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DOI
10.1016/j.pec.2025.108733

Publication date
2025

Document Version
Final published version

Published in
Patient Education and Counseling

Patient Education and Counseling 135 (2025) 108733

Contents lists available at ScienceDirect

Patient Education and Counseling

journal homepage: www.journals.elsevier.com/patient-education-and-counseling

Exploring the state of shared decision-making in head and neck oncology: Assessing treatment communication

Anne N. Heirman [a,1,2], Song L.L. Duimel [a,b,3,4], Roosmarijn S. Tellman [a,5], Richard Dirven [a,6], Annemiek J. Linn [b,7], Gyorgy B. Halmos [d,8], Rob J.J.H. van Son [a,c,9], Lisette van der Molen [a,10], Alfons J.M. Balm [a,e,11], Julia C.M. van Weert [b,12], Michiel W.M. van den Brekel [a,c,e,*,13]

[a] Department of Head and Neck Oncology and Surgery, The Netherlands Cancer Institute, Amsterdam, the Netherlands
[b] Amsterdam School of Communication Research/ASCoR, Department of Communication Science, University of Amsterdam, Amsterdam, the Netherlands
[c] Amsterdam Center of Language and Communication, University of Amsterdam, Amsterdam, the Netherlands
[d] Department of Otorhinolaryngology, Head and Neck Surgery, University of Groningen, University Medical Center Groningen, Groningen, the Netherlands
[e] Department of Oral and Maxillofacial Surgery, Amsterdam University Medical Center, Amsterdam, the Netherlands

ARTICLE INFO

Keywords:
Shared decision-making
Head and Neck Oncology
Patient involvement
Participation
Patient-provider communication
OPTION^{mcc}
Treatment decision-making
Preferences
Care goals, Values

ABSTRACT

Objective: To explore the state of shared decision-making (SDM) in head and neck (HN) oncology by investigating the extent to which SDM is currently employed by HN surgeons and how the perceived levels of SDM relate to the observed levels of SDM. Additionally, surgeon and patient perspectives on patient involvement in SDM and potential associations with observed levels of SDM were explored.

Methods: Perceived level of SDM and patient involvement were measured by SDM-Q-9/SDM-Q-Doc resp. Control Preference Scale. Observed SDM was measured by analyzing audiotaped consultations (N = 42) using the OPTION^{mcc+} instrument. Univariate linear analyses were conducted to identify possible associations with surgeon-observed SDM.

Results: Median perceived SDM scores of surgeons (74.4 %) and patients (71.1 %) were relatively high, whereas observed median OPTION-scores were moderate (surgeons 48 %, patients 42 %, caregivers 24 %). Consultation time and patient OPTION-score were positively associated with surgeon OPTION-score.

Conclusion: Surgeons and patients seem to overestimate the extent of SDM compared to the observed reality. Patients' goals, values and preferences need to be addressed more during consultations.

* Correspondence to: Amsterdam Center of Language and Communication, University of Amsterdam, Spuistraat 134, Amsterdam 1000 BP, the Netherlands.
E-mail addresses: a.heirman@nki.nl (A.N. Heirman), s.duimel@nki.nl (S.L.L. Duimel), r.tellman@nki.nl (R.S. Tellman), r.dirven@nki.nl (R. Dirven), a.j.linn@uva.nl (A.J. Linn), g.b.halmos@umcg.nl (G.B. Halmos), r.v.son@nki.nl (R.J.J.H. van Son), l.vd.molen@nki.nl (L. van der Molen), a.balm@nki.nl (A.J.M. Balm), j.c.m.vanweert@uva.nl (J.C.M. van Weert), m.w.m.vandenbrekel@uva.nl (M.W.M. van den Brekel).
[1] Joint first authorship
[2] https://orcid.org/0000–0003-4467–9804
[3] Joint first authorship
[4] https://orcid.org/0000–0002-0248–4067
[5] https://orcid.org/0009–0003-9576–5654
[6] https://orcid.org/0009–0005-5465–889X
[7] https://orcid.org/0000–0003-0912–3712
[8] https://orcid.org/0000–0003-2460–2260
[9] https://orcid.org/0000–0001-6321–7635
[10] https://orcid.org/0000–0002-0514–2142
[11] https://orcid.org/0000–0001-9935–3217
[12] https://orcid.org/0000–0002-2259–5864
[13] https://orcid.org/0000–0002-6338–6743

https://doi.org/10.1016/j.pec.2025.108733
Received 29 May 2024; Received in revised form 26 February 2025; Accepted 2 March 2025
Available online 4 March 2025

Practice Implications: The findings can be used to raise awareness of SDM among surgeons to improve their skills. Routine training in medical education can benefit from effective integration of SDM principles during consultations.

1. Introduction

The dynamic, collaborative process of shared decision-making (SDM) allows patients, and when present, informal caregivers (hereafter: caregivers), to be involved during consultations [1–4]. Particularly important in applying SDM is the prioritization of the patient's needs, values, goals of care, and preferences. When it comes to health- or treatment-related decisions, SDM has demonstrated several benefits, such as reducing the likelihood of decisional regret, higher patient satisfaction, lower healthcare costs, and ultimately, potentially higher quality of life (QoL) [5–10]. As a result of SDM, patients are generally better informed about benefits and risks, enabling healthcare providers and patients to choose treatment options that best suit patient needs [1–4].

In recent years, there has been a significant drive towards SDM in oncology healthcare. Patients are increasingly being viewed as partners, rather than passive recipients of treatment [11]. However, the implementation of SDM often proves to be challenging due to several factors, such as consultation time [12], uncertainty or lack of consensus regarding the preferred treatment choice [13], or healthcare providers' limited communication skills [13,14]. In addition, patients' preferences for involvement in the decision-making process may differ significantly from the healthcare provider's view of these preferences. Previous research has shown that patients' preferences and perceptions of their involvement in decision-making vary [15]. Some patients prefer active involvement, while others opt for a more passive role [15,16]. The application of SDM should acknowledge these potential differences by requiring healthcare providers to step in as mediators in order to collaboratively make treatment decisions [17,18]. Nevertheless, healthcare providers often find it difficult to involve patients in decision-making [12,19]. Meanwhile, patients and their caregivers may encounter barriers that hinder their participation in the decision-making process, including limited knowledge as well as underestimating their own expertise relative to that of healthcare providers [20,21]. Patients' belief in the "doctor knows best" concept might pose significant hurdles in making collaborative treatment decisions [22–24]. Consequently, weighing the potential benefits of treatment against the potential impact on their QoL is often very complex.

In the context of head and neck cancer (HNC), a delicate consideration of the potential advantages and drawbacks of each treatment option remains crucial, as comprehensive aggressive treatments, including surgery, radiation therapy, and chemotherapy, are frequently required [25]. These treatment modalities can have a major impact on patients' QoL by potentially causing significant functional impairments related to speaking, swallowing, eating, or breathing [26–28]. Moreover, patients may experience pain, fatigue, and emotional distress, which can further affect their overall well-being [29]. The overarching goal of most treatments is to cure patients from their malignancy, but there is often a delicate balance between extending survival and preserving QoL [27,30]. Consequently, in these situations, the implementation of SDM is important to value the patients' personal values, goals of care, needs, and preferences.

Despite the fact that SDM is particularly suitable for HNC, its implementation remains insufficiently explored. This represents an essential knowledge gap, as it has been documented that HNC patients experience clinically significant decisional conflict and regret [31–35], despite initially being satisfied with the treatment decision [36]. This lack of research is especially concerning given that SDM has already been shown to be employed only to a limited extent in less invasive medical contexts, such as rheumatoid arthritis [37], vascular surgery [38,39], (medical) oncology [39], anesthesiology [40], a mixture of diverse medical specialties [41,42], and different types of decisions [43]. Studies in these areas have reported relatively low OPTION-scores, ranging from 3.8 to 39.3, indicating that healthcare providers are not fully applying SDM in practice. As such, we need to clarify two issues. First, information is lacking on the extent to which healthcare providers within HNC presently apply SDM. Second, it remains unknown to what extent head and neck (HN) healthcare providers and patients perceive SDM being employed during consultation, and how these observed and perceived levels of SDM relate to each other. As far as we are aware, only a few prior studies exist that have assessed SDM implementation and have taken into account the perceived level of SDM of healthcare providers and patients while also investigating the observed level of SDM [38,40]. Accordingly, with this study, we aim to explore SDM in HN oncology by (1) investigating the extent to which surgeons employ SDM in daily practice and (2) gaining insight into how the perceived level of SDM by surgeons and patients relates to observed SDM. Additionally, we examine patient preferences for SDM and the extent to which surgeons can properly assess them.

