

BMJ Open How defensive medicine is defined in European medical literature: a systematic review

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ABSTRACT

Objectives Defensive medicine has originally been defined as motivated by fear of malpractice litigation. However, the term is frequently used in Europe where most countries have a no-fault malpractice system. The objectives of this systematic review were to explore the definition of the term ‘defensive medicine’ in European original medical literature and to identify the motives stated therein.

Design Systematic review.

Data sources PubMed, Embase and Cochrane, 3 February 2020, with an updated search on 6 March 2021.

Methods Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses, we reviewed all European original peer-reviewed studies fully or partially investigating ‘defensive medicine’.

Results We identified a total of 50 studies. First, we divided these into two categories: the first category consisting of studies defining defensive medicine by using a narrow definition and the second category comprising studies in which defensive medicine was defined using a broad definition. In 23 of the studies (46%), defensive medicine was defined narrowly as: health professionals’ deviation from sound medical practice motivated by a wish to reduce exposure to malpractice litigation. In 27 studies (54%), a broad definition was applied adding ... or other self-protective motives. These self-protective motives, different from fear of malpractice litigation, were grouped into four categories: fear of patient dissatisfaction, fear of overlooking a severe diagnosis, fear of negative publicity and unconscious defensive medicine. Studies applying the narrow and broad definitions of defensive medicine did not differ regarding publication year, country, medical speciality, research quality or number of citations.

Conclusions In European research, the narrow definition of defensive medicine as exclusively motivated by fear of litigation is often broadened to include other self-protective motives. In order to compare results pertaining to defensive medicine across countries, future studies are recommended to specify whether they are using the narrow or broad definition of defensive medicine.

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INTRODUCTION

The term defensive medicine (DM) originated in the US medical research literature in

Strengths and limitations of this study

- This systematic review was based on a systematic and thorough search of literature, performed independently by two researchers in concordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.
- The protocol for this study was peer-reviewed and published.
- The scientific quality of each reviewed study was assessed by use of standardised quality assessment tools.
- Only English language studies were included in this systematic review.
- Only a limited number of synonyms of defensive medicine were included.

the late 1960s.¹ DM has been associated with rising healthcare costs, overtreatment and diagnosing of patients, and decreased trust in the physician–patient relationship, leading patients to mistrust physicians’ motives and physicians to regard patients as potential plaintiffs.^{2–6} Moreover, physicians report a development towards decreased medical authority, decreased job satisfaction and increased inequality in healthcare as possible consequences of DM.^{7,8}

The original, what we have termed ‘narrow’, definition of DM states that DM is defined as ‘physicians deviating from sound medical practice due to fear of liability claims and lawsuits’.^{3,9–12} DM can be active, also called positive, for example, when ordering extra tests and procedures; and DM can be passive, also called negative, indicating that high-risk patients and procedures are avoided.^{3,9,10,12} In the USA, DM is considered a consequence of the legislation not adequately protecting the physicians from tort,³ expensive individual malpractice insurances¹³ and the fact that the risk of malpractice claims decreases with increasing use of medical resources.¹⁴ However, contrary to the USA, malpractice

litigation is rare in many European countries, such as the Netherlands,^{15 16} Denmark,⁷ Switzerland¹⁷ and the UK.¹⁸ The medicolegal systems in these European countries do not hold physicians financially liable for malpractice or other treatment-related adverse events. Furthermore, in some European countries patients entitled to it are compensated for avoidable injuries by the government not requiring prove of healthcare provider negligence.^{19–21} This is known as a **no-fault system**. Nevertheless, DM is frequently reported in Europe and a substantial part of research on DM originates from Europe.^{6 7 15 18 22–24} This raises the question whether the definition of DM as **deviations motivated** primarily by litigious concerns holds true in European countries where physicians are not subjected to tort legislation to the same degree as in the USA.¹⁸ A recent study found that **Danish** general practitioners understand DM in a broader way, including motives **without relation to fear of lawsuit**.⁷ To interpret the increasing number of European studies of DM correctly, it is relevant to explore the definition of DM found in European studies.²⁵ Hence, this systematic review aims to **explore the definition of the term 'DM' in European** original medical literature and to identify the **stated motives** therein.

METHODS

This systematic review was conducted in concordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).²⁶

Patient and public involvement

Patients or the public were not involved in the design, conduct, reporting or dissemination of our research.

Protocol and registration

The protocol is published in *BMJ Open*, doi:10.1136/bmjopen-2019-034300 (see online supplemental file 1).

Amendments to the published study protocol

For clarification, the aim was rephrased from 'To analyse variations in the definitions and understandings of the term 'DM' in European research articles' to 'To explore the definition of the term 'DM' in European original medical literature and to identify the stated motives therein'. Inclusion criteria 5 was simplified from, 'DM is stated as part of the study's aim/objective in at least one of the following ways: a. DM is included in the publication's aim/objective. b. DM is implicitly a significant part of the aim/objective' to 'DM is a significant part of the aim/objective'. Inclusion criteria 6 was rephrased from 'European data are included in the study' to 'The study includes data from Europe'. Eligible studies were searched on 3 February 2020, with an updated search on 6 March 2021.

