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Does the Implementation of Clinical Pathways Affect Hierarchical Structures Within a Surgical Department? A Qualitative Study

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Objective: To explore effects of the implementation of clinical pathways (CPs) on hierarchical structures within a surgical department.

Summary of background data: CPs are care plans stipulating diagnostic and therapeutic measures along a time axis for a given condition or procedure. They are widely used in surgery. There is limited evidence to what extent CP implementation has an effect on hierarchical structures within surgical departments.

Methods: Semistructured individual interviews were conducted with key members of a CP project team in a large academic surgery department. Interviews were carried out by an external researcher to increase the likelihood of obtaining unbiased opinions. Using an interview guide, it was ensured that respondents provided opinions on various issues related to CP implementation, including hierarchical relationships within the department, but also between caregivers and patients. The transcribed text was independently content analyzed by 2 researchers who converged their findings.

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Results: Clinical pathway implementation changed perceived surgical hierarchy from a top-down to a participatory approach. However, it was acknowledged that some form of hierarchy is required to ensure successful clinical pathway implementation. Respondents felt that clinical pathways changed surgical culture from a largely eminence-based to more evidence-based medicine.

Conclusions: The implementation of CPs potentially affects several dimensions of surgical hierarchy. It changes "traditional" surgical hierarchy and is associated with perception of increased autonomy and competency in junior staff. The clinical approach appears to shift from eminence- to evidence-based medicine. The knowledge about these changes is important for carrying out CP projects in surgery.

Key words: Clinical pathways – Hierarchy – Qualitative research – Evidence-based medicine – Surgery

In order to achieve optimal outcomes for patients undergoing surgery, it needs to be ensured that the right task is carried out by the right person at the right time. As a tool to address this challenge, clinical pathways (CPs) have gained popularity. The nature of a CP as a multidisciplinary, standardized, evidence-based instrument seems to considerably conflict with what is commonly referred to as "surgical hierarchy." Historically grown, the concept of "one leader" deciding mostly independently about the treatment of "his" (or her) patients, often based rather on "eminence" than "evidence," and using "subordinates" to carry out his/her decisions, has strongly influenced the way surgeons work.[1] Certain "rites" have been established within surgical departments to foster and maintain this hierarchy.[2] This phenomenon is at least partially owed to the nature of the subject. In surgery, the impact of the single physician performing the operation has a much more direct influence on patients' outcome than in non-surgical disciplines.[3] This might also be the reason why the interaction between surgeons and patients has traditionally been of a hierarchical nature with a rather limited degree of patient participation and shared-decision making.[4–7] Although modulated by peculiarities of the geographical and cultural setting, the described concept of hierarchy seems to be present universally, albeit to a variable degree, in all surgical environments.

Numerous studies have assessed the effects of CP implementation on quality of care. In surgery, it has been shown that the implementation of a CP is associated with improvements in process and outcome quality, measured, among other indicators, by morbidity, mortality, cost, and patient satisfaction.[8–14] Studies have also explored determinants of successful CP implementation, and what effects CPs have on processes and management structures within institutions. Although many reports were based on theoretical frameworks and individual perceptions,[15–19] fewer studies have collected evidence using a structured quantitative or qualitative approach.[20–23] They identified a series of factors including multidisciplinarity, early and continuous feedback of outcomes, and the flattening of hierarchical structures, which leads to a strengthening of the confidence of "junior" health professionals. However, there is a complete lack of data on what effects CP implementation actually has on hierarchical structures in a surgical setting.

Materials and Methods

Study setting and CP implementation

This study was conducted at the Department of Surgery of the University Medical Center Mannheim, Germany. The unit covers the whole spectrum of general, abdominal, vascular, and thoracic surgery. At the time of study conduction, it had 142 beds, treated approximately 5000 patients annually, and employed 45 physicians and 99 nurses. In the department, CPs have been implemented for several surgical procedures. At the time of study conduction, this had been the case for kidney transplantation,[11] 4 different thoracic procedures,[12,14] and 2 colorectal surgeries.[13,24] After this study, additional CPs have been implemented for bariatric surgery,[25] pancreatic, hepatic, and upper gastrointestinal resections. Implementation followed a defined protocol, which has been previously described.[11–14,24,25] CPs were introduced upon the initiative of 1 consultant (MS), who was closely assisted by a resident (UR). The head of department granted

approval and support for the CP program, but was not actively involved in implementation. CPs were designed by a multidisciplinary team based on available evidence and taking into account established institutional standards. The final version of a CP was consented to by all team participants. Prior to implementation, staff involved in patient care received training sessions. After implementation, regular meetings took place where new proposals and ideas could be brought forward and integrated into CPs. Changes in process and outcome quality following CP implementation and compliance with the CPs were evaluated in a number of studies.[11–14,24,25] These showed that, depending on the specific CP, deviations from the CP were rather frequent, but often limited to single treatment steps (e.g., drains removed later than stipulated in the CP). In case of deviations, patients were continued to be treated according to the CP to the possible extent. The results of these studies were fed back to staff members. If the need was felt and consensus reached, details of the CPs were adapted based on the results.