2. Methods

This prospective cross-sectional study was conducted according to the principles of the Declaration of Helsinki at the Department of Head and Neck Oncology and Surgery at a Dutch tertiary hospital [44]. The ethical review committee approved the study (registration number IRBd21–078). The research design, data collection process, and anticipated analyses were preregistered on the Open Science Framework (OSF; https://osf.io/248fu/).

2.1. Participants and procedure

We recruited five out of ten experienced HN surgeons based on age and gender to form a representative group within the Head and Neck department. Inclusion criteria were: 1) performing clinical work for more than three days per week; 2) having a permanent position as an HN surgeon; and 3) having treatment decision-making consultations with non-cutaneous carcinoma HNC patients. Surgeons involved in the study setup were excluded as potential participants (RD, MvdB). To be eligible for the study, patients had to 1) be diagnosed with a primary non-cutaneous HNC; 2) be eighteen years or older; 3) have sufficient command of the Dutch language, and 4) be without cognitive impairments (e.g., Korsakov syndrome). Patients were screened by the multidisciplinary tumor board, and then contacted by one of the researchers (AH or SD) to be informed about the study. Interested patients were seen before consultation for a face-to-face explanation of the study and the opportunity to ask questions, after which they signed informed consent.

Between May 2021 and October 2022, consultations between surgeons, patients, and if present, their informal caregivers (hereafter: caregivers) were recorded with a Roland Ediroll R-07 [45]. During these consultations, diagnosis and advice for treatment from the multidisciplinary tumor board were discussed. Following up on previous studies [37–43], we aimed to obtain at least five recordings per surgeon.

2.2. Measures

Patients' age, gender, and diagnosis were collected from their electronic health record. Other characteristics, such as marital status, living situation, education level, employment status, and presence of an informal caregiver, were obtained after consultation via a study specific

questionnaire that included the Dutch version of the SDM-Q-9 for patients and the Control Preference Scale (CPS) [46]. Likewise, after consultation, HN surgeons completed a similar study specific questionnaire, including questions about their work experience in Head and Neck oncology (in years), training in SDM (none, minimal= attended at least one course/training, some= attended > 2 courses/trainings), the SDM-Q-Doc for healthcare providers, and an adjusted CPS to fit surgeons' perspective.

The Dutch versions of the SDM-Q-9 and SDM-Q-Doc (Appendix A) have previously been shown to be reliable instruments for investigating how SDM is perceived [47–49]. Both are nine-item, validated questionnaires that measure patients' and surgeons' perceived level of SDM on a six-point Likert scale, ranging from 0 (completely disagree) to 5 (completely agree). Scores can be summed up, averaged, and then rescaled into a percentage range from 0 (no perceived SDM) to 100 (highest level of perceived SDM). In addition, the validated Control Preference Scale (CPS) was used to assess patients' preference for and perceived involvement in the decision-making process. The scale contains five decision-making related statements, with two describing an active role of the patient (patient-led), one a shared role (collaborative), and two a passive role of the patient (physician-led), which we reduced into three categories for analysis [46,50]. We developed two customized CPS measures alongside Degner's original: one to assess surgeons' perception of patients' preferences and another to measure their own preference for patient involvement in decision-making.

For objective assessment of the level of SDM, the validated Observing Patient Involvement (OPTION) scale was used. The original OPTION^5 manual [51], which assesses only healthcare providers, does not incorporate patient behavior, making it insufficiently specific as SDM should also allow the patient and their caregivers to actively participate in conversation [52]. For this reason, we used the OPTION^{mcc} manual [53] and adapted it for our study, the OPTION^{mcc+} (Appendix B). Instead of scoring patients and caregivers from 0 (passive participation) to 2 (active participation), they were assessed similarly to the surgeons on a 5-point scale. The seven OPTION items were scored based on the general description in the manual wherein scores for surgeons range from 0 (no effort) to 4 (exemplary effort) and scores for patients and caregivers from 0 (passive participation) to 4 (very active participation). Before actual assessment of the consultations, two raters (SD and RT) performed a calibration session. Each scored ten randomly chosen consultations independently, spread over three calibration phases, to discuss any discrepancies in OPTION-scores and to reach consensus. Subsequently, the remaining consultations were independently scored in batches of five to give room to discuss any doubts. A third assessor (AH) was consulted in case any doubts or disagreements could not be solved. The OPTION-scores (0−28) of both raters were summed, averaged and then rescaled into a percentage total score between zero and hundred [53]. There are no officially defined cutoff values to interpret the observed level of SDM, but some studies have used three categories [37,40]: low (0–33.3 %), moderate (33.3–66.6 %), and high (66.6–100 %), which we adopted.

2.3. Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics 27 [54], with a significance level set at $p < 0.05$. Only consultations with both surgeon's and patient's questionnaires were included for analysis. Descriptive data were employed in accordance with the normal distribution of the data. Before analysis of the data, the two-way mixed inter-rater reliability, single measurement intra-class correlations coefficients (ICC) with a consistency agreement and 95 % confidence interval (CI) were calculated [55]. Following the OPTION manual, an ICC score of > 0.6 was deemed to be acceptable to continue independent scoring by the two raters [51]. When ICC was ≤ 0.6, calibration between the raters was continued until ICC > 0.6 was achieved.

A Bland-Altman plot was created to examine the consistency between the SDM-Q-9 and SDM-Q-Doc questionnaires, thereby providing insight into potential systematic discrepancies and the extent of the differences in scores. To investigate any potential associations with surgeons' OPTION-scores, univariate linear regression analyses were conducted for the variables: consultation duration, patients' age, gender, education level, tumor stage, tumor location, SDM-Q-9 score, SDM-Q-Doc score, CPS, the presence of a caregiver, and patients' and caregivers' OPTION-scores. All independent variables were carefully considered in relation to the dependent variable (surgeons' OPTION-scores) to determine inclusion and exclusion in case of minimum variation to avoid skewed distribution, as this could limit statistical power and lead to potentially misleading results from the regression analysis. Hence, multivariate linear regression was not performed due to the lack of statistical power.

3. Results

Five surgeons conducted 42 audiotaped consultations. Six consultations were excluded because questionnaires were not returned, leaving 36 consultations for analysis (Fig. 1). The median duration of the consultations was 20 minutes (range 10–43 minutes). Most patients were male (25/36), and the mean age was 67.8 years (SD 2.0). Sixteen patients were diagnosed with an early stage of disease (stage I and II), and the predominant types of carcinoma were oral (10/36) and oropharyngeal (10/36). Most of the HN surgeons were male (4 out of 5), and their working experience ranged from 15 to 40 years. Only one surgeon had followed multiple courses on SDM (the only female) and two others had completed an SDM-related course, whilst the remaining two had no experience or training in SDM. Table 1 presents a full overview of characteristics.

3.1. Observed levels of SDM

3.1.1. Inter-rater reliability

Reliability calculations, including the ten calibration consultations, resulted in a good level of agreement with ICCs of 0.767 (surgeons), 0.762 (patients), and 0.809 (caregivers).

