The many flow-mediating tests based on guidelines may, however, mask activities that individual physicians might find defensive, if they had to decide based on pure and simple anamnesis and clinical findings. It may be argued that flow optimization has overruled medical clinical reasoning in some ways, introducing a liability to conduct DM. Defensive medicine may not be actively performed to a large degree in acute care settings in Denmark. Nevertheless, it is important to ensure that this does not change and that the use of clinical guidelines will not introduce mandatory tests and procedures not relevant to each patient.

Abbreviations

DM: Defensive medicine
GP: General Practitioner
FGI: Focus group interviews

Declarations

The study was conducted in accordance with guidelines for good scientific practice.

Storage management of the data fulfilled the European General Data Protection Regulations (GDPR) and was registered with the Research and Innovation Organization (RIO), University of Southern Denmark (Project number 10.796).

The study was submitted to the Regional Committee of Health Ethics in the Region of Southern Denmark, Denmark, for approval (case no. 20192000-152). According to the committee, the project falls outside the scope of a notifiable Health Science research project as it is based on interviews.

Availability of data and materials

No additional data are available.

Competing interests

Nothing to declare.

Funding

This study was not funded.

Authors' contributions

All authors contributed to the design, the revision and the methodological considerations. THM drafted and completed the analysis and wrote the draft and the final version. THM, MB, AFC and MKA were involved in the acquisition and interpretation of data. THM and MKA were involved in the analysis of data. All co-authors contributed to the final version and approval of the article.

Acknowledgements

The authors thank the participating physicians participating in this study for their time and interest. In addition, we would like to thank Mette Rahbek Kristensen, Peter Biesenbach and Line Emilie Lilholm Laugesen for help with transcription.

