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Identifying decisions in optometry: A validation study of the decision identification and classification taxonomy for use in medicine (DICTUM) in optometric consultations

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ABSTRACT

Objective: The aim of this study was to assess the validity and reliability of the Decision Identification and Classification Taxonomy for Use in Medicine (DICTUM) applied to optometry, to compare decisions in medical and optometric consultations, and to describe decisions in optometry.
Methods: The study had a cross-sectional design. Data was collected from January to August 2016. Forty video-recorded patient-optometrist consultations were analysed. Clinical decisions were categorised according to DICTUM by two independent coders.
Results: The framework was applied without modification. The inter-rater reliability was moderate, Cohen's kappa 0.57. The mean duration of the consultations was 41 (±9) minutes. In all, 891 clinical decisions were identified, mean 22 (±13) per consultation. Types of decisions were significantly different between optometric and medical consultations (chi-square, $p < 0.001$). More frequently, optometrists conveyed interpreted test results (27.6% vs 16.7%) and gave advice (23.6% vs 8%), while doctors defined the problem (30.4% vs 24.6%) and decided on treatment (17.8% vs 13.4%).
Conclusion: DICTUM is applicable to optometry encounters and may provide valuable insight to different health care settings.
Practice implications: Descriptive studiesofdecisions in patient-provider consultations is a first step for normative and prescriptive exploration of decision-making processes in health care.

1. Introduction

1.1. Clinical reasoning

Clinical decision-making includes observation, patient history, physical examination, and problem solving to understand of the relationship between clinical findings and to confirm/rule out clinical hypotheses [1]. Clinical experts use both formal/scientific and informal/experiential knowledge in problem-solving. Experiential knowledge lays ground for pattern recognition, while listing up possible differential diagnoses draws on both scientific and experiential knowledge [1,2]. Pattern recognition can be effective and efficient for simple and frequently encountered problems, but for rare and complex problems, a wide range of scientific and experiential knowledge is required.

1.2. Person-centred care and shared decision-making

Evidence-based medicine defines what should influence management decisions, but we know little about what influence practitioners management decisions [2]. The essence of person-centred health care is that patients should be "treated as persons" in the "context of their social world, listened to, informed, respected and involved in their care – and their wishes honored" [3,4]. Hence, good communication skills and ability to relate are essential [3,5,6]. Person-centred communication should ensure attention to the whole person, including sharing information and decisions, delivering compassionate and empowering care, and being perceptive to patient needs [7]. The patient's view is central for decisions both in person-centred care and clinical judgment [8]. When there is more than one equally relevant management option

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or when the patient has preferences concerning the different options, patients should be invited in a shared decision-making process [9,10]. A recent study has described how optometrists do clinical reasoning [11], but we do not know what decisions they make, how they make and convey the decisions, and how they involve patients in decisions. Stiggelbout et al. have defined four steps for shared decision-making to take place. The health care provider must inform the patient that a decision has to be made and that the patient's opinion is important. The options and their advantages and disadvantages must be explained. The patient's preferences must be taken into account. Finally, the patient's wish to make the decision must be clarified before the decision is made and management is discussed [12]. In clinical encounters, decision talk often starts with a diagnostic statement by the clinician, which is the result of a decision-making process involving information revealed through history taking, clinical examination and test interpretations. The clinician rarely includes the patient in the clinical reasoning, and infrequently in the decisions about treatment and management planning. Therefore, research on clinical decision-making should include both descriptive, normative, and prescriptive functions; that is explore how decisions are made (descriptive), define best practice (normative), and develop and implement tools for decisions making (prescriptive). Identifying clinically relevant decisions is a key to explore these topics.

1.3. The decision identification and classification taxonomy for use in medicine

To explore shared-decision making and how decisions are made, clinically relevant decisions must first be identified. The Decision Identification and Classification Taxonomy for Use in Medicine (DICTUM) has been developed to identify and categorise all clinically relevant decisions communicated in medical encounters [13]. DICTUM differs from other decision frameworks by having a descriptive approach, whereas evidence-based medicine, shared decision-making, and informed decision-making all have normative approaches with prescriptive intentions [14–17]. DICTUM defines a clinically relevant decision as *"a verbal statement committing to a particular course of clinically relevant action and/or statement concerning the patient's health that carries meaning and weight because it is said by a medical expert"*. In such, the definition is more comprehensive than Braddock's definition *'a verbal statement committing to a particular course of action'* [14].