The implementation process was accompanied by a qualitative study drawing on face-to-face interviews with key staff members of all hierarchy levels and disciplines. Results of that study regarding factors, which are important for successful development and implementation, have been published.[20] The present paper reports results of the same study regarding effects of CP implementation on hierarchical structures within the department.

Local context

With regard to hierarchical structures in the local context, it deserves mentioning that the head of department is the ultimate decision-maker for all clinical and managerial matters. Consultants independently perform surgeries and provide instructions for the treatment of patients. They are however directly subordinate to the head of department and expected to consult him in case of difficult clinical decisions. Residents perform surgeries and take relevant clinical decisions exclusively under supervision. This structure leads to a hierarchical organization and organizational climate where it is rather uncommon for junior staff to introduce initiatives. Nursing staff has its own hierarchy, with a head nurse as overall manager and specifically trained nurses in charge of each ward. Physicians take all medical decisions; thus the autonomy of nurses is limited regarding issues other than those closely related to nursing. Other disciplines, such as anesthesiology, physiotherapy, or internal medicine, are part of the treatment team for only certain defined periods of time.

Data collection

A full description of the study methods can be found elsewhere.[20] A qualitative study was designed to evaluate CP implementation. We approached key staff members involved in CP development and implementation for their participation in semi-structured face-to-face interviews. During recruitment we took specific care to include individuals with differing hierarchical positions. An interview guide was used. It covered various topics and also explicitly inquired about the role of hierarchical structures in CP development and implementation. All interviews were conducted in German by AL, who is an epidemiologist/health scientist with qualitative research experience but without a background in surgery. AL was external to the department and not involved in CP design or implementation. Informed consent was obtained prior to the interviews. All interviews were audio-recorded and transcribed.

Analysis

Transcribed texts were read and content analyzed by AL and another qualitative researcher.[26] The analysts conducted interim analyses when it was felt that inclusion of key members representing different hierarchical positions had been achieved ($n = 8$). Those interim analyses suggested that saturation had been reached and thus data collection was concluded. In the main content analyses, codes were created *de novo* and grouped to enable identification of (sub)themes. Initially, transcripts were coded and codes were grouped independently. In the next step, both sets of codes were compared, discussed, and converged into a shared set. This set was then applied to the transcripts. For the present study, we reanalyzed the transcripts to specifically allow for the emergence of themes related to the potential role of hierarchical structures in CP implementation.

Results

Eight staff members were asked to be interviewed and consented. After these interviews, the analysts conducted an interim analysis and felt that satura-

Table 1 CP project collaborators with their formal position within the department and their project task[20]

Formal position	Tasks within CP project
Head of department	The project was carried out under his auspices and he is the ultimate one responsible for all decisions on how patients are treated within the department.
Nursing director	Overall support; motivated and instructed the nursery staff to participate in all CPs
Anesthesiology consultant	Developed and implemented the anesthesiological parts of the CPs
Abdominal surgery consultant and vice head of department	Responsible for development and implementation of colorectal surgery CPs
Head nurse of thoracic surgery ward	Responsible for development and implementation of nursery elements of thoracic surgery CPs
Head nurse of kidney transplant program	Responsible for development and implementation of nursery elements of kidney transplant CP
Researcher / intern physician 1	Prospectively documenting variation from CPs during treatment; assisting nurses and physicians on the wards in everyday usage of CPs
Researcher / intern physician 2	Prospectively documenting variation from CPs during treatment; assisting nurses and physicians on the wards in everyday usage of CPs
Thoracic surgery and kidney transplant consultant (MS)[a]	Initiator of entire CP project, responsible for development and implementation of thoracic surgery and kidney transplant CPs
Researcher / resident (UR)[a]	Close assistance of MS during entire CP project, responsible for scientific evaluation of the project

[a]Not interviewed because of direct involvement in the development of the study and the interview guide.

tion had been reached. The details of the single interviewees regarding formal position within the department and tasks within the CP project are presented in Table 1.

Findings from interviews are illustrated using verbatim translated quotations and grouped according to themes. Demographic information is omitted from quotations to ensure confidentiality. The designation assigned to each respondent (A to F) does not correspond to the position of respondents in Table 1.