Eligibility criteria

Studies were included in the systematic review based on the following criteria:

Inclusion criteria

1. One or both terms 'DM' and 'defensive practice' are stated in the title or the abstract.
2. The study is available in full-text and English language.
3. DM is performed by or related to physicians.
4. The study is original research (quantitative, qualitative or mixed-methods primary research or systematic review) published in a peer-reviewed medical, scientific journal.
5. DM is a significant part of the aim/objective.
6. The study includes data from Europe.

Information sources

Eligible studies were searched in three databases: PubMed, Embase, and Cochrane, 3 February 2020, with an updated search on 6 March 2021.

Search strategy

In the database PubMed, the MeSH term **'defensive medicine'** was combined with the entry terms **'defensive practice', 'defensive practices' and 'medicine, defensive'**. Consequently, the search string: **'defensive medicine OR defensive practice OR defensive practices OR medicine, defensive'** was applied. Reference lists of eligible studies were manually checked for additional relevant studies. The literature search was updated before the final analysis. See online supplemental appendix 1, online supplemental file for detailed search string.

Study records

Data management

Publications found by the search strategy were exported into the reference management software EndNote²⁷ and Covidence,²⁸ where the systematic screening and data extraction were performed. Studies not existing in full text in the selected databases were searched at the library. Numbers of citations were found in Web of Science on 7 May 2021.²⁹

Selection process

To ensure inter-rater reliability and compliance with the inclusion criteria, in a two-phase screening, two researchers (NB and PLS) independently reviewed the full texts of all potentially relevant studies for eligibility. Disagreements were resolved through discussion in the research group until consensus was reached.

Data collection process

Data extraction

NB and PLS independently registered the following information for all eligible studies: **name of the first author, year of publication, research design, country of origin, sample size, medical specialty investigated, number of citations, study objective, any stated definition of DM, and all motives regarded as defensive in the study**.

Data synthesis

For each study, the stated definition of DM was reviewed and assessed by all the six researchers. The stated

definitions were extracted if they comprised constructions such as: 'DM is...', 'DM is defined as...', 'DM refers to...' or 'DM is characterised by...'. If a study did not explicitly state a definition of DM, an interpretation of the study's introduction to DM was made and excerpts to support the interpretation were extracted. If a study's definition of DM was stated with references, these references were recorded and, by chain searching, followed back to the original source. The stated definitions of DM were categorised according to the included actions (eg, 'deviation from sound medical practice') and motivations (eg, 'fear of lawsuit') using qualitative content analysis.³⁰ Next, any motives regarded as defensive were identified in the text, tables, figures as well as in the data collection methods in order to examine whether they differed from the motives stated in the study's definition of DM. Studies where researchers differed in the extraction and categorisation of DM motives were discussed among all researchers sometimes leading to rephrasing, merger, or de novo creation of categories. This was an iterative process until consensus could be reached.

Quality assessment

The researchers independently assessed the quality of the studies. Qualitative studies were assessed using the Critical Appraisal Skills Programme.³¹ Quantitative, mixed-methods and cross-sectional studies were all assessed using the Cross-Sectional Appraisal Tool with questions adapted from Guyatt *et al.*^{32 33} Any relation between the studies' quality and definition of DM were assessed.

Outcomes and prioritisation

The main outcome is categorisation of the identified definitions of DM in the European medical studies based on actions and motives for practising DM. Furthermore, studies applying different definitions of DM are compared regarding year of publication, country, medical specialty, study design, research quality and number of citations.

RESULTS

Study selection and characteristics

We identified 151 studies on DM worldwide meeting inclusion criteria 1–6, of which 101 studies were from countries outside of Europe (figure 1). The studies were published during 1972–2021. Among those, the 50 European studies included in this systematic review^{2 3 5–8 16–20 22–25 34–68} were published during 1995–2020 with a steep increase in publications during the recent years (table 1, figure 2).

The European studies were performed in 12 different countries, mainly UK (n=12), Italy (n=10) and Spain (n=6). One study included data from 74 countries⁵⁶ and one study only mentioned the continents included.⁶¹ The studies encompass 39 medical specialties with general practice (n=14), obstetrics and gynaecology (n=12), emergency department (n=9), general surgery (n=8) and anaesthesiology (n=8) emerging as dominant sources of research data. Forty-eight studies (96 %) have

a cross-sectional design, of which 37 (74%) are surveys, 6 (12%) are interview studies and 3 (6%) are combined survey and interview studies. One study is an evolutionary game theory and one study is a theoretical analysis model. No systematic reviews regarding DM were identified. The studies have various aims, including how physicians practice DM, the prevalence of DM, the cost of DM, the motives/reasons for practising DM, medical overuse, the adverse effects of DM, medicolegal systems, impact of complaints and litigations, how complaint processes can be improved, the quality and cost of healthcare, the experience of regret following diagnostic decisions, solutions to reduce DM, doctors' well-being, low-value medical practice, and how DM is understood (online supplemental table 1).