3.1.2. OPTION-scores

The median total OPTION-score for all surgeons was 48.0 %, and ranged between 9.0 and 95.0 percent. OPTION-scores varied widely between the five surgeons. Three surgeons scored substantially lower for observed SDM level than perceived based on the SDM-Q-Doc and SDM-Q-9 (Appendix C). When looking at the item level (Table 2), surgeons scored moderate on all items of the OPTION, except for item 4 'option talk' on which they scored high. The median total OPTION-score for patients was 42 % (range 0–91 %). Patients scored low on item 2 'alternative option talk', and moderate on all other items. The median total OPTION-score for caregivers was 24 % (range 0–64), with no median scores above 37.5 % on all seven items. Appendices D and E provide a visual representation of the OPTION-scores per individual group and per item.

3.2. Perceived levels of SDM

The surgeons gave themselves a median SDM-Q-Doc score of 71.1 %, with a wide range (26.7–91 %). None of them rated themselves the maximum 100 % score (Appendix F). The highest median score was observed for item 9 'agreement' with a score of five points, while items 7 'weighing' and 8 'decision' had the lowest median scores of three points. Similarly, patients had a median SDM-Q-9 score of 74.4 % (range 8.9–100 %). A quarter of the patients (9/36) rated the consultation with the maximum SDM-Q-9 score (100 %). Item 5 'understanding' received the highest median score of five points, while items 6 'preference' and 7 'weighing' scored the lowest with a median of 3.5 points. Appendix G presents the scoring on the SDM-Q-Doc and SDM-Q-9 per item.

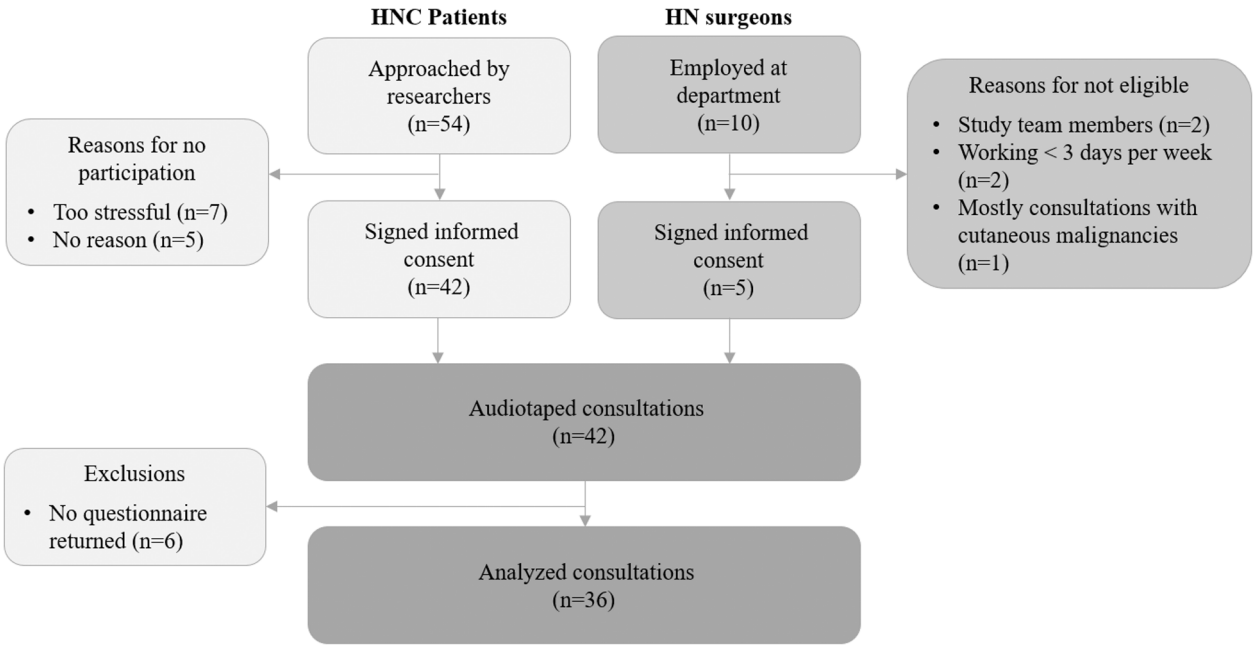


Fig. 1. Flowchart of study inclusions.

When comparing scores for the perceived level of SDM, a Bland-Altman analysis showed that the SDM-Q-9 scores were significantly higher than the SDM-Q-Doc scores, with a small mean difference of 2.5 %. However, several opposing scores were also observed. The plot can be found in Appendix H.

3.3. Patient involvement in SDM process and surgeon's perspective (CPS)

Based on the CPS scored, most patients (n = 17, 47.2 %) expressed a preference for a collaborative treatment choice, followed by a physician-controlled choice (n = 11, 30.6 %). Surgeons also predominantly favored a collaborative choice (n = 16, 44.4 %), with a patient-controlled choice (n = 13, 36.1 %) being the next most common option (Table 3).

In twenty-three cases (63.9 %), the surgeon's assumptions aligned with patient preferences for involvement, but in thirteen cases (36.1 %), there was a mismatch. Among cases where surgeons assumed a patient-controlled approach (n = 13), one patient actually preferred collaboration, while five patients favored a physician-controlled approach. Conversely, in cases where surgeons assumed a collaborative approach (n = 15), one patient desired a patient-controlled approach, and two preferred a physician-controlled one. Additionally, when surgeons assumed patients preferred physician-controlled decision-making (n = 7), four patients preferred a collaborative decision-making process.

In nine of 42 consultations (21.4 %), the way in which the consultation had taken place did not match the patient's preferences. Seventeen of 42 (40.5 %) patients preferred a collaborative approach to decision-making, but five of 42 (11.9 %) patients perceived it as a patient-controlled choice, and four perceived it as a physician-controlled one.

3.4. Associations with HN surgeons' observed level of SDM

Consultation time (β0.019, 95 % CI 0.004 – 0.034, p = 0.013), and a higher OPTION-score of patients were positively correlated (β0.606, 95 % CI 0.338 – 0.874, p < 0.001) with HN surgeons' observed level of SDM. No other significant associations were found. Additionally, no characteristics of surgeons were included in the univariate linear regression analysis due to the small number of participating surgeons. Results are shown in Table 4.

4. Discussion and conclusion

4.1. Discussion

4.1.1. Main findings

This study explored the current state of SDM in the complex setting of HN oncology. Although both surgeons and patients perceived a relatively high level of SDM, participation in SDM during consultation was observed to be lower than reported. Moreover, when looking at patient involvement, we found that both patients and surgeons mostly preferred a collaborative approach to the decision-making process. In almost two-thirds of the cases, surgeons' assumptions aligned with patients' preference for involvement. However, the mismatch in the remaining cases and the nine consultations that had not taken place as preferred by the patient demonstrate that discordance in surgeons' and patients' perceptions of decision-making roles is still commonly present. Furthermore, the duration of the consultation and patient OPTION-score were correlated with the observed SDM level of surgeons. No other associations were found.

4.1.2. Interpretations and comparing studies

Overall, surgeons in our study were observed to apply SDM moderately, with a median total OPTION-score of 48.0 %. This finding was contrary to our expectations, as it indicates a somewhat higher level of SDM compared to what has been reported in other studies and the Netherlands [37–40,42,56]. One explanation for this higher OPTION-score may be that treatments for HNCs are extensive and have a significant impact on patients' functioning and QoL, requiring a trade-off between survival and organ preservation through elaborate discussion [27,57,58]. Notably, the relatively higher scores were primarily driven by surgeons' performance on specific aspects of SDM, particularly their ability to effectively discuss the recommended treatment options (OPTION item 4). While this indicates strength in presenting information and guiding patients, it may not necessarily imply equally strong performance across all dimensions of SDM, such as eliciting patient preferences or exploring their values and concerns. Secondly, patients in our study showed relatively active engagement during consultations (mean total OPTION-score of 42 %), which appeared to positively correlate with the surgeons' SDM performance. While it remains unclear whether this is a reciprocal relationship – where active

Table 1
Baseline characteristics of patients and surgeons.