CPs change traditional hierarchy

Several interviewees expressed that the implementation of a CP, and its application in clinical routine, have exerted effects on professional hierarchical structures. In particular, health care staff at lower hierarchical positions, which had previously been expected to consult superiors for all treatment decisions, is provided with detailed instructions by CPs. This results in a reduced need for consultation due to clearer task descriptions.

> *Tasks are now known. I [member of nursing staff] do not have to ask the physician regarding every single step, because things are predefined. (respondent A)*

> *Thanks to CP implementation[...] I get a better preparation for my tasks and feel safer. Treatment is standardized. Thus there are fewer problems regarding potential orders which physicians have to be asked for. (respondent B)*

Respondents appreciated that CP implementation had not been initiated and led by the head of the department, but by 2 subordinates at lower hierarchy levels.

> *Usually, the boss commissions the development of a new initiative. But in this case [. . .] his staff members initiated the pathways and only asked for his green light. (respondent C)*

Homogeneity and interpersonal cooperation within the development team were perceived as success factors for successful CP implementation.

> *Homogeneous groups work better. If there are struggles about competency within the team, the development is tougher and productivity lower. (respondent D)*

Nevertheless, nursing staff felt excluded from development and implementation and perceived the taken approach still as top-down. This hampered initial acceptance.

> *A ready-made CP was presented but we [nursing staff] were not involved in its actual development. Only after complaining, nursing staff got involved. Nursing staff should have been involved earlier, as resistance would have probably been smaller. (respondent E)*

> *Nurses should have been involved earlier on when the*

pathway was developed. This would have caused much less initial resistance. (respondent E)

Several respondents acknowledged that CP implementation leads to treatment standardization, thus contrasting the traditional approach of "eminence-based medicine." This term describes an organizational hierarchy in health care where treatment decisions are taken by specific persons with a superior position within the hierarchy based on their personal experience. It sharply contrasts with the concept of "evidence-based medicine," where decisions are taken in a consensus based on scientific evidence and not personal seniority.[27,28]

CPs have led to a tangible simplification of clinical work. That's because everybody acts the same way according to the CP. (respondent A)

All tasks are now known and defined. I don't have to consult a physician for every single step, because everything is defined. (respondent A)

CPs require hierarchy to render their implementation and use in everyday practice feasible

Several statements emphasized that a certain degree of hierarchy is required to implement CPs. Some respondents felt that their role was to exert control and pressure towards "good" CP implementation.

There should be someone on the ward who really has an interest in CPs and who has participated in their development. In wards where this was the case the implementation has worked out better.[. . .] Ideally, this should be a person with directive power towards physicians, like a consultant. (respondent F)

My task was not only to document deviations from the pathway but also to go to the ward and exert pressure that tasks are carried out according to the pathways. If the pathways didn't work, I was supposed to ask for the reasons. (respondent G)

My task was to control if nurses implement the pathways correctly. (respondent E)

CPs influence the hierarchical relationship between caregivers and patients

Respondents expressed that using CPs in clinical practice reduced uncertainty and increased transparency for patients.

Patients are in a state of pronounced uncertainty. Every measure that ultimately reduces this feeling is positive. (respondent D)

Patients can now be much better informed about their treatment. This creates more transparency for them. (respondent D)

In contrast, there were also opinions that CPs lead to less individualized treatment with possible negative consequences for patients.

Individual treatment is restricted. This can lead to inability to properly react in certain situations, to perform everything according to a fixed scheme, which could ultimately even hurt patients. Probably, younger staff thinks that pathways are a "law." They want to exactly abide to pathways and don't realize when it is necessary to deviate from them. This is also true for nursing staff as they might regard pathways as cooking recipes. (respondent B)

Discussion

The present study used qualitative methods to explore how the implementation of perioperative CPs influences surgical hierarchy, i.e., the mode of interaction among staff and between staff and patients. Although the concept of surgical hierarchy has been the subject of research in many settings,[1,2,29,30] to our knowledge this study is the first to specifically evaluate if CP implementation influences surgical hierarchy.

Our study has some methodological limitations. It was based on a small sample from a single institution. This represents a constraint according to traditional views of generalizability. Importantly though, while statistical generalizability is a key quality criterion in quantitative research, its adoption as a methodological quality indicator is less established in qualitative research.[31] This is because qualitative approaches seek to explore the full range of potential views on a topic of interest in depth and aim to enable researchers to evaluate the potential transferability of findings to populations or settings of interest. Given the heterogeneity in care patterns and professional cultures across countries and health care systems, the generalizability of our findings to other settings might yet be limited. The strength of our study is that, compared to previous studies on CP implementation, which did not use a comprehensive approach but rather reflected subjective views of project leaders, and which did not specifically explore issues related to surgical hierar-

chy,[15,17–19,32–37] it relied on semistructured interviews with multidisciplinary staff members at all seniority levels. The use of an external interviewer without a clinical background in surgery and of external analysts minimized bias.