Definitions of DM

We identified the following two main categories of DM definitions (online supplemental table 1).

1. A narrow definition of DM as health professionals' deviation from sound medical practice motivated by a wish to reduce exposure to malpractice liability, n=23 (46%).
2. A broad definition of DM adding ... or other self-protective motives, n=27 (54%).

Based on the 27 studies applying a broader definition of DM, we identified other self-protective motives different from fear of malpractice liability influencing DM. We grouped these additional self-protective motives into the following four categories.

Fear of patient dissatisfaction

Panella *et al.*,³ Tanriverdi *et al.*⁵⁵ and Osorio *et al.*⁶³ state that having a poor physician–patient relationship or a challenging communication with patients will motivate physicians to conduct DM in order to establish a better relationship to the patient. Tanriverdi *et al.*⁵⁵ suggest that physicians' fear of exposure to patients' verbal and/or physical violence motivates them to conduct DM. According to Tanriverdi *et al.*,⁵⁵ Rohacek *et al.*¹⁷ and Osorio *et al.*⁶³ physicians feel pressured to practice DM due to demands from an increasing population of 'consumeristic' patients and/or relatives who request specific more or less indicated medical tests and examinations. Osorio *et al.*, p. 464⁶³ suggest that DM 'may contribute to building trust between professionals and patients'. Panella *et al.*³ state that DM can be performed to increase patient satisfaction, reduce patient risk and put the patients' needs at the centre. Likewise, Van Boven *et al.*,¹⁶ Symon⁵³ and Elli *et al.*,³⁸ find that physicians' wish to reassure the patient was a motive for them practising defensively.

Fear of overlooking a severe diagnosis

Rohacek *et al.*,¹⁷ Tebano *et al.*⁵⁶ and Osorio *et al.*⁶³ find that fear among physicians of missing out on something, or of making medical errors that have serious consequences for the patient, leads physicians to act defensively. Fear of receiving complaints or lawsuits following such errors