DICTUM was developed based on the SOAP-note structure for the clinical consultations (subjective (S), objective (O), assessment (A) and plan (P)) [18], and includes all clinically relevant decisions related to patient history, physical examination, clinical reasoning, and patient management. DICTUM comprises all clinically relevant decisions that influence the course of action - including diagnostic, treatment and management decisions. The natural flow of the eye examination also follows the SOAP-structure, and includes patient history (S), clinical examination (O), clinical reasoning/diagnosis (A), and patient management (P).

1.4. Decisions in optometry

Poor vision has an impact on daily living activities such as driving, reading, and mobility, as well as general health and quality of life [19–22]. Therefore, vision care is essential. In Norway, optometrists are the largest profession in vision care, and they make decisions related to both vision and ocular health [23–25]. However, the scope of practice for optometrists varies worldwide [26]. The literature on clinical decision-making in optometry is sparse [27–32]. To our knowledge, there are no studies describing the landscape of clinical decisions in optometry, or how optometrists involve their patients in treatment and management decisions.

1.5. Aim of the study

In this paper, we assess the validity and reliability of the DICUTM framework applied to optometry, compare decisions made in medical and optometric consultations, and describe the nature of clinically relevant decisions made by optometrists.

2. Methods

2.1. Study design, sample and data collection

We chose a cross-sectional, exploratory and descriptive design because decision-making in optometry has previously never been observed and described in a precise, detailed, and exhaustive approach. In our opinion, an unexplored phenomenon should be precisely captured and explored before it can be assessed normative and/or prescriptive. The study was part of the COMHOME study, a study on person-centred communication in the care of older people. [33] In home care and radiography, we defined older people as being 65 years and older. In optometry, older people was defined as being 45 years and older as age-related vision changes starts and the risk of eye disease increases after this age. The target populations were Norwegian optometrists working in a retail setting and their encountering patients. The sample populations included optometrists practicing in the counties of Buskerud, Vestfold and Telemark and encountering patients of 45 years or older. Data was collected from January to August 2016. All optometric practices (n = 17) of a national members-owned optical retail chain (Alliance Optikk) in Buskerud, Vestfold and Telemark were invited to take part in the study. The optometrists were recruited from seven (41%) volunteering practices. All optometrists working in the practices were invited to take part in the study, 11 of 13 (85%) consented to participate. Patients 45 years or older were recruited consecutively during one to three pre-selected workdays for each optometrist aiming to recruit five patients for each optometrists. All patients gave informed consent to participate. Data was collected using video-recordings. The principle investigator (VS) informed the patients, obtained the consent, and managed the video recording. In total, 40 video-recorded consultations were available for analysis, including 11 optometrists and 40 patients. The number of patient-consultations for each optometrist ranged from one to five. The patients mean age was 66 (±10) years, ranging from 46 to 91 years, 20 were female and 20 male. The study followed the ethical principles for medical research involving human subjects [34]. An application describing the project was submitted to the Regional committees for Medical and Health Research Ethics in Norway (REK), which concluded that the project did not fall under the legislation of the Norwegian Health Research Act and therefore did not require approval from REK. The Norwegian Centre for Research Data approved the statutory data privacy requirements of the study (#36017). The participants could request access to their data, and have their video and other data deleted if they chose to withdraw from the study.

2.2. Data coding and validation

The DICTUM framework consists of ten mutually exclusive categories [13], Table 1. The first three categories relate to the *subjective*, *objective* and *assessment* phases of the medical consultation, identifying decisions related to clinical evidence and medical problem solving. The remaining seven categories relate to the *planning* phase of the medical consultation, representing clinically relevant decisions about treatment and management.

A team of three researchers was formed to analyse the optometric consultations. The team consisted of two optometrists;

Table 1
The Decision Identification and Classification Taxonomy for Use in Medicine* and examples of statements conveying decisions in optometric consultations.