References

1. OTA_Office_of_technology_assessment. Defensive medicine and medical malpractice. Washington DC1994 [cited 2024 9 january]. Available from: https://ota.fas.org/reports/9405.pdf.
2. Hershey N. The Defensive Practice of Medicine: Myth or Reality. *The Milbank Memorial Fund quarterly.* 1972;**50**(**1**):69-97.
3. Baungaard N, Skovvang PL, Assing Hvidt E, Gerbild H, Kirstine Andersen M, Lykkegaard J. How defensive medicine is defined in European medical literature: a systematic review. *BMJ open.* 2022;**12**(**1**):e057169-e.
4. Panella M, Rinaldi C, Leigheb F, Knesse S, Donnarumma C, Kul S, *et al.* Prevalence and costs of defensive medicine: a national survey of Italian physicians. *Journal of health services research & policy.* 2017;**22**(**4**):211-7.
5. Brateanu A, Schramm S, Hu B, Boyer K, Nottingham K, Taksler GB, *et al.* Quantifying the defensive medicine contribution to primary care costs. *Journal of medical economics.* 2014;**17**(**11**):810-6.
6. Assing Hvidt E, Lykkegaard J, Pedersen LB, Pedersen KM, Munck A, Andersen MK. How is defensive medicine understood and experienced in a primary care setting? A qualitative focus group study among Danish general practitioners. *BMJ open.* 2017;**7**(**12**):e019851-e.
7. A KR, Casey MA. Focus groups: a practical guide for applied research. 5. ed. Thousand Oaks, Calif: SAGE; 2015.
8. Liamputtong P. Focus group methodology: principles and practice. 1 ed. London: SAGE; 2016.
9. Vermeire E, Van Royen P, Griffiths F, Coenen S, Peremans L, Hendrickx K. The critical appraisal of focus group research articles. *The European journal of general practice.* 2002;**8**(**3**):104-8.
10. Kvale S, Brinkmann S. Interview: det kvalitative forskningsinterview som håndværk. 3. udgave ed. København: Hans Reitzels Forlag; 2015.
11. Malterud K, Siersma VD, Guassora AD. Sample Size in Qualitative Interview Studies: Guided by Information Power. *Qualitative health research.* 2016;**26**(**13**):1753-60.
12. Malterud K. Systematic text condensation: A strategy for qualitative analysis. *Scandinavian journal of public health.* 2012;**40**(**8**):795-805.
13. Henriksen DP, Brabrand M, Lassen AT. Prognosis and risk factors for deterioration in patients admitted to a medical emergency department. *PloS one.* 2014;**9**(**4**):e94649-e.
14. Scott I, Vaughan L, Bell D. Effectiveness of acute medical units in hospitals: a systematic review. *International journal for quality in health care.* 2009;**21**(**6**):397-407.
15. Guttmann A, Schull MJ, Vermeulen MJ, Stukel TA. Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada. *BMJ.* 2011;**342**(**7809**):1250-.
16. Tancredi LR, Barondess JA. *The Problem of Defensive Medicine. Science* (American Association for the Advancement of Science). 1978;**200**(**4344**):879-82.
17. Delice O, Tekin E, Yılmaz S. Defensive Medicine in the Emergency Department: A Cross-sectional Study from the Perspective of Emergency Medical Specialists. *Eurasian journal of emergency medicine.* 2019;**18**(**4**):178-84.
18. Studdert DM, Mello MM, Sage WM, DesRoches CM, Peugh J, Zapert K, et al. Defensive Medicine Among High-Risk Specialist Physicians in a Volatile Malpractice Environment. *JAMA : the journal of the American Medical Association*. 2005;**293**(**21**):2609-17.
19. Cervellin G, Cavazza M. Defensive medicine in the emergency department. The clinicians' perspective. *Emergency care journal.* 2016;**1**(**1**).
20. Nettleton S, Burrows R, Watt I. Regulating medical bodies? The consequences of the 'modernisation' of the NHS and the disembodiment of clinical knowledge. *Sociology of health & illness.* 2008;**30**(**3**):333-48.
21. Andersen MK, Pedersen LB, Dupont M, Pedersen KM, Munck A, Nexøe J. General practitioners' attitudes towards and experiences with referrals due to supplemental health insurance. *Family practice.* 2017;**34**(**5**):581-6.
22. Rowe M. Doctors' responses to medical errors. *Critical reviews in oncology/hematology.* 2004;**52**(**3**):147-63.
23. Christensen JF, Levinson W, Dunn PM. The heart of darkness: the impact of perceived mistakes on physicians. *Journal of general internal medicine : JGIM.* 1992;**7**(**4**):424-31.
24. Allsop J, Mulcahy L. Maintaining Professional Identity: Doctors' Responses to Complaints. *Sociology of health & illness.* 1998;**20**(**6**):802-24.
25. Mikkelsen TH, Sokolowski I, Olesen F. General practitioners' attitudes toward reporting and learning from adverse events: Results from a survey. *Scandinavian journal of primary health care.* 2006;**24**(**1**):27-32.
26. Mikkelsen TH, Rubak JM, Olesen F. General practitioners' attitudes toward reporting and learning from adverse events. Experiences from focus group interviews. *Ugeskrift for læger.* 2004;**166**(**19**):1766-9.

Supplementary file: semi-structured interview guide

The interview guide was primarily prepared by one of the co-authors (MKA) in connection with a previous project on defensive medicine in general practice[1]

Interview guide for the focus group interviews	
Main themes	Probing questions
Understandings of DM	What do you at first understand by the concept 'Defensive medicine' when you hear it?
Exchange of experiences	As a way of further approaching the concept, we would ask you to look back on the last couple of weeks in the emergency departments. Can you recall a doctor–patient situation that you would describe as defensive?
Motives	Now that you have listened to each other you might recognise some features and situations from your own practice. If you again recall the specific situation, which you have described, what do you think was the reason(s) for acting as you did?
Perceptions	Can you try to describe how you perceived these situations?
	► What kind of feelings did they initiate (if any)?
	► To what extent do these types of situations fill your mind?
	► How often do these types of consultations occur in your daily practice? (eg, never, seldom, often?)
	► If you look back in time, do you think you would have acted differently 10 years ago?
Experiences with complaints	Can you try to describe you experiences with receiving complaints?
	► If you have received a complaint, how did it affect you? Has it made you change anything in you clinical behaviour?
	► If no, do you think that it would affect your future clinical behaviour?
Perspective	► If we look back on what we have talked about until now, do you have the same understanding of the concept 'DM' as when we started out discussing it?

Reference

1. Assing Hvidt E, Lykkegaard J, Pedersen LB, Pedersen KM, Munck A, Andersen MK. How is defensive medicine understood and experienced in a primary care setting? A qualitative focus group study among Danish general practitioners. *BMJ open.* 2017;7(**12**):e019851-e.