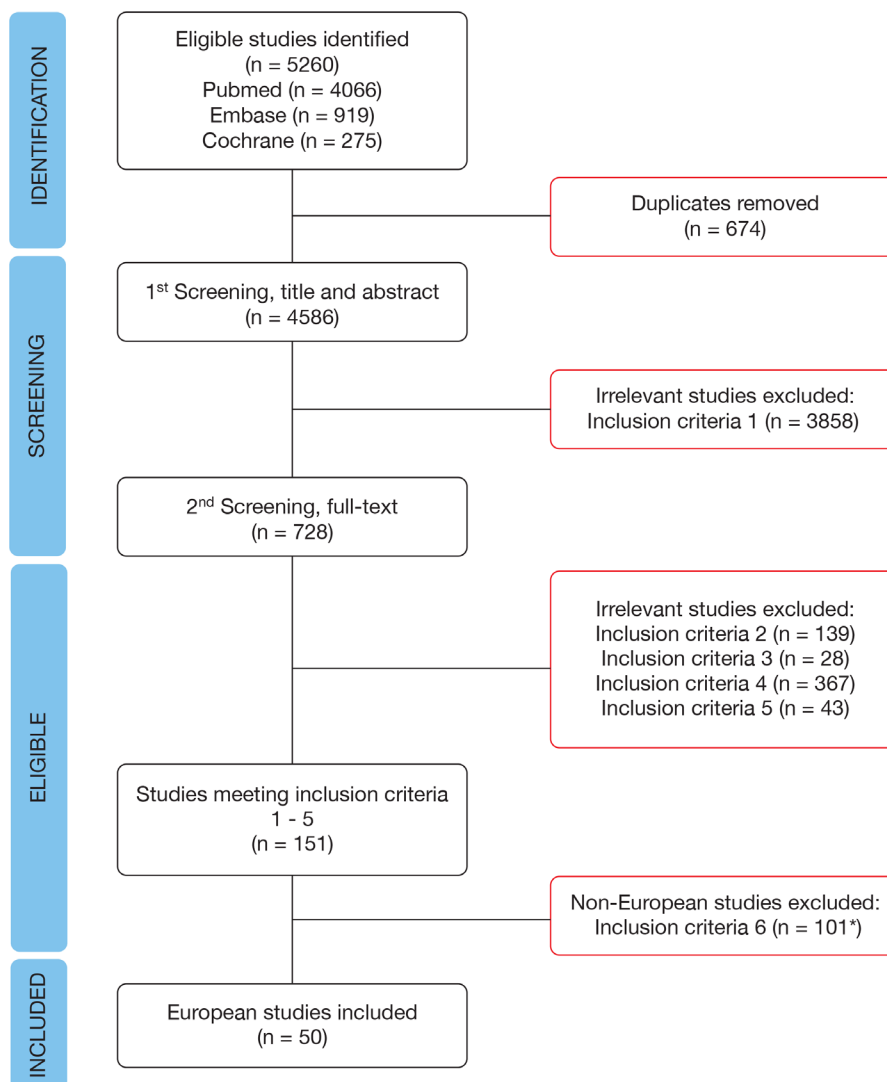


Figure 1 Flow chart of study selection process Inclusion criteria: (1) One or both terms ‘defensive medicine’ and ‘defensive practice’ are stated in the title or the abstract. (2) The study is available in full-text and English language. (3) Defensive medicine is performed by or related to physicians. (4) The study is original research (quantitative, qualitative or mixed-methods primary research or systematic review) published in a peer-reviewed medical, scientific journal. (5) Defensive medicine is a significant part of the aim/objective. (6) The study includes data from Europe. *USA,^{11 12 14 76–145} New Zealand,^{74 75 146 147} China,^{148–150} Japan,^{151 152} Iran,¹⁵³ Israel,^{154–160} Sudan,¹⁶¹ Canada,^{162 163} Australia,^{164 165} South Africa,¹⁶⁶ Singapore,¹⁶⁷ India,¹⁶⁸ Hong Kong,¹⁶⁹ Brazil¹⁷⁰ and one study from both USA, Canada and South Africa.⁷³

are not necessarily part of the physicians’ main concerns as stated by Panella *et al*, p. 4⁴⁸: ‘A second victim is likely to be a physician that experiences liability. On the other hand, a physician can be a second victim with or without having been sued. We believe that being a second victim is a better predictor of practising DM than the mere liability experience and exposure, because it better measures the personal anxiety and emotional toll of physicians that harmed their patients and suffered for their own actions’. In line with this argument, Summerton²² states that diagnostic difficulties and uncertainty motivate physicians to act defensively. Moreover, Müller *et al*⁶² state that physicians’ insight into colleagues’ incident reports and experiences contributes to an increase in defensive practice. Lindenthal *et al*, p. 176⁴² define DM as ‘increasing

referrals and diagnostic tests for fear of missing something or making the wrong diagnosis’.

Fear of negative publicity

Panella *et al*,³ Catino and Celotti,⁶ Ramella *et al*,²⁵ and Passmore and Leung⁴⁹ state that physicians act defensively due to fear of negative publicity and mass media being negatively biased towards physicians. Moreover, Ramella *et al*, p. 424²⁵ highlight that ‘more than 68% of physicians stated that the climate of opinion that exists towards doctors was one of the major issues for practising DM, and there is an upward trend with regard to more experienced respondents’. Physicians’ fear of compromising their professional reputation, image and/or career is thus seen as contributing to DM.^{3 6 25 45 47 51}

Table 1 Studies included in the analysis listed after year of publication

Study	Year of publication	Country of origin	Specialty	Study design	Sample size, N	No of citations 7 May 2021
Summerton ⁵²	1995	UK	General practice	Cross-sectional study (survey)	300	110
Van Boven <i>et al</i> ¹⁶	1997	The Netherlands	General practice	Cross-sectional study (survey)	18	19
Lindenthal <i>et al</i> ⁴²	1999	The Netherlands and USA	Physicians*	Cross-sectional study (survey)	2355	6
Summerton ²²	2000	UK	General practice	Cross-sectional study (survey)	339	26
Symon ⁵⁴ (Litigation and defensive clinical practice: quantifying the problem)	2000	UK and Scotland	Obstetrics and Midwifery	Cross-sectional study (survey)	2001	24
Symon ⁵³ (Litigation and changes in professional behaviour: a qualitative appraisal)	2000	UK and Scotland	Obstetrics, Neonatology and Midwifery	Cross-sectional study (interview)	30	11
Vimercati <i>et al</i> ⁵⁷	2000	Italy	Obstetrics	Cross-sectional study (survey)	63	23
Passmore <i>et al</i> ⁴⁹	2002	UK	Psychiatry	Cross-sectional study (survey)	96	34
Brilla <i>et al</i> ²⁴	2006	Germany and USA	Neurology	Cross-sectional study (interview + survey)	67	11
Catino <i>et al</i> ⁶	2009	Italy	General practice, general surgery, Specialist (uncategorised), Anaesthesiology	Cross-sectional study (survey)	431	19
Steurer <i>et al</i> ¹⁸	2009	Switzerland	General practice, Internal medicine	Cross-sectional study (survey)	231	15
Feess ³⁹	2012	Germany	Physicians*	Theoretical analysis, model	0	11
Rohacek <i>et al</i> ¹⁷	2012	Switzerland	Emergency department	Cross-sectional study (survey)	140	29
Elli <i>et al</i> ³⁸	2013	Italy	Gastroenterology	Cross-sectional study (survey)	64	22
Ortashi <i>et al</i> ⁴⁶	2013	UK	Medicine, surgery, obstetrics and gynaecology, paediatrics, other specialties	Cross-sectional study (survey)	204	52
Domingues <i>et al</i> ³⁷	2014	Portugal	Obstetrics	Cross-sectional study	168 cases	4
Garcia-Retamero <i>et al</i> ²	2014	Spain	General practice	Cross-sectional study (interview + survey)	160	25
Litchfield <i>et al</i> ⁴³	2014	UK	General practice	Cross-sectional study (interview)	11	2
Renkema <i>et al</i> ⁵⁰	2014	The Netherlands	Physicians*	Cross-sectional study (interview)	22	16
Solaroglu <i>et al</i> ⁵¹	2014	Turkey	Neurosurgery	Cross-sectional study (survey)	404	9
Bourne <i>et al</i> ⁵	2015	UK	Physicians*	Cross-sectional study (survey)	7926	72
Motta <i>et al</i> ⁴⁴	2015	Italy	Otolaryngology	Cross-sectional study (survey)	100	6
Osti <i>et al</i> ⁴⁷	2015	Austria	Orthopaedic surgery, trauma surgery, radiology	Cross-sectional study (survey)	183	12
Ramella <i>et al</i> ²⁵	2015	Italy	Radiation oncology	Cross-sectional study (survey)	361	13
Tanriverdi <i>et al</i> ⁵⁵	2015	Turkey	Oncology	Cross-sectional study (survey)	146	1