Patients	N = 36
Age in years (mean, SD)	67.8 (2.0)
Gender	
Male	25 (70 %)
Female	11 (30 %)
Educational level	
Low	15 (42 %)
Middle	10 (28 %)
High	11 (30 %)
Tumor stage	
I	9 (25 %)
II	7 (19 %)
III	11 (31 %)
IV	9 (25 %)
Tumor location	
Hypopharynx	2 (6 %)
Larynx	4 (11 %)
Oral cavity	10 (28 %)
Oropharynx	10 (28 %)
CUP & MUP	2 (6 %)
Nasopharynx	2 (6 %)
Parotic gland	3 (6 %)
Vestibulum nasi*	3 (8 %)
Treatment undergone	
Surgery	17 (48 %)
(+ PORT)	*4*
Chemo-radiation	7 (19 %)
Radiation therapy	9 (25 %)
None	3 (8 %)
Intended treatment	
Curative	33 (92 %)
Palliative	3 (8 %)
Treatment according to protocol	
Yes	35 (97 %)
No	1 (3 %)
Reason	Patient's wish
Duration of consultation in minutes (median, range)	20,15 (10,05 – 43,23)
Visiting primary physician	
Yes	9 (25 %)
No	27 (75 %)
Brought to consultation	
Came alone	7 (19 %)
Partner	16 (44 %)
Child(ren)	6 (17 %)
Friend	2 (6 %)
Sibling	1 (3 %)
Partner and child(ren)	1 (3 %)
Other* *	3 (8 %)
Head-and-Neck Surgeons	**N = 5**
Age in years (median, range)	54 (39 – 63)
Gender	
Male	4 (80 %)
Female	1 (20 %)
Work experience in years (median, range)	24 (15 – 40
Training in SDM	
None	2 (40 %)
Minimal	2 (40 %)
Some	1 (20 %)

Note: *Of which one had a mucosal melanoma; **Others were daughter in law, partner's cousin, child, and sibling; CUP = Carcinoma of an unknown primary tumor; MUP = metastasis of an unknown primary; SDM = shared decision-making; PORT = postoperative radiation treatment

patients prompt more engagement from physicians and vice versa – or if one behavior inherently strengthens the other, these dynamics may have encouraged surgeons to adopt practices that possibly resulted in higher OPTION-scores. Thirdly, the study setting – a specialized center with a strong emphasis on patient-centered care - might have contributed to the higher scores. However, even if physicians express support for SDM, their tendency to predominantly discuss treatment options, and not other aspects of SDM, still reflects a commonly observed behavior that hinders the full implementation of SDM [59]. Additionally, important to note is that the surgeons performed less well on the OPTION items that specifically address SDM behavior (i.e., item 1 'goal talk', item 5 'decision talk', item 6 'integrative decision talk', and item 7 'evaluation talk'). Consequently, our findings suggest that while SDM is being moderately applied in this context, there is still room for improvement, particularly in ensuring a more balanced approach across all elements of SDM. Future research could explore the variability in scores among different physicians and settings, and investigate how specific training interventions can enhance SDM practices in HNC care.

Similar to surgeons, patients were observed to participate moderately in the decision-making process (median total OPTION-score 42 %), scoring low on asking about alternative treatment options (OPTION item 2) but moderate on all other items. On the other hand, caregivers participated considerably less during consultations (median 24 %), with a median score indicating low participation across all OPTION items. While our primary focus was on the performance of surgeons and patients as key actors in the decision-making process, caregivers are often involved in patients' care. Although we did not delve further into caregivers' contributions in this study, exploring the dynamics of the relationship between the patient and caregiver could provide valuable insights. There was considerable variation in who was included as a caregiver – ranging from partners and children to extended family members or neighbors – making it difficult to draw firm conclusions about their overall influence. Exploring this relationship could enhance our understanding of patient involvement, and future research could incorporate qualitative study designs to explore this aspect further [60].

When exploring both levels of SDM, a discrepancy appears to exist between surgeons' and patients' perceptions of SDM and the extent to which we observed SDM being employed. As expected, both surgeons and patients perceived SDM to be adequately implemented during the consultation, which is consistent with previous research [37,38,40,42,43,56], indicating that surgeons and patients tend to overestimate the extent of SDM in their consultations. This discrepancy between perception and observation may stem from a lack of comprehensive understanding of what SDM truly involves, leading surgeons and patients to believe that SDM has occurred [61,62]. Consequently, they might have misinterpreted aspects of counseling as SDM, whereas objective scoring may indicate otherwise. Additionally, they might have mistaken the mere inclusion of some SDM-related components, such as discussing patients' goals, values and preferences, for quality discussion of the components. Another explanation for this discrepancy may be that surgeons and patients reported on their overall satisfaction with the consultation rather than on the perceived level of SDM. However, given the complexity and potential impact of the treatment decisions, it is important to improve the decision-making process with HNC patients, especially since SDM has been shown to be beneficial for various patient and health care-related outcomes [5–10]. As such, given the overall satisfaction of surgeons and patients with the current state of the decision-making process in HN oncology, we recommend future research to explore these considerations.

Furthermore, patients' preferences for involvement in decision-making vary widely, and discrepancies between the preferred and perceived level of involvement are often observed [15,24,38,42]. In our study, the surgeons almost never explicitly asked the patient to what extent they wished to be involved in the decision-making. Similarly, we found this discordance in surgeons' assumptions of patients' preference for involvement in decision-making and patients' actual preference, with surgeons overestimating patients' preferences eight times and underestimating them five times. This highlights the need for more attention to patients' involvement preferences by HN surgeons, especially since discordance between preferred and actual involvement has been reported to substantially affect several patient outcomes, such as patient satisfaction, patients' understanding of information, fulfillment of information needs [63], and both physical and emotional QoL [64].

Lastly, a longer consultation time and a higher patient OPTION-score were found to positively increase surgeons' OPTION-score. Longer

Table 2
OPTION-scores per item.

Item	Behavior description	Surgeons Median (range)	Patients Median (range)	Relatives Median (range)
1	Goal talk: identify patient values and goals of care	37.5% (0-75.0%)	50.0%, (0-100%)	25.0% (0-75.0%)
2	Alternative option talk: discussion of alternate options	50.0% (0-100%)	25.0% (0-100%)	25.0% (0-75.0%)
3	Team talk: forming a partnership	62.5% (12.5-100%)	50.0% (0-100%)	37.5% (0-75.0%)
4	Option talk: information about options	75.0% (12.5-100%)	50.0% (0-100%)	37.5% (0-75.0%)
5	Decision talk: eliciting patient's preferences	50.0% (0-100%)	50.0% (0-100%)	37.5% (0-87.5.0%)
6	Integrative decision talk: integrating patient's preferences	43.8% (0-100%)	43.8% (0-100%)	25.0% (0-75.0%)
7	Evaluation talk: check satisfaction with choice and SDM process	37.5% (0-100%)	37.5% (0-100%)	25.0% (0-75.0%)

Note: The categories are indicated in colors: low score is white (score between 0 % and 33.3 %), moderate score is light grey (score between 33.3 % and 66.6 %), and high score is dark grey (score between 66.6 % and 100 %).

Table 3
CPS: Patient's preferred and perceived involvement in SDM and concordance with surgeon's perspective.

CPS items	Preference of the patient N = 36	How it went according to the patient N = 34 *	What the surgeon thinks the patient prefers N = 36	What the surgeon prefers N = 36
Patient-controlled	8 (22.2 %)	13 (38.2 %)	13 (36.1 %)	13 (36.1 %)
Collaborative	17 (47.2 %)	8 (23.6 %)	15 (41.7 %)	16 (44.4 %)
Physician-controlled	11 (30.6 %)	13 (38.2 %)	8 (22.2 %)	7 (19.5 %)

Note: *Missing data of two patients

consultation time and an active patient during SDM are two known correlates [37,38,43]. However, further implementation and improvement of SDM into HNC decision-making does not necessarily have to lead to prolonged duration of the consultation [65,66]. Although consultation time may initially increase while healthcare providers are still in training and learning to apply SDM in their consultations, the duration of the consultations may decrease once they have acquired the adequate SDM skills [67]. While we hypothesized that being an older patient and lower literacy would relate to a lower OPTION-score, as suggested in qualitative research [68], we found no significant correlations for any patient and tumor characteristic.