	Category name	Category description	Subcategory	Statement
1	Gathering additional information	Decision to obtain information from other source than patient interview, physical examination, and patient chart	Ordering test Consulting colleague Seeking external information	*"I think I will take a scan as well, to have a look, to get an idea of the cause"* *"So, I would like install a drop in each which will make your pupils a bit larger"* *"So, we will check your peripheral vision later"* *"So, I think we should take of a photo of your retina as well"* *"I am a bit unsure. That is why I will ask my colleague as well"* *"Then we will call, and get the exact power."*
2	Evaluating test result	Simple, normative assessments of clinical findings and tests	Positive Negative Ambiguous	*"This is what we call 100% visual acuity. So this seems very good"* *"The intra ocular pressure is good in both the right and left eye"* *"The nervefiber layer thickness looks normal"* *"I think they look at bit dry, your eyes* *"Your intraocular pressure is at bit higher than last visit"*
3	Defining problem	Complex, interpretative assessments that defines what the problem is and reflects a medically informed conclusion	Diagnostic conclusion Evaluation of state of health Aetiological inference Prognostic judgment	*"There are no signs of glaucoma or cataract. With optimal correction, your visual acuity is very good. Your near vision is also very good."* *"You are more long-sighted than last time"* *"You need some power both at distance and near."* *"there is no doubt that your visual function of your right eye is poorer than you left"* *"I can see that your eyes show signs of having been out in sun and wind"* *"In the area of detail vision in your left eye there is a so called cellophane membrane. That causes your vision to be slightly poorer in that eye"* *"It is your tearfilm, which is not stable"* *"It is because of UV-exposure to the eyes"* *"It is difficult to predict how this will develop. It might go fast, and it can go very slow."* *"You will always experience that the visual acuity in you right eye is strange, but we cannot alleviate that. So it is important to have realistic expectations"* *"..but I think this will not change to much in the future"*
4	Drug-related	Decision to start, refrain from, stop, alter or maintain a drug regimen	**Start** Stop Alter Maintain Refrain	*"We talked about eyedrops, I think you should try to use eyedrops."* *"You are a bit red, your eyes look irritated. Try some artificial tears"*
5	Therapeutic procedure -related	Decision to intervene upon a medical problem, plan, perform, or refrain from therapeutic procedures of a medical nature	**Start** Stop Alter **Maintain** **Refrain**	*"You use your glasses a lot, so multifocals would be very good."* *"I think we should keep the same power"* *"For distance there is little to gain by a pair of spectacles"* *"I think it is a bit too early to consider referral for cataract surgery, so I think we should wait"* *"To do anything surgical is more complicated, so I do not thick they are interested as long as your visual acuity is good and your vision has not deteriorated"*
6	Legally and financially related	Medical decision concerning the patient, which is based upon or restricted by a legal regulation	Fitness to drive* Workplace optical aids* Optical aids covered by the National Insurance Act*	*"You fulfil the criteria for driving."* *"This means that you have to wear spectacles for driving"* *"The employer may contribute to cost of . . . ."* *"We will send an application to NAV for reimbursement of the cost of you filter glasses"* .
7	Contact-related	Decision regarding admittance or discharge from hospital, scheduling of control and referral to other part of the health care system	Routine examination Monitoring Referral to other health care provider	*"I recommend that we send you a new appointment in 2 years to examine your ocular health."* *"I think we should repeat the measurement of your intraocular pressure in a couple of weeks"* *"It is not very clear in there, so I would like to refer you for an assessment."*
8	Advice and precaution	Decision to give the patient advice or precaution, thereby transferring responsibility for action from provider to patient	Advice on: Spectacles* Contact lenses* Ocular protection* Further examination/ follow up* Visual ergonomics* Lens design and coating* Purchase of optical correction* Management of ocular problems/ disease* Precaution	*"Multifocal spectacles, an all-round solution, is probably first priority"* *"You exercise a bit, there is an option to use contact lenses"* *"It is important to protect your eyes from UV-radiation"* *"The older you get, the higher the risk of developing ocular disease, so it is recommended to have regular eye exams"* *"This stains you neck. Try to be good at using this. Look down"* *"We should make a good multifocal, with a polarized pair of glasses"* *"The risk is that if something goes wrong with the frame and you have bought new lenses, you will be stuck if the frame cannot be replaced."* *"Often the main cause of tearing is dry eyes»* *"It is important that you let us know if you experience something in the other eye"* *"It is important that you let us know if this happens again."*
9	Treatment goal	Decision to set defined goal for treatment and thereby being more specific than giving advice	Quantitative Qualitative	

Table 1 (*Continued*)

	Category name	Category description	Subcategory	Statement
10	Deferment	Decision to actively delay decision or a rejection to decide upon problem presented by a patient	Transfer responsibility Wait and see Change subject	*"Ideally I should have taken a scan of the retina to assess the cause of the poor vision in her left eye, but we know that this is taken care by the ophthalmologist"*

* Added to scope the nature of optometric consultations.

an associate professor in optometry (VS) and a masters' degree student in optometry (HAS), and a medical doctor; the main developer of DICTUM (EHO). The two optometrists analysed the video material. They independently identified, transcribed, and reflected on observed statements that potentially conveyed clinically relevant decisions. Informed by their professional background and clinical experience, they had full knowledge of the language terms used by optometrist and patients, and the actions observed during the consultations.