Continued



Table 1 Continued

Study	Year of publication	Country of origin	Specialty	Study design	Sample size, N	No of citations 7 May 2021
Antoci <i>et al</i> ¹⁹	2016	Italy	Physicians*	Evolutionary game theory	0	8
Bourne <i>et al</i> ³⁶	2016	UK	Physicians*	Cross-sectional study (survey)	100	17
Panella <i>et al</i> ⁴⁸	2016	Italy	13 specialties†	Cross-sectional study (survey)	1313	10
Assing Hvidt <i>et al</i> ⁷	2017	Denmark	General practice	Cross-sectional study (interview)	28	15
Bourne <i>et al</i> ³⁴	2017	UK	11 specialties‡	Cross-sectional study (survey)	6144	9
Olçay <i>et al</i> ⁴⁵	2017	Turkey	Cardiology	Cross-sectional study (survey)	250	0
Panella <i>et al</i> ³	2017	Italy	13 specialties†	Cross-sectional study (survey)	1313	19
Vandersteegen <i>et al</i> ²³	2017	Belgium	31 specialties§	Cross-sectional study (survey)	508	7
Yan <i>et al</i> ²⁰	2017	The Netherlands	Neurosurgery	Cross-sectional study (survey)	45	9
Kucuk ⁴⁰	2018	Turkey	Obstetrics and gynaecology	Cross-sectional study (survey)	108	10
Mira <i>et al</i> ⁶⁷	2018	Spain	General practice, paediatrics and nurses	Cross-sectional study (survey)	1904	6
Tebano <i>et al</i> ⁵⁶	2018	74 countries¶	Infectious diseases and clinical microbiology	Cross-sectional study (survey)	830	6
Assing Hvidt <i>et al</i> ⁸	2019	Denmark	General practice	Cross-sectional study (interview)	28	2
Bourne <i>et al</i> ³⁵	2019	UK	Obstetrics and gynaecology	Cross-sectional study (survey)	3073	8
Laarman <i>et al</i> ⁴¹	2019	The Netherlands	General practice, medical specialists and Other.	Cross-sectional study (survey)	210	2
Aranaz Andrés <i>et al</i> ⁵⁸	2020	Spain	Surgeons and anaesthetist	Cross-sectional study (survey)	370	1
Calikoglu <i>et al</i> ⁵⁹	2020	Turkey	12 specialties**	Cross-sectional study (interview + survey)	190	0
Ferorelli <i>et al</i> ⁶⁰	2020	Italy	Emergency department	Cross-sectional study	100 cases	1
Gadjradj <i>et al</i> ⁶¹	2020	Europe, Africa, Asia and Oceania, North America and South America	Neurosurgery and other	Cross-sectional study (survey)	490	2
Müller <i>et al</i> ⁶²	2020	Germany	General practice	Cross-sectional study (survey)	29	1
Osorio <i>et al</i> ⁶³	2020	Spain	31 specialties††	Cross-sectional study (survey)	184	2
Pausch <i>et al</i> ⁶⁸	2020	Germany	General practice	Cross-sectional study (survey)	135	0
Vargas-Blasco <i>et al</i> ⁶⁴	2020	Spain	Urology	Cross-sectional study (survey)	202	0
Vizcaino-Rakosnik <i>et al</i> ⁶⁵	2020	Spain	Physicians*	Cross-sectional study (survey)	282	0
Young <i>et al</i> ⁶⁶	2020	UK	Ten specialties‡‡	Cross-sectional study (interview)	28	0