4.1.3. Limitations

We acknowledge that this study has some limitations. First, due to the exploratory nature of the study, only five surgeons from one hospital were included. Nevertheless, an attempt was made to assemble a reality-based group, with different ages and only one female surgeon (out of 2 employed). Multivariate analysis was not possible due to the limited statistical power, which highlights the need for further research on SDM in head and neck oncology. This limitation prevented us from exploring the potential influence of several important variables on SDM practices. For example, factors such as the gender of the surgeon, prior SDM training, years of clinical experience, and specific institutional characteristics could not be included in our analysis. These variables might play a critical role in shaping how SDM is implemented in clinical practice and could provide valuable insights into strategies for improving patient-centered care [69]. Future (international) multicenter studies involving larger sample sizes are needed to allow for more robust statistical modeling, such as multivariate analyses, to investigate these factors comprehensively. This would allow us to identify key determinants of SDM performance and tailor interventions to address gaps more effectively. Although this expansion of research is crucial for advancing the implementation of SDM and optimizing decision-making processes in head and neck oncology, obtaining a larger, diverse dataset may present challenges, including differences in incidence rates [70,71] and distribution of HN surgical oncology workforce [72–74].

Second, despite our efforts to ensure the reliability of the scoring process, raters may have influenced the OPTION-scores. We implemented thorough calibration, inter-rater reliability assessment, and a third reviewer for discrepancies, but bias remains a possibility, potentially limiting generalizability. Factors such as raters' familiarity with SDM principles or subjective interpretations of certain consultation behaviors may have led to higher scores. Nonetheless, we believe our calibration process ensured that both raters were sufficiently aligned before proceeding to independent scoring (ICC score of >0.6). Still, future research could enhance objectivity by further standardizing coding guidelines (e.g., extension of scoring examples), involving external raters, and assessing intra-rater reliability alongside inter-rater reliability. This is especially important when there are limited calibration opportunities due to a high volume of recordings or extended gaps between analyses, preventing double coding of all consultations.

Third, consultations were only audio recorded, whereas videos could have provided more insight into the communication process through nonverbal communication [75]. Fourth, surgeons' effort to apply SDM may have been stimulated by our study, as they were aware of being audiotaped. However, the effect of the presence of an audio recorder during consultation has been reported to be negligible [76]. Fifth, the proposed treatment modality may have influenced the duration of consultations. For instance, HN surgeons may spend less time explaining radiotherapy treatment plans in detail compared to surgical procedures. This suggests that rather than the consultation length itself being directly related to SDM, the type of treatment proposed might influence the length of the consultation. Sixth, the SDM-Q-9 and SDM-Q-Doc questionnaires seem to be overly generic instruments for measuring perceived SDM levels. They lack detailed elaboration of each item, which is necessary to fully appreciate the quality of SDM. Lastly,

Table 4
Associations with HN surgeons' observed level of SDM.

	Univariate linear regression analysis		
Variable	B	95 % CI	*p*-value
Patient age	0.126	−0.506 – 0.758	0.688
Patient gender	12.469	−3.620 – 28.558	0.125
Patient educational level			
Low	Reference		
Middle	4.950	−12.457 – 22.358	0.567
High	−10.823	−24.928 – 3.282	0.128
Tumor stage	1.903	−5.454 – 9.259	0.603
Tumor location			
Parotic gland	Reference		
Hypopharynx	−2.264	−23.058 – 18.531	0.825
Larynx	1.473	−33.300 – 36.245	0.932
Oral cavity	−2.409	−12.392–7.573	0.625
Oropharynx	−2.275	−6.554 – 2.003	0.286
CUP & MUP	0.195	−8.123 – 8.512	0.962
Nasopharynx	2.096	−3.614 – 7.805	0.459
Duration consultation	0.019	0.004 – 0.034	*0.013*
The presence of a caregiver			
No	Reference		
Yes	4.212	−15.130 – 23.554	0.661
SDM-Q−9 score	0.141	−0.143 – 0.426	0.319
SDM-Q- Doc	0.363	−0.177 – 0.902	0.181
OPTION patient	0.606	0.338 – 0.874	*0.000*
OPTION caregiver	0.246	−0.129 – 0.620	0.191
CPS patient – What would you prefer?			
Collaborative decision-making	Reference		
Patient-led decision-making	29.611	−15.441 – 74.663	0.190
Physician-led decision-making	−10.507	−25.337 – 4.324	0.159
CPS patient – How was the choice made?			
Collaborative decision-making	Reference		
Patient-led decision-making	−4.720	−33.174 – 23.734	0.738
Physician-led decision-making	−4.845	−23.762 – 14.072	0.606
CPS HN surgeon – What would the patient prefer?			
Collaborative decision-making	Reference		
Patient-led decision-making	17.762	−3.315 – 38.840	0.096
Physician-led decision-making	−13.571	−28.356 – 1.214	0.071
CPS HN surgeon – What would you prefer?			
Collaborative decision-making	Reference		
Patient-led decision-making	18.579	−28.915 – 66.073	0.432
Physician-led decision-making	−1.546	−17.253 – 14.161	0.843

Note: All significant p-values (<0.05) are displayed in italics; *including nasal vestibu**le** and mucosal melanoma; CPS = Control Preference Scale for patient involvement; CUP = Carcinoma of an unknown primary tumor; MUP = metastasis SDM = shared decision-making

although the OPTION^{mcc+} instrument reflects the three-talk model of SDM, it cannot be directly compared with the SDM-Q-9 and SDM-Q-DOC questionnaires due to the difference in items. For example, OPTION items 1 'goal talk', 3 'team talk', 6 'integrative decision talk', and 7 'evaluation talk' do not appear to be exactly included in the SDM-Q questionnaires. No statistical correlation exists between all items of both measures that assess the same part of the SDM process [77]. Measuring SDM thus far remains challenging, further emphasizing the need for future research using measures with the exact same, comparable items. Ultimately, by addressing these limitations, we can better understand the determinants of SDM performance and develop tailored interventions to improve shared decision-making in head and neck oncology.

4.2. Conclusion

This exploratory study revealed that SDM in HN oncology of a tertiary hospital in the Netherlands is being applied to a moderate extent. However, a significant gap exists in the discussion of patients' values, goals, and preferences, indicating that more attention and involvement from healthcare providers is required. It is therefore essential to raise awareness about what SDM truly entails, especially considering the high prevalence of decisional conflict and regret. Both surgeons and patients tend to overestimate the extent of SDM compared to objective observations, and different perceptions of patient involvement exist. Moving forward, future research in the context of HN oncology should delve deeper into investigating the duration of consultation and patient OPTION-score, as they appear to be associated with a higher objective physician SDM-score. Specifically, exploring how SDM can be implemented without extending the consultation time may contribute to facilitating SDM uptake. Additionally, it is important to explore methods for effectively assessing both observed and perceived SDM levels in clinical practice. Enhancing SDM in HN oncology could lead to better patient and health care-related outcomes. As such, addressing the identified gaps in SDM practice is needed for improving patient care and health care delivery in this setting.

4.3. Practice implications

Our study offers insight to SDM in HN oncology and presents opportunities for improvement. Although it appears that the majority of patients and surgeons prefer to make the final treatment decision together, we believe that it is the healthcare provider's responsibility to take the lead in supporting the patient in decision-making, particularly in stressful situations such as HN oncology. This involves assessing the patients' values, needs, and preferences, taking into account the most relevant clinical evidence available, before making a joint decision about the course of action. Therefore, we suggest that healthcare providers ask as many open (follow-up) questions when discussing patients' values, needs, and preferences and listen carefully to gain more insight into their patients' lives, what is important to them, and what doubts, concerns, and fears they may have. This is important as patients' goals, values, and preferences regarding different treatment options, as well as concluding the decision-making process during consultations, appeared to require improvement.