The team (VS, HAS and EHO) had general discussions about the threshold for defining an observed statement or action as a clinically relevant decision, applying the same definition as in medicine: "*a verbal statement committing to a particular course of clinically relevant action and/or statement concerning the patient's health that carries meaning and weight because it is said by a medical expert*" [13]. All statements were required to have some element of optometric or medically relevant content like "You need glasses", and a relation to the patient's actual situation distinct from general optometric information, "I think your uncorrected refractive error is causing your eye strain" as opposed to "Uncorrected refractive error may cause eye strain".

After statements or actions were identified as clinically relevant decisions, they were categorized according to DICTUM [13]. The coders and the developer of DICTUM continuously discussed the application of categories. Finally, inter-rater reliability was assessed. Coding consensus was developed in steps using sets of two or three videos. This process was repeated for 15 videos in total, and the codebook was adjusted after team discussion (VS, HAS, EHO). This process, including consensus discussion, controlled for the influence of the optometrists' clinical experience and reduced the risk of coder bias. This lead to a stricter and narrower definition of drug-related and therapeutic procedure-related decisions (category 4 and 5), so that only directive or imperative statements were defined as drug- or therapeutic procedure-related decisions. Decisions on drugs and therapeutic procedures expressed as recommendations were defined as advice (category 8). Further, optometry specific descriptions (subcategories) were included for decisions related to evaluating test results, advice and precaution (category 2 and 8) to scope practice, Table 1.

When the optometrist ordered additional auxiliary diagnostic tests, discussed the patient with a colleague, or requested external information, this was coded as decisions to gather additional information. Normative assessment of clinical tests was coded as evaluation of test results, whereas complex assessments providing a diagnostic conclusion, an evaluation of state of health, an etiological inference, or a prognostic judgment were coded as defining the patient's problem. Statements providing information to and involving the patient in decisions about management of visual and ocular problems were coded as decisions related to drugs, therapeutic procedures, legal and insurance issues, follow-up, advice and precaution, treatment goals or deferment, respectively. Providing advice and precautions transfer the responsibility for action from the optometrist to the patient. The adapted consensus version of the taxonomy was deemed fit for reliability testing. We coded four sets of five videos to establish consensus between the two coders, then a final set of five videos (178 decisions) were coded to assess agreement between raters and inter-rater reliability. Further, we asked nine clinical experts (optometrists) to review the relevance of the ten DICTUM categories on a scale from 1 to 4, where 1 was not relevant and 4 was very relevant, to assess content validity.

2.3. Data analysis

The data analysis was designed to assess the validity of the DICTUM framework, and to provide univariate and bivariate statistical analysis of clinically relevant decisions communicated in patient-optometrist encounters. All 40 video recordings were included in the evaluation of the taxonomy's validity to optometry, in the description of decisions made by optometrists, in analysis of correlations with the number of decisions per encounter and the difference between optometric and medical decisions. Content validity using averaging calculation method for scale-level content validity index (S-CVI/Ave) [35]. Inter-rater reliability was assessed with Cohen's kappa [36]. Cohen's kappa is suitable for inter-rater reliability assessment in a fully-crossed design with two coders assessing a nominal variable, Krippendorf's alpha is more appropriate with more than two coders [37]. To determine an inter-rater reliability of 0.5 with 80% power and 5% precision for a 10×10 contingency table where the categories are not assumed to be proportionate assuming fair agreement (0.3) requires a sample size of minimum 116 [38]. Distribution of decisions were analysed in frequency and summation tables, correlation between number of decisions and duration of the consultation using Pearson's R, and group differences between optometry and medicine using Chi-square/Fisher Exact test using Chi-square/Fisher Exact test.