Continued

Table 1 Continued

Study	Year of publication	Country of origin	Specialty	Study design	Sample size, N	No of citations 7 May 2021
*Physicians in general, no specific specialty enlightened.						
†General surgery, anaesthesiology, internal medicine, paediatrics, psychiatry, emergency department, radiology, cardiology, urology, pathology, neurology, rehabilitation doctors and other specialties.						
‡Accident and emergency, anaesthetics, general medicine, general practice, obstetrics and gynaecology, oncology, other, paediatrics, pathology, psychiatry, radiology.						
§Acute and emergency medicine, anaesthesiology and reanimation, gynaecology and obstetrics, general surgery, neurosurgery, neurology, orthopaedic surgery, plastic, reconstructive and aesthetic surgery, urology, cardiology, dermato-venereology, internal medicine, ophthalmology, otorhinolaryngology, pulmonology, radiology, rheumatology, stomatology, physical medicine and rehabilitation, gastroenterology, geriatrics, clinical biology, medical oncology, neuropsychiatry, nuclear medicine, pathological anatomy, paediatrics, psychiatry, radiotherapy and oncology.						
¶Area of origin, continent: Europe, Africa, America, Asia, Oceania. Area of origin, countries with >20 participants: Australia, Austria, Croatia, France, Germany, Israel, Italy, Norway, Slovenia, Spain, Sweden, Turkey, UK. The five most represented countries were Germany, UK, France, Spain and Italy.						
**Anaesthesia, gynaecology and obstetrics, ENT diseases, general surgery, urology, eye diseases, orthopaedic, cardiovascular surgery, neurosurgery, plastic surgery, thoracic surgery, paediatric surgery.						
††Endocrinology, medical oncology, paediatrics, internal medicine/geriatric, cardiology, genetics, nursing, thoracic surgery, ophthalmology, plastic surgery, anaesthesiology, radiology, surgical nursing, anatomical pathology, critical care, dermatology, gastroenterology, gynaecology and obstetrics, general surgery, haematology, immunology/allergology, infectious diseases, nephrology, neurology, nuclear medicine, psychiatry, pulmonology, rehabilitation, rheumatology, trauma and orthopaedics, urology.						
‡‡Not applicable, palliative care, renal medicine, surgery, anaesthetics, emergency medicine, rheumatology, critical care, microbiology, obstetrics and gynaecology.						
ENT, ear, nose, and throat.						

Unconscious DM

The above-listed categories capture motives behind DM as a conscious act performed by the physician. However, Brilla *et al.*,²⁴ Küçük,⁴⁰ Motta *et al.*,⁴⁴ Panella *et al.*,^{3,48} Solaroglu *et al.*,⁵¹ Vandersteegen *et al.*,²³ Calikoglu and Aras⁵⁹ and Olcay *et al.*⁴⁵ call attention to how DM might exist as an unconscious phenomenon, that is, physicians conduct DM on a daily basis without reflecting on why and how they do it. Supporting this argument, Yan *et al.*, p. 2347²⁰ state that ‘DM has partly become ingrained in the institutional culture of some clinics’. Therefore, the prevalence of DM is challenging to estimate, as Küçük, p. 204⁴⁰ state: ‘Naturally, the conscious practice of DM could

be investigated in our study. We do not know the dimensions of unconscious DM practice in this regard’.

Stated definitions

The chain search revealed that most studies refer to the same two narrow definitions of DM: 8 (16%) studies refer to Office of Technology Assessment (OTA),¹⁰ 3 studies (6%) refer to Hershey¹¹ and 16 studies (32%) refer to both definitions (online supplemental table 1), online supplemental appendix 2, (online supplemental file). Seventeen studies (34%) refer to OTA¹⁰ or Hershey¹¹ but nevertheless apply the broad definition of DM. Thirteen (26%) studies refer to other studies than OTA¹⁰ and