Furthermore, education and awareness campaigns have recently been launched that highlight the importance and benefits of SDM [78]. Nevertheless, whilst the concept of SDM has increasingly found its way into medicine and is also included in the vision document for Dutch medical specialists [79], HN surgeons tend to overestimate how skilled they are at applying it. We therefore recommend communication skills training in medical (follow-up) training programs in SDM [80]. This training should be part of the Continuous Medical Education (CME) program to keep the SDM skills of surgeons up-to-date [81–85]. Moreover, while the implementation of SDM has made progress through the use of training and tools [80], challenges such as the potential prolongation of consultation time remain. To address this, integrating SDM preparation into the electronic patient record system could be an effective strategy [86–88]. By allowing patients to complete pre-consultation questionnaires or indicate their treatment preferences at home, physicians can review this information in advance and focus on more critical discussions during the consultation. This approach will likely not only streamline the SDM process and reduce time pressure during face-to-face interactions but also foster an environment that encourages patient participation.

Additionally, the use of decision aids, audiovisual materials, and written resources remains crucial. These tools allow patients to process information at their own pace and come prepared for the consultation [89]. By combining these resources with pre-consultation inputs, we can optimize SDM implementation while maintaining manageable consultation times [90,91]. In conclusion, both patients and healthcare providers can benefit from prioritizing patient engagement and employing approaches that facilitate SDM.

Compliance with ethics requirements

This study was approved by the Institutional Review Board of the Netherlands Cancer Institute-Antoni van Leeuwenhoek. All participants signed informed consent before participation.

Funding

The Netherlands Cancer Institute-Antoni van Leeuwenhoek receives a yearly unrestricted research grant from Atos Medical AB.

CRediT authorship contribution statement

Heirman Anne N.: Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Duimel Song L.L.:** Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Tellman Roosmarijn S.:** Writing – review & editing, Investigation, Formal analysis. **Dirven Richard:** Writing – review & editing. **Linn Annemiek J.:** Writing – review & editing. **Halmos Gyorgy B.:** Writing – review & editing, Supervision. **van Son Rob J.J.H.:** Writing – review & editing. **van der Molen Lisette:** Writing – review & editing. **Balm Alfons J.M.:** Writing – review & editing. **van Weert Julia C.M.:** Writing – review & editing, Supervision, Project administration. **van den Brekel Michiel W.M.:** Writing – review & editing, Supervision, Project administration.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used Chat GPT version 3.5 in order to correct spelling, grammar and punctuation as well as to find synonyms and shorten sentences. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

The authors would like to thank all participating Head-and-Neck surgeons and patients of the Netherlands Cancer Institute-Antoni van Leeuwenhoek.

Conflict of interest

Generally, the Netherlands Cancer Institute-Antoni van Leeuwenhoek receives a yearly unrestricted research grant from Atos Medical AB.

Appendix A. SDM-Q-9 and SDM-Q-Doc items

Item	Description	Referred to in the text
Item 1	Clarifying a decision needs to be made	'clarification'
Item 2	Eliciting the patients' preferred involvement	'involvement'
Item 3	Stating there is more than one way to deal with the problem	'alternatives'
Item 4	Explaining the pros and cons of treatment options	'options'
Item 5	Investigating if the patient has understood all the information	'understanding'
Item 6	Identifying the patients' preferred treatment option	'preference'
Item 7	Weighing the treatment options	'weighing'
Item 8	Making a shared decision	'decision'
Item 9	Agreement on follow-up arrangements	'agreement'

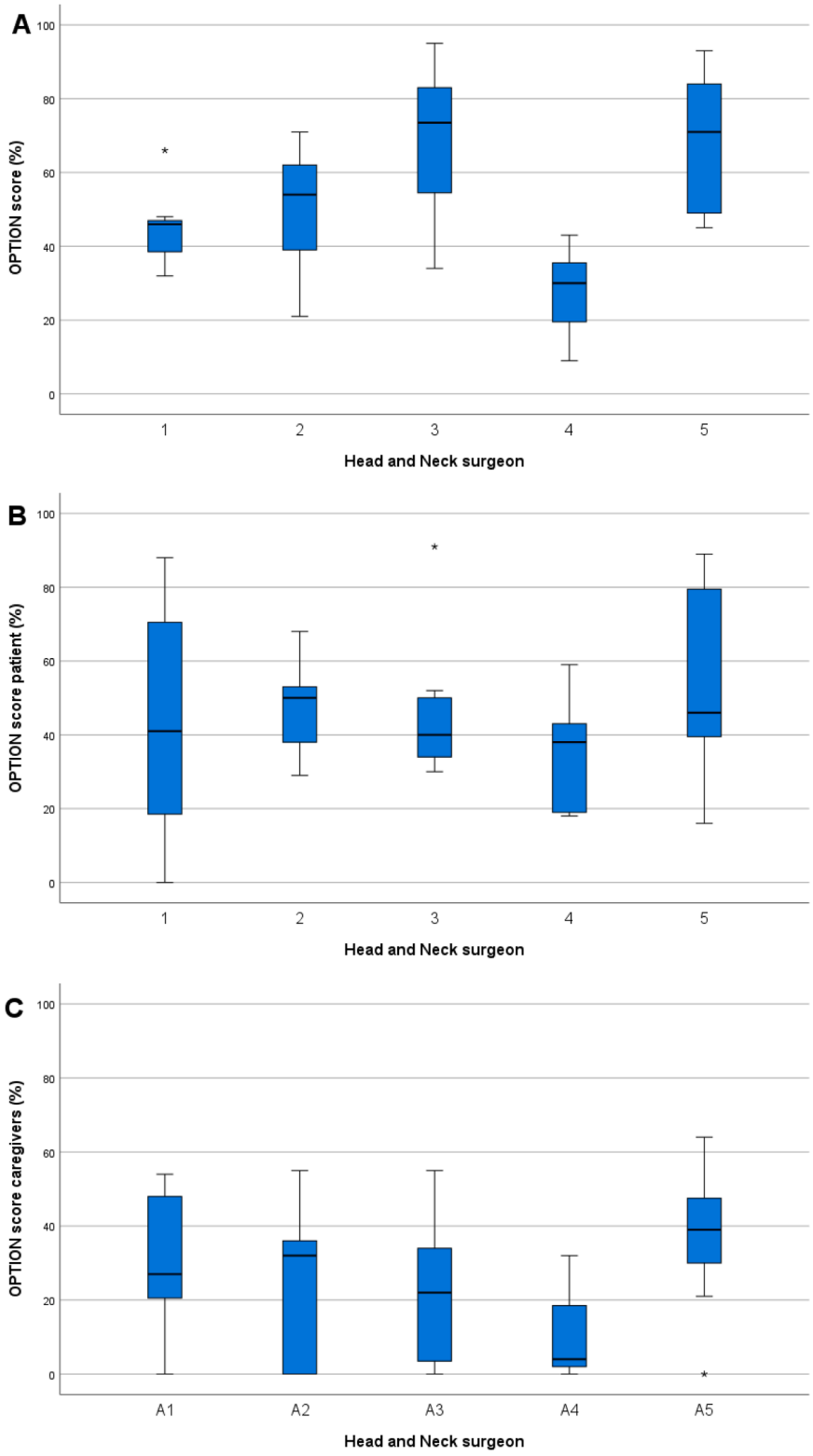
Appendix B. OPTION^{mcc+} items and measure scoring guide