3. Results

3.1. Decisions in optometric encounters

In our material, we found decisions comprised by nine of the ten DICTUM-categories. First, the optometrists made clinical decisions about obtaining more information, test results and clinical problem providing the patient with information about these decisions. Second, the optometrists made clinical decisions about treatment and management providing the patients with information and opportunity to be involve in the decisions. These decisions were related to dry eye treatment, refractive error, ocular disease, referral to ophthalmologist, fitness to drive, workplace vision aids, low vision aids, follow-up and further examinations, and treatment options for optical correction, ocular disease, optical protection and visual ergonomics. Table 1 shows the characteristics of optometrists' decisions distributed across DICTUM-categories with examples of statements and Fig. 1 shows decisions according to SOAP-structure. The content validity for DICTUM in optometry was excellent [35], S-CVI/Ave was 0.94. The simple agreement between coders was 71%, and the inter-rater reliability was moderate [36], Cohen's kappa was 0.57. The average time to code and transcribe decisions verbatim was 2–2.5 times the length of the consultation.

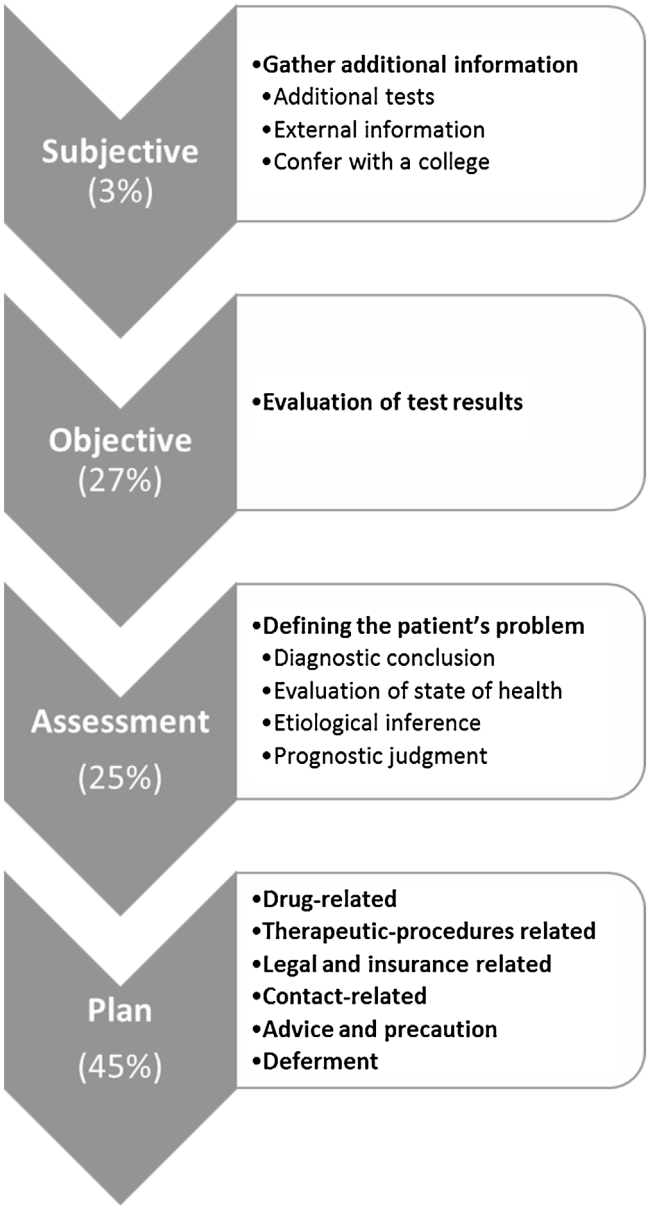

Fig. 1. Clinically relevant decisions defined by DICTUM with respect to the natural flow of the optometric consultation (SOAP-structure).

The material included 891 clinical decisions. The average (sd) duration of the consultation was 41 (±9) minutes, ranging from 19 to 60. The average (sd) number of decisions per consultation were 22 (±13), ranging from five to 63. Fig. 2 shows the number of decisions per consultation for each optometrist, there was no correlation between number of decisions and each optometrist. The number of decisions per consultation was correlated with the duration of the consultation, $r = 0.48$, $p = 0.002$. The number of decisions in optometric consultations with respect to duration of consultation was similar to the number of decision in medical consultations, mean 22 decisions/41 min (0.54 per minute) versus 13 decisions/22 min (0.59 per minute) [39].