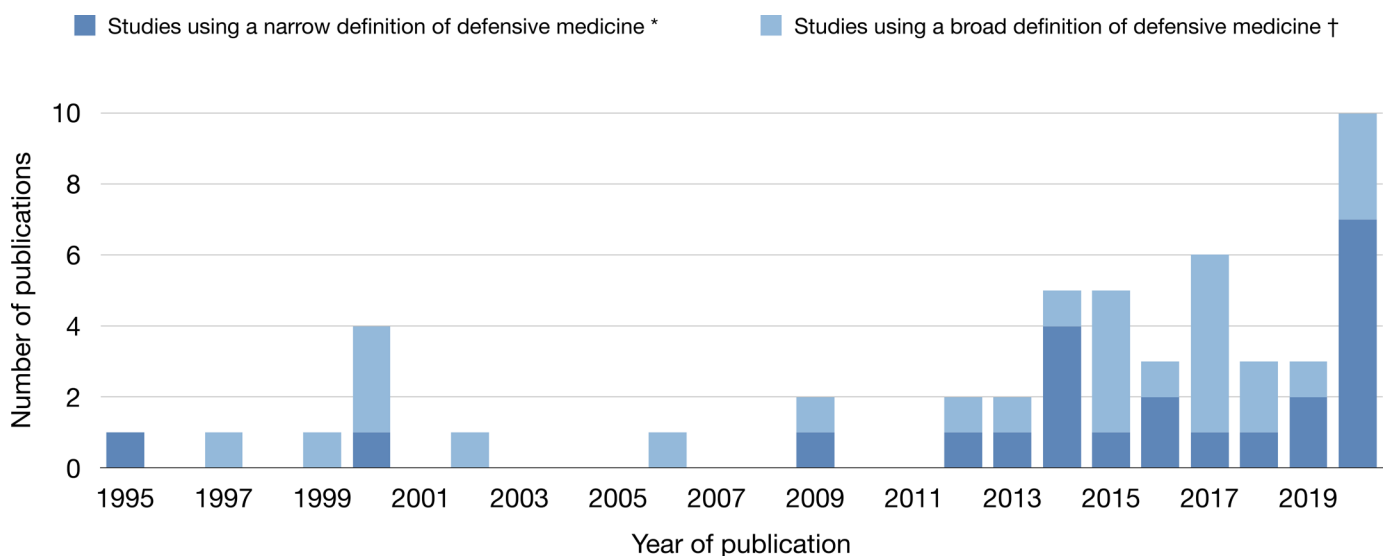


Figure 2 All European medical research studies of defensive medicine according to year of publication and whether the narrow or broad definition was applied *A narrow definition of defensive medicine as ‘health professionals’ deviation from sound medical practice motivated by a wish to reduce exposure to malpractice liability. †A broad definition of defensive medicine adding ‘or other self-protective motives’.

Hershey¹¹ and 10 (20%) studies did not refer to any definition of DM.

Studies using narrow versus broad DM definition

The 27 studies (54%) applying the broad definition of DM were conducted from 1997 to 2020 across 11 European countries and 38 medical specialties. No pattern was found between year of publication and use of either the narrow or broad definition of DM (figure 2). Likewise, no pattern was found between studies applying the narrow and broad definition regarding country, medical specialty, study design, number of citations.

Quality of the studies

The quality assessment is listed in (online supplemental table 2). The assessment of two studies could not be made because the quality assessment tools were not applicable.^{19 39} The research quality of the included studies was generally high. No pattern was found between the studies' research quality and whether a narrow or broad definition of DM was used.

DISCUSSION

Summary of evidence

This is the first study exploring the definition of the term 'DM' in European original medical studies. In this systematic review, more than half of the European studies used a broad definition of DM, indicating that a revised definition of DM may be needed in European countries.

Our results show that in the European scientific medical literature, already since the first studies in the late 1990s, DM has had a narrow and a broad definition. The narrow definition implies that defensiveness is motivated by the wish to reduce the health professional's exposure to malpractice claims while the broad definition includes other self-protective motives. The self-protective motives included in the broad definition include, among others, fear of patient dissatisfaction, fear of overlooking a severe diagnosis, and fear of negative publicity. Furthermore, several studies point to unconscious DM being deeply culturally imbedded and without relation to legal concerns. No pattern was found between studies applying the narrow or broad definition regarding year of publication, country, medical specialty, study design, number of citations or research quality.

The definition of DM

The definitions presented in this systematic review, generally originates from the same two references: OTA¹⁰ and Hershey.¹¹ These US sources are the most significant influencers on how European researchers define DM. OTA presented a definition in their report from 1994, p. 3.¹⁰ The report rejected that the sole purpose of DM was to protect the physicians against lawsuits. As a result, the definition of DM was rephrased as follows: 'primarily (but not necessarily solely) to reduce their exposure to malpractice liability (red.)' opening for broader understandings of DM. Our systematic review

shows that 27 out of the 50 European studies on DM apply a definition of DM where deviations from sound medical practice are considered as DM also if motivated solely by other self-protective motives than fear of patient complaints.^{3 6-8 16 17 20 22-25 38 40 42 44 45 47-49 51 53-56 59 62 63}

We often encountered the abovementioned additional motives in the studies' questionnaires. Some of the additional motives may to some extent be associated with fear of lawsuit. As an example, the category fear of patient dissatisfaction may be a result of the unspoken threat of a complaint, even if it is not clarified in the study. If this is the case, the authors should bring explicit attention to this and, for example, distinguish between DM motivated by fear of litigation and fear of patient dissatisfaction. Other identified motives such as fear of overlooking a severe diagnosis clearly goes beyond a fear of litigation and can be seen as a motive that is related to the concept of becoming a second victim, that is, physicians suffering and feeling personally responsible from an adverse patient event.⁴⁸