Item	Behavior description
1	Goal talk: identify patient values and goals of care
2	Alternative option talk: discussion of alternate options
3	Team talk: forming a partnership
4	Option talk: information about options
5	Decision talk: eliciting patient's preferences
6	Integrative decision talk: integrating patient's preferences
7	Evaluation talk: check satisfaction with choice and SDM process
Score for physicians	**Description (based on the OPTION^{mcc})**
0 = no effort	Zero effort was observed. The behavior is not observed.
1 = minimal effort	Efforts to communicate could be implied or interpreted. A minimal attempt is made to exhibit the behavior.
2 = moderate effort	Basic phrases or sentences used. The behavior is exhibited to a good standard.
3 = skilled effort	Substantive phrases or sentences are used. The behavior is exhibited to a good standard.
4 = exemplary effort	Clear, accurate communication methods are used. The behavior is executed to a very high standard.
Score for patients and caregivers	**Description (adapted based on OPTION^{mcc} manual)**
0 = passive	No, or minimal participation (e.g., only "yes", "no" or "uhu"
1 = responsive	Answers concisely on questions (short/one sentence answers, or short responses to the doctor, e.g., 'What?')
2 = very responsive	Answers in detail on questions (multiple or long sentences as answers or questions in response to the doctor, e.g., 'So you mean that X?'
3 = active	Answers and asks questions (more than one question(s) that add new information to what is already discussed)
4 = very active	Answers and asks questions, brings in own ideas, and shares perceptions

Appendix C. Observed and perceived level of SDM per head and neck surgeon

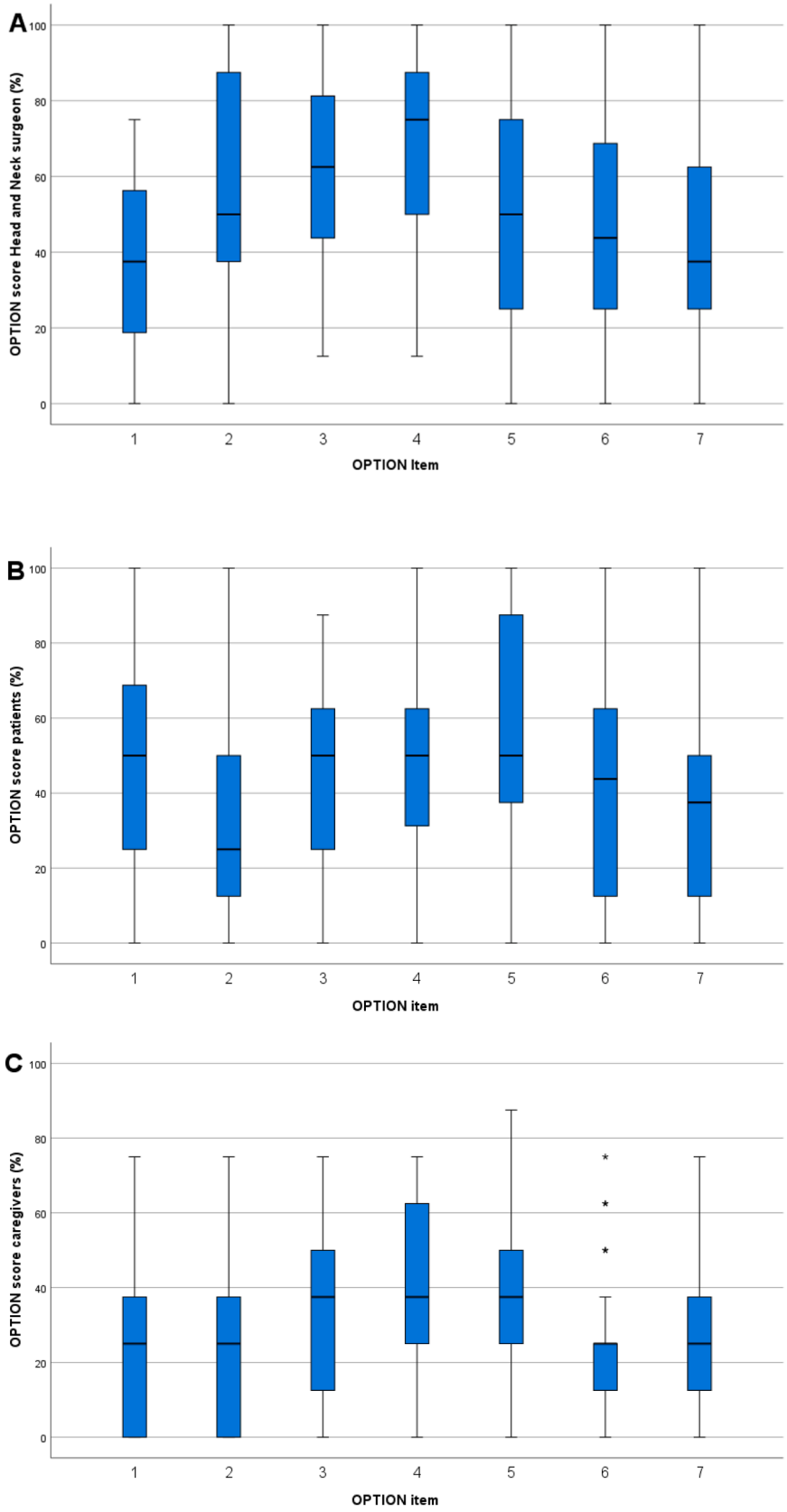
Surgeon	OPTION-score Median (range)	SDM-Q-Doc Median (range)	SDM-Q-9 Median (range)
1	46.0 % (32.0–66.0 %)	57.8 % (46.7–91.1 %)	93.3 % (55.6–100.0 %)
2	54.0 % (21.0–71.0 %)	80.0 % (26.7–84.4 %)	51.1 % (11.1–100.0 %)
3	73,5 % (34.0–95.0 %)	72.2 % (55.6–80.0 %)	80.0 % (37.8–95.6 %)
4	30.0 % (9.0–43.0 %)	82.2 % (66.7–86.7 %)	77.8 % (20.0–100.0 %)
5	71.05 % (45.0–93.0 %)	71.1 % (57.8–80.0 %)	68.9 % (8.9–100.0 %)

Appendix D. OPTION^{mcc+} scores per head and neck surgeon



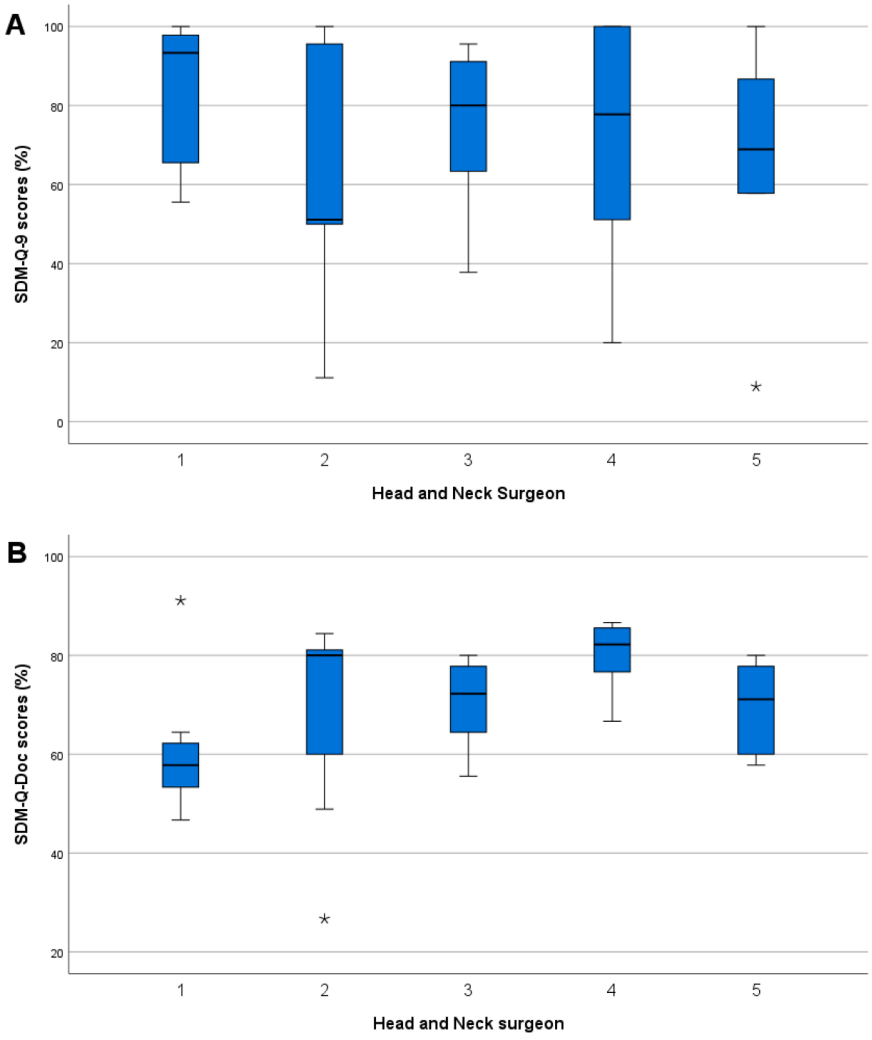
Note: (A) Rescaled total OPTION score physician per head and neck surgeon. (B) Rescaled total OPTION score patients per head and neck surgeon. (C) Rescaled OPTION score relatives per head and neck surgeon. Boxes represent values between the 25th and 75th percentiles, whiskers the upper and lower adjacent values, and the horizontal lines represent the median values. Outliers are displayed as asterisks.