3.2. Comparison of decisions in optometric and medical encounters

In all, 30% of decisions were related to the subjective and objective phase of the consultation, and 25% and 45% the assessment and planning phase, respectively. Fig. 3 shows the distribution of decisions in optometric consultations compared with the distribution of decisions found in hospital medical consultations [39]. The distribution of types of decisions were significantly different between optometric and medical consultations (chi-square, $p < 0.001$). Optometrists communicated a higher proportion of decisions related to the clinical assessment than doctors did (52.2 versus 47%) and more frequently conveyed interpreted test results (27.6% versus 16.7%), whereas doctors more frequently defined the problem (30.4% versus 24.6%). Moreover, the proportion of drug- and therapeutic-procedure related decisions and follow-up decisions were lower in optometric practice than in the hospital setting (18.1% versus 27.8%), whereas the proportion of clinical decisions provided as advice or precaution was much higher in optometric consultations than in medical consultations (23.6% versus 8%).

3.3. Content and function of the DICTUM categories in optometry

Decisions to do additional diagnostic tests included dilated fundus examination, digital retinal photography, visual field screening, dry eye assessment, and assessment of workplace visual ergonomics. Decisions defining the patients' problem included diagnosis of refractive error, visual problem and ocular disease, evaluation of visual function and ocular health, identification of the cause of visual problem and ocular disease, and assessment of the severity and prognosis of the visual problem and ocular disease. Management decisions were related to treatment and management of vision and ocular problems, including topical

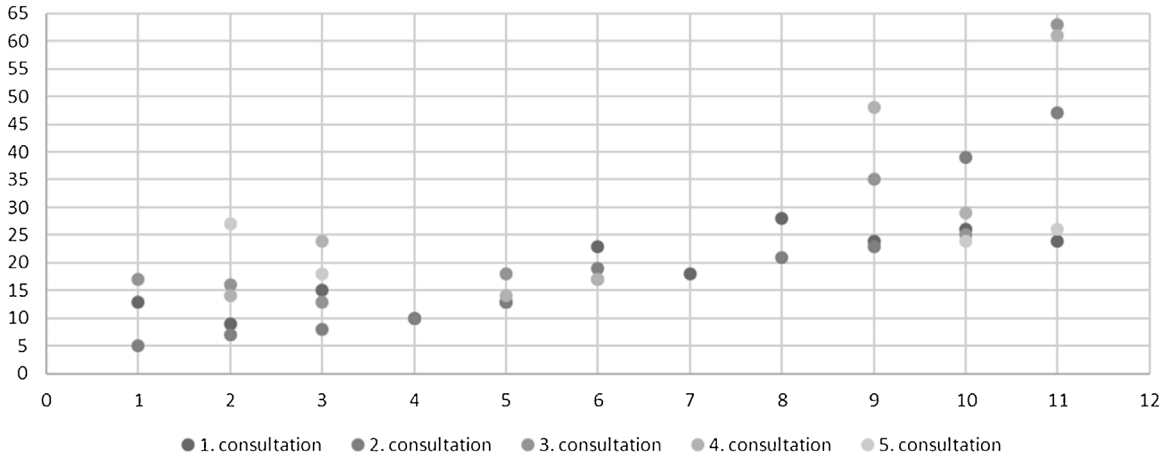

Fig. 2. Number of clinically relevant decisions per consultation for each of the optometrists.