Few researchers explicitly question the narrow DM definition nor discuss the concept of DM. When researchers do not agree on the definition of DM, it may result in an inability to compare studies. Our findings question whether the DM researched in many European studies can rightly be termed DM. Our systematic review indicates that a revised definition of DM may be needed in European countries to capture the right meaning of the medical actions that are being investigated under the label of 'DM'. Using the narrow definition of DM without reflecting on its adequacy may lead to misconceptions and consequently result in an underestimation of DM. A definition is a statement or description of the exact meaning of a word or concept.⁶⁹ We have shown that the term DM is not a uniformly understood term—neither analytically nor empirically. In a scientific contribution from 2020, Bester⁷⁰ examines DM from an ethical and professional perspective. In order to define DM, Bester⁷⁰ outlines what DM is and what it is not. The need to describe what DM is not, in order to understand the concept, emphasise the growing necessity of using precise and explicit conceptualisations of DM and descriptions of how the term is understood, when it is used and in which particular research context.

The complex phenomenon of DM

DM can be perceived as a complex phenomenon comprising a number of actions provoked by various motives, dependent on contextual factors that make it difficult to compare results pertaining to DM across countries.⁴⁵ Specific contextual factors derive from the underlying medicolegal, welfare or healthcare systems.^{38 48} Two European studies from 2020 find that the debates on DM are both 'confusing'⁷¹ and 'slippery'⁷² which emphasises the complexity of DM. An increased understanding of DM, and the societal and cultural factors that have contributed to its existence, is essential in order to raise the level of consciousness in clinicians of why they

act defensively. As highlighted in some of the studies above, the practice of so-called unconscious DM is likely to lead to an underestimation of the prevalence of DM. Awareness of the aspects of DM calls for a public debate and professional discussion among physicians within and across medical specialties.

Our results have expanded the definition of DM identifying numerous additional motives for practising DM. This, we hope, will contribute to an improved understanding and more nuanced discussion of the phenomenon of DM. According to several European studies, there is a need for a more detailed and clear definition of DM in order to understand the internationally widespread phenomenon more thoroughly.^{8 48 51 54 55}

Strength and limitations

This systematic review is based on a systematic and thorough search of the literature on DM strictly using the PRISMA guidelines which increases the validity and reliability of the results.

Although there are multiple languages used in Europe, only studies written in English have been included. However, most high-ranking scientific journals reporting on DM are written in English and we specifically aim to support future research on DM targeting an international research audience. Furthermore, DM was originally conceptualised in English.

A limitation of this systematic review is the limited number of included synonyms of DM. Other synonyms were discussed, such as defensive treatment, defensive testing, defensive behaviour, overtesting, overtreatment, unnecessary treatment, unnecessary medical care and defensive medical decision making. These terms were not included to secure the highest possible accuracy of the research question and definition of DM and thus to avoid confusion of different terms. However, during the last fifty years, other synonyms for DM may have been used increasingly in some countries or during some time periods. Additionally, the exclusion of studies due to unavailable full text or wrong study design may have left out various reflections and comprehensions of DM.

Studies where DM is a significant part of the aim/objective were included in this systematic review. This inclusion was based on the researchers' assessment that cannot be characterised as objective, thus other researchers might not assess and include in exactly similar ways.

As this is the first study systematically studying the definition of DM in European medical literature, it was not possible to compare our results with other similar studies.

Future research

The phenomenon of DM has only been examined in few qualitative studies, cf. [table 1](#). More qualitative study designs are needed, using different types of data generation methods, for example, observation of the clinician-patient interaction in the clinic, individual interviews or focus group interviews with clinicians across specialties and/or with patients in order to investigate the

understandings of the term and the perceived consequences of DM for the physician-patient relationship and for the physician's job satisfaction. Insights from studies employing these research designs will enable future work with clarifying and reconceptualising the phenomenon of DM. The geographical delimitation to Europe excluded countries like New Zealand and Canada that has medicolegal systems like that in the UK.⁷³⁻⁷⁵ DM studies from these countries are likely to deviate from the original, narrow definition of DM in ways similar to what we have demonstrated in the European studies. However, it is beyond the scope of this systematic review to identify and analyse the underlying medicolegal systems of countries worldwide. Investigating the interrelationship between medicolegal system and DM in future research could contribute to an understanding of how medicolegal systems influence the motives for practising DM.

CONCLUSION

This systematic review addresses the variations in the definition of the term 'DM' in European studies and the motives for practising DM. As such, it provides a broader and more nuanced definition of the complex and non-beneficial phenomenon of DM, hereby supporting the quality of future research on DM.

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