Appendix E. OPTION-scores per item



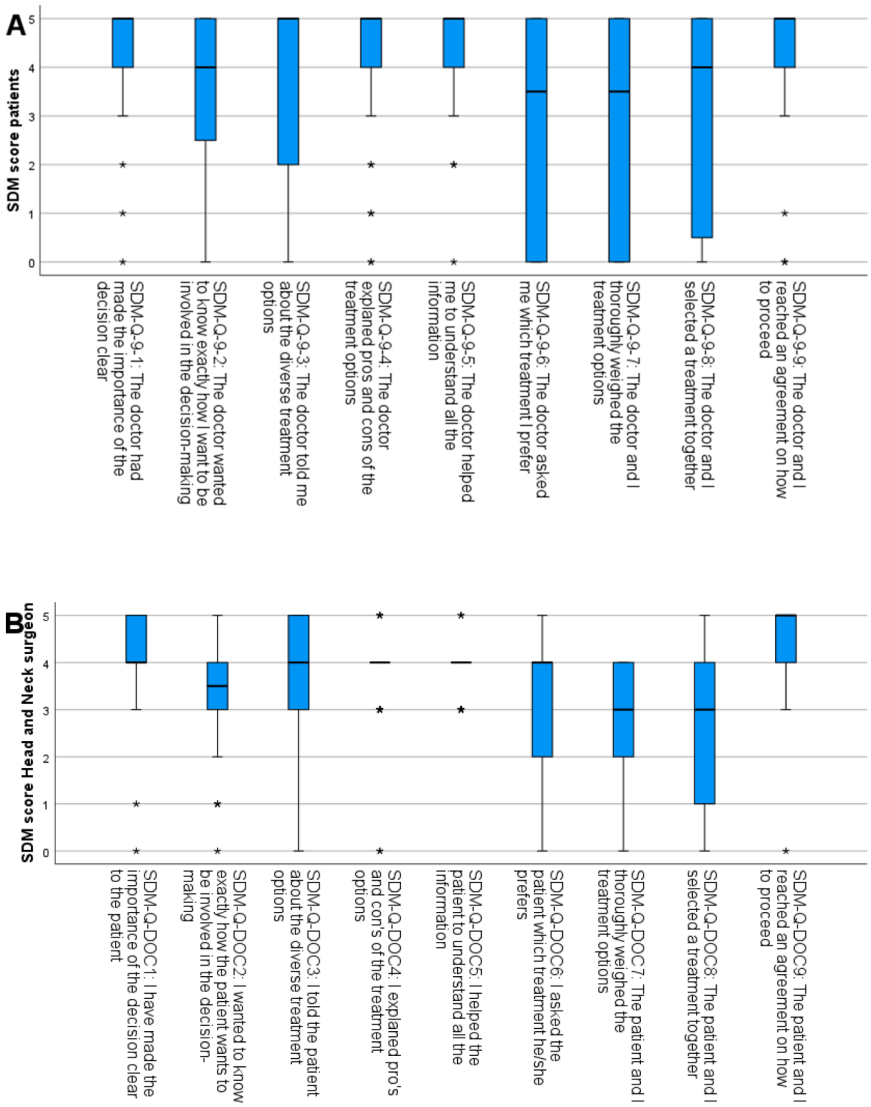
Note: (A) Physicians' OPTION scores for each of the 7 items. (B) Patients' OPTION scores for each of the 7 items. (C) Relatives' OPTION scores for each of the 7 items. Boxes represent values betweent he 25th and 75th percentiles, whiskers the upper and lower adjacent values, and the horizontal lines represent the median values. Outliers are displayed as astrisks.

Appendix F. SDM-Q-9 scores and SDM-Q-Doc scores per head and neck surgeon



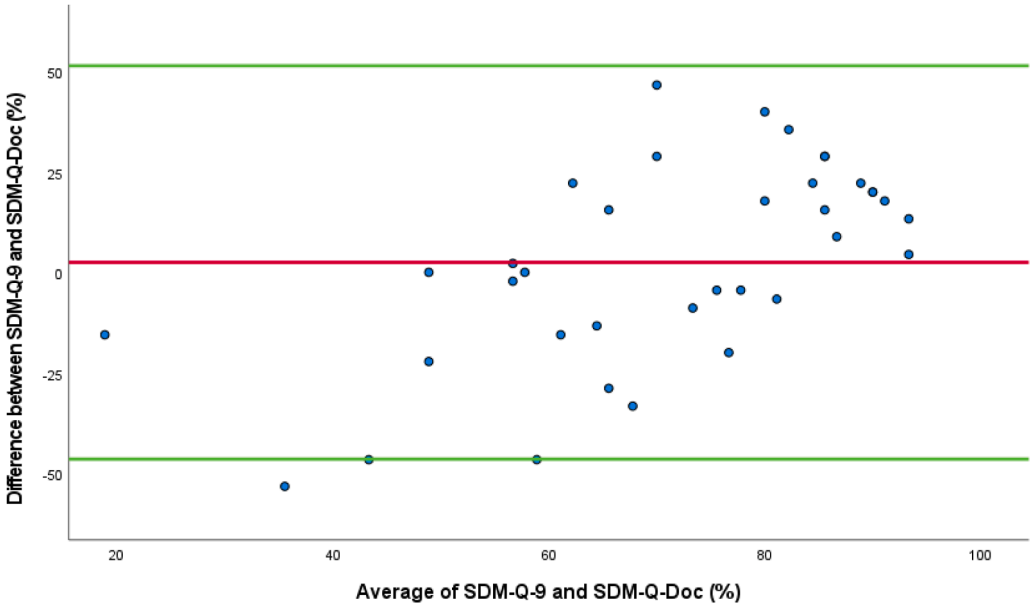
Note. (A) SDM-Q-9 scores (patient) per head and neck surgeon. (B) SDM-Q-Doc scores per head and neck surgeon. Boxes represent values between the 25th and 75th percentiles, whiskers the upper and lower adjacent values, and the horizontal lines represent the median values. Outliers are displayed as asterisks.

Appendix G. SDM-Q-9 and SDM-Q-Doc scores per item



Note. (A) SDM-Q-9 scores (patient) per head and neck surgeon. (B) SDM-Q-Doc scores per head and neck surgeon. Boxes represent values between the 25th and 75th percentiles, whiskers the upper and lower adjacent values, and the horizontal lines represent the median values. Outliers are displayed as asterisks.

Appendix H. Bland-Altman plot for SDM-Q-9 and SDM-Q-Doc scores



Note: Bland-Altman plot of the differences between SDM-Q-9 (patient) and SDM-Q-Doc (surgeons) scores. The green horizontal line indicates the mean difference, and the red horizontal line the 95 % limits of agreement ($p < 0.05$).

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