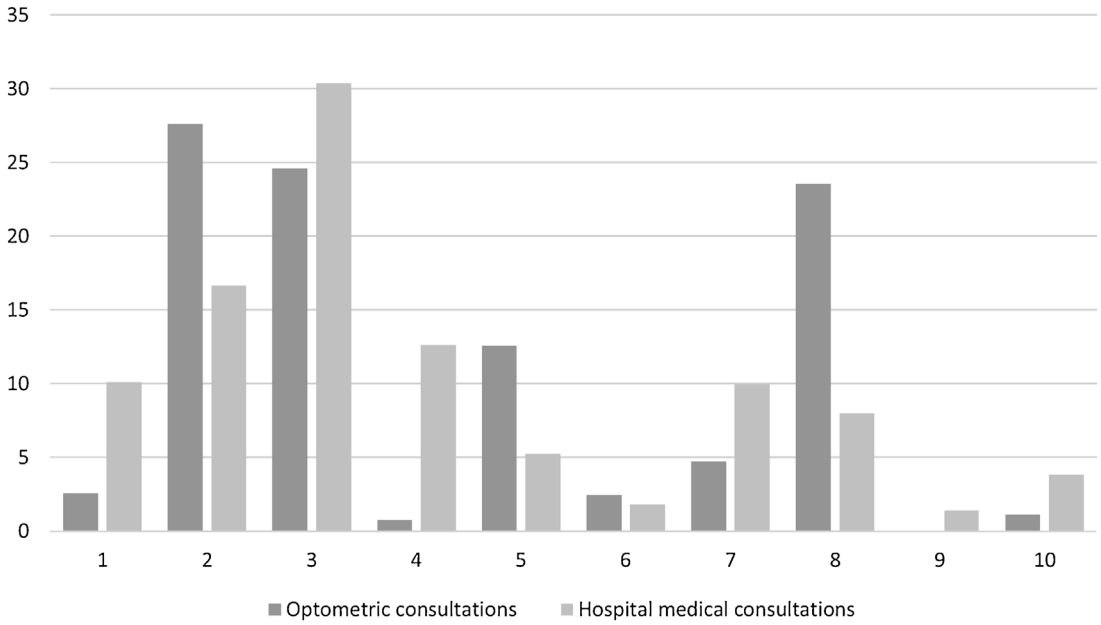

Fig. 3. Distribution (%) of decisions categories* in optometry consultations compared with hospital medical consultations**.
*1; Gathering additional information, 2; Evaluating test result, 3; Defining problem, 4; Drug-related, 5; Therapeutic procedure –related, 6; Legally and financially related, 7; Contact-related, 8; Advice and precaution, 9; Treatment goal, 10; Deferment. ** [39].

ocular drugs, optical correction, visual ergonomics, referrals, plans for follow-up and advice and precautions on treatment and management.

In 17 (42.5%) of the consultations the optometrists decided to gather additional information. In all consultations, they either expressed decisions about test results (95%), defined the problem (95%) or did both (90%). Explicit decisions about treatment was made in 36 (90%) of the encounters. Decisions on follow-up and referral were found in 27 (67.5%) of encounters, describing the course of management of vision and ocular health, and implicitly indicated the state of vision and ocular health in terms of need for routine examination or monitoring, further medical examination, vision rehabilitation and pedagogical support. Further, the optometrist gave recommendations about management and precautionary advice on how patients should act in case of visual symptoms or ocular problems in 39 (97.5%) of the encounters. The main intention of the advice was to involve the patient in decisions and to promote good vision and ocular health. No decisions about treatment goals were made and deferments of decisions were found in five (12.5%) encounters. In these encounters the optometrists transferred the responsibility for the decision to the general practitioner or the ophthalmologist.

4. Discussion and conclusion

4.1. Discussion

To our knowledge, this is the first study that identify and classify all clinically relevant decisions communicated in patient-optometrist consultations. DICTUM is a novel method for assessing clinically relevant decisions [13], and prior to this study, DICTUM has only been applied to medical consultations [39]. Optometrists make and communicate a large number of clinically relevant decisions per encounter. The ratio of decisions per minute in optometric encounters, was similar to the ratio found in hospital medical encounters [39]. This could indicate that more decisions were made because more tests were being done. However, it could also reflect that the more time people spend in the same room, the more they talk and the more decisions will be made. Our study shows that DICTUM has validity beyond the medical consultation. The content validity was excellent, and decisions were identified for nine of the ten mutually exclusive categories. The tenth category would likely be identified in a larger sample of consultations ($n \geq 197$), as the prevalence of the tenth category (treatment goal) is relative low (15.1%) for medical consultations [39]. There was no need for additional categories to account for decisions made by the optometrists, although we added optometry specific descriptions to aid coding. We therefore propose DICTUM as a potential tool to broaden the understanding of decisions made and communicated across the spectrum of healthcare consultations.