The interviews yielded a number of intriguing findings. First, and probably most important, it was widely acknowledged that the implementation of a CP into clinical routine has the potential to change traditional surgical hierarchy structures. In particular, the top-down order chain, i.e., that diagnostic and therapeutic measures are only carried out after a senior staff member ordered them or at least approved of them,[30,38–40] is interrupted. This leads to a feeling of increased autonomy and competency in individual staff, particularly so at junior levels. This feeling was enhanced by the fact that the CP project was initiated and carried out by representatives of lower hierarchy levels in a horizontal manner. This poses an enormous contrast to the way projects have traditionally been conducted in many surgical departments, i.e., the initiation by the head and the execution of specific tasks by subordinates.[38,41] This particular approach, given it leads to more perceived homogeneity within project teams, has been identified as additional success factor for quality improvement projects.[20,42] This is underlined by the initial reluctance towards the CP project expressed by nurses, who despite efforts to involve them felt excluded in the early phase.[20] To achieve homogeneity within the project team and to give all disciplines a genuine sense of inclusion, participation should therefore be one of the early aims during such projects.[37]

Importantly, it cannot be fully excluded that some staff members still perceived the project to be of a somewhat top-down nature. Although the head of department did not initiate or carry out the CP project himself, the mere fact that he granted permission for the project to be carried out in the department might have created a notion of traditional hierarchy. However, the head of department displayed his initial skepticism towards CPs rather overtly, so that most staff members probably felt that the project was implemented in a more horizontal than vertical manner.

Several interviewees were convinced that a certain degree of hierarchy is indispensable for successful CP implementation. They refer to personal control on wards in an indirect (recording CP deviations) and direct (asking staff to adhere to CPs) manner. Interestingly, the project leaders had no intention to establish a control system. Recording of CP deviations took place exclusively for research purposes,[11–14,24,25] and was never meant to be a means of controlling staff. Direct control and requests of CP adherence were not made by the project leaders unless patients under their immediate treatment were affected.[20] This shows that the project initiated a change resulting in the development of an informal hierarchical structure not created by defined positions in the traditional hierarchy roster of the department. Evidence from previous studies suggests that "champions," i.e., visible proponents of CP usage, could be important for implementation.[17,18,43,44] These reflect mostly personal experiences and therefore it must remain the subject of future investigations if a certain degree of hierarchy and control is truly indispensable for the success of complex clinical projects like CP implementation.

From several comments, it became clear that CPs change clinical decision-making away from the traditional "eminence base" towards an "evidence base."[1,45–47] In other words, decisions on patient management are taken in a consensus based on scientific evidence and not according to the individual judgement of senior staff.[27,28] Obviously, this holds true only if CPs are, like in our case, indeed evidence-based. This should be a prerequisite for good CPs, but is unfortunately not always ensured.[48] As described already, this shift away from "eminence-based medicine" granted a sense of increased autonomy and empowerment especially to junior staff.

The last element to be explored was the hierarchical relationship between caregivers and patients. In the "traditional" surgical culture, it is often perceived that patient participation and knowledge concerning specific treatments is limited.[4–7] Probably this is not true per se but rather it depends on attitudes and behaviors of single surgeons. Participants in our study perceived CPs as a good means to make treatment decisions more transparent to patients. There is only limited data if this holds true from patients' point of view, but anecdotal evidence suggests that this is the case, especially if a redesigned "patient pathway" is given to the patient as reference.[49,50] Such a document did not exist for our patients, so it remains speculative if they indeed gained a sense of increased participation and transparency. Some respondents expressed concerns that CPs lead to less individualization of treatment, which would imply less participation and less adaptation of the treatment to the single patient's needs. However, there is no evidence supporting the

view that patients perceive pathways as too rigid a framework with negative effects on attention paid by staff.

Our findings have implications for future research. Studies should assess structural and organizational changes brought along by CP implementation using both quantitative and qualitative methods. They should extend to other perioperative disciplines and other health systems, as these all have their peculiarities. A very interesting topic in the context of CP implementation is the perceived change towards a more evidence-based medicine. Future studies should try to objectify this perception.

This qualitative study identified effects of the implementation of CPs on various dimensions of hierarchy in the surgical setting. Most importantly, CP implementation leads to a feeling of increased autonomy and competency in junior staff and induces a change from "eminence-based" to "evidence-based" practice. Moreover, CPs are perceived to increase transparency of treatment to patients. The knowledge about these induced changes plays an important role for planning and carrying out CP projects. The obtained views may pertain primarily to the given CP project and generalizability to other settings might be limited. We therefore encourage conducting more studies exploring the effects of CPs on hierarchy in surgery.

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