The number and types of decisions in optometric consultations differed from medical consultations [39]. Optometrists in our study communicated more decisions per consultation than hospital doctors did; this could be related to both to the length and content of the consultation as the ratio of decisions per minute was similar. The average duration of the optometric consultations was nearly two times the duration of medical consultations. The number of decisions in optometric consultations were almost two times higher than in the hospital encounters from the original study. Further, optometrists more frequently provided statements about test results and advice than hospital doctors did [39]. This may reflect different professional communication styles, as well as the scope of practice. The optometrists are likely to undertake more tests during an eye examination than medical doctors do in during a hospital encounter. Moreover, optometrist could attempt to engage patients in decisions about treatment, more so than hospital doctors did. However, how optometrist engage patients in decisions was outside the scope of this study and needs to be further explored. Overall, optometrists communicated a higher proportion of decisions related to the clinical assessment than doctors, which may reflect clinical context, the expected role of the health care provider, as well as the purpose and duration of the consultation. Optometrists expressed test results, whereas doctors defined the problem. This may be explained by the fact that optometrists mainly examine healthy people who need a prescription for refractive error or presbyopia [23] and decisions related to refractive error and presbyopia may not be

communicated as a diagnostic conclusion. On the other hand, people examined in hospitals usually have a medical problem, and decisions related to assessment commonly regard the patient's state of health, provision of a diagnostic conclusion, aetiological inference or a prognostic judgment [13]. Moreover, the proportion of drug- and therapeutic-procedure related decisions and follow-up decisions were lower in optometric practice than in the hospital setting, whereas the proportion of clinical decisions provided as advice or precaution was higher in optometric consultations than in medical consultations. One explanation could be the stricter definition of these categories in our study. However, this may also reflect the different nature of clinical practices. Optometrists provide services in a retail setting, and the nature of customer services could incline the optometrist to provide decisions about the treatment, such as spectacles, contact lenses, eye drops and follow up, as options and by that transferring the responsibility for the decision to the patient, thereby laying grounds for shared decision-making. The literature is sparse, however, studies have shown that optometrists can facilitate clinical management decisions [29,30,32] and this could be further improved by training, mentoring, and feed-back on clinical management decisions [25,27–29]. The optometrists in our study did not communicate any statements classified as treatment goal decisions. This category was also the least frequent category in the medical consultations. In general, the lack of communication concerning treatment goals in optometric consultations, together with the low frequencies in medical consultations, are somewhat surprising, as treatment goals can be a tool to support patient empowerment and compliance. However, in optometry treatment is mainly optical corrections, as a cure to the patients' visual problem, this rarely require explicit statements on treatment goals. Moreover, implicit statements on how and when to use the optical correction was not defined and coded as treatment goals in this study, but as advice and precautions. In the hospital medical encounters, it is the patient is there to have their medical problem cured, and decisions on treatment goals could be more likely found in the patient-general practitioner consultation. However, the current data is limited. The low frequency of treatment goal decisions in hospital medical encounters - and the absence of goal-oriented statements in our optometry material - could also reflect that Norwegian health care providers have a very low focus on goal-oriented care compared to healthcare providers in countries like the US.

4.1.1. Limitations and strengths

The number of consultations in this study was limited, and may not be representative of Norwegian optometric practice in general. However, the sample provided a broad range of optometrists with regards to educational background and work experience, and the sample of decisions was well above the sample size needed to assess inter-rater reliability. Simple agreement reflects that the majority of decisions were identified by both coders. Moreover, the inter-rater reliability estimated in our study and the original study [33] is acceptable. The immediate applicability of DICTUM to clinical decisions in optometric consultations provides validity of DICTUM as a framework to other health care settings than medicine. Further, our study has showed that DICTUM has potential to provide insight to clinical decisions in different health care settings. Increased awareness about how decisions are made, conveyed, and who should make them is essential to improve the quality of clinical dialog and in turn the quality of health care. Two equally good treatment options advocates for shared decision-making, in order for this to happen, the clinician needs to be aware that a decision needs to be made and take appropriate steps to team with the patient, before presenting the pros and cons of the different options and collaboratively involve the patient in deliberation and decision-making [10]. By identifying decisions in the objective, subjective and assessment phase the health care provider's clinical judgement and foundation for treatment decisions can be identified and explored. Whereas decisions identified in the planning phase can be used as a starting point to describe and assess the steps of shared-decision making [10,12].

4.2. Conclusion

DICTUM is applicable to optometry encounters and may provide valuable insight to different health care settings. Descriptive studies of decisions in patient-provider consultations is a first step for normative and prescriptive exploration of decision-making processes in health care.

4.3. Practice implications

The findings from this study could influence research on decision-making in health care, as well as the optometry education and clinical practice of optometrists and eye care quality in the future.

Role of funding and conflict of interest

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The Research Council of Norway had no involvement the in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

Competing interests

The authors declare that they have no competing interests.

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