

Field Measurement Protocol for Team Communication: A Study of Medical Rehabilitation Team Interaction

Balázs Péter Hámornik
hamornik@erg.bme.hu

Márta Juhász
juhaszm@erg.bme.hu

Ildikó Vén
National Institute for Medical
Rehabilitation, Ward for Rehabilitation
of Traumatic Injuries
Szanatórium utca 19. 1528 Budapest,
i.ven@rehabint.hu

Budapest University of Technology and Economics,
Department of Ergonomics and Psychology
Egry J. utca 1, Budapest H-1111, Hungary

ABSTRACT

The paper is introducing an online communication behavior measurement protocol, developed for medical team work, especially for studying the medical rehabilitation teams on interdisciplinary meetings. The purpose of the research is to analyze the development and usage of shared mental models (SMM) through the communication in medical practice of interdisciplinary rehabilitation teams in order to identify the factors determining the patient safety, and the effectiveness of rehabilitation. The online quantitative rating method uses two parallel raters to count and record the communication utterances of each participant directed to another. The quantitative and interactional data is analyzed, and visualized by AGNA network analysis software. Based on the results (network indices, and communication network diagram) the strong and weak points of communication can be recognized, as the important areas of SMM development. This can be a basis of a development process to enhance team effectiveness, and patient safety.

Author Keywords

Team communication, rehabilitation team, online rating, network analysis, patient safety, shared mental model.

ACM Classification Keywords

H.5.3 Group and Organization Interfaces: Organizational design, H5.m. Miscellaneous

INTRODUCTION

The medical field is not as important subject of research as it should be, especially those aspects that consider a hospital, or ward as an organizational entity [4,6,7,10]. This is why our research project is aiming to study and explore the fields of development in interdisciplinary medical

rehabilitation teams with the tools of work psychology. The aim is to ameliorate the intra-team information flow about the patients and practices, to help the development of the shared knowledge and mental model in the team, and to contribute the faster and successful rehabilitation. The shared mental model is a shared knowledge and reference between the team mates. It develops by the team communication, and contains shared representations about the current situation, about roles and responsibilities, and about the competencies [3]. Thus the goal is not to change the rehabilitation practice, but to give an organizational aid to communication, knowledge and information sharing about the patient, the patients' conditions in order to make the development of the shared mental model faster and make the model itself more effective [9].

THE MEDICAL REHABILITATION TEAM

The medical rehabilitation field is an interdisciplinary field, because the injuries of patient usually exceed the competency of a single specialist, so thus several specialists, and different knowledge fields should cooperate in the rehabilitation team [6]. The medical rehabilitation team consists of (rehabilitation) physicians, clerk physicians, physiotherapists, nurses, occupational therapist, ergotherapist, social worker, clinical psychologist, prosthetist, and speech/language therapist, sport therapist, and psychiatrist [9].

Certain specialists are assigned to a specific ward (like the physicians, the nurses and the physiotherapists), and several other team members are centrally employed by the institute, and serving all the different wards (e.g. occupational therapist, ergotherapist, sport therapist) thus they participate in more than one rehabilitations teams in the same time. This causes that the members of the rehabilitation team are not always in the same location, and not always together, but the information is needed to be updated as fast as possible to guarantee the adequate treatment for the patients by all the specialists. To maintain the information sharing, there are oral and written occasions and tools, both on the formal and informal level. They can be shown in Table 1, organized by the modality, and the formal or informal manner of them.

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Occasions of information sharing			
Written occasions		Oral occasions	
Formal	Informal	Formal	Informal
Treatment documentation (e.g. medications, nursing, physiotherapy)	Shift change notes of nurses	Daily ward round	
Documentation of previous treatments in the past	Nurses' notes ordered treatments by the physician on a ward round (they are accessible for all team members)	Weekly ward round	Conversations on the corridors or in the rest rooms of the ward
		Interdisciplinary team meeting	
		Prosthetist's ward round	

Table 1. The occasions of information sharing in the medical rehabilitation team [8].

From the perspective described above, the interdisciplinary team meeting is the most important field for our research, because on this meeting, the specialists of the ward and the specialist serving several wards in the institute are also participating, and discussing, sharing information with each other. The patients are not participating the team meeting usually, thus the communication is more open, and less formal between the specialists. This is why we choose the interdisciplinary team meeting to be the field of our research of communication presented in this paper.

THE METHOD

Our field research took place in a ward of the National Institute for Medical Rehabilitation, near to the capital of Hungary. We participated, and recorded four interdisciplinary team meetings (online) for quantitative communication analysis in January, 2010. The rehabilitation team consisted of fifteen specialists: two physicians, a clerk physician, two nurses, six physiotherapists, an occupational therapist, a social worker, a sport therapist, and an ergotherapist. The physicians, the nurses and the physiotherapists are linked to the ward studied by us, the other specialist are serving more than one wards. The method based on online rating using a rating table containing the sender and the receiver of a communication utterance during the team meeting. The important point in this strategy is the definition of the element of measurement, what has to be recorded as one utterance. Based on the literature of different subjects, but similar measurement method, we jointly defined a standard utterance by intonation contour and by the presence of a discernible pause between it and surrounding utterances [5]. This standard utterance mostly consists of a single phrase or sentence expressing a complete thought [2]. The two raters who participated the interdisciplinary team meetings have recorded the number of utterances spoken by the team mates including the sender and the receiver in order to build a transactional data to build a communicational network. In order to secure the reliability of our measurement of communication behavior, we used two parallel and independent raters. Both raters have been trained together to identify and record the utterances according to the

definition described above. Before the research started, they had the opportunity to practice, and compare recordings on previously taped team meetings from the same institution. In the analysis, we correlated their ratings (the recorded amount of utterances between the team mates), and to justify the inter-rater reliability, we used intra-class correlations also. After the control of the reliability, we summarized the utterances by team meetings (four summarized communication matrices), than we computed an average communication matrix from the four matrices. For the network analysis we summarized the utterances in the specialists' groups, thus we used the physicians, the nurses, the physiotherapists, the occupational therapist, the social worker, the sport therapist, and the ergotherapist as measured senders and receivers in the communication matrix. We used the AGNA social network analysis software [1] to visualize the average communication matrix of the recorded four interdisciplinary team meetings in a network diagram. And also we used the network measures computed by AGNA to interpret the network diagram. The AGNA computed density, closeness, and betweenness measures. The density of a network is the total number of edges divided by the number of all possible edges in that network. The closeness measure as a measure of centrality, which represents the average distance from a node to the other nodes in the network (the higher value means that the node is in a central position). The betweenness measure represents a position in the network, when the node is in a transmitter role between two subgroups.

Ethical Statement

The field research has been authorized by the Ethical Committee of the National Institute for Medical Rehabilitation as a part of a research project "The Development of Knowledge Sharing in Expert Medical Teams". All the participants and the patients are not identifiable in the data, the analyses and in the results. The members of the rehabilitation team agreed to audiotape the meetings for further analyses, and for the training of the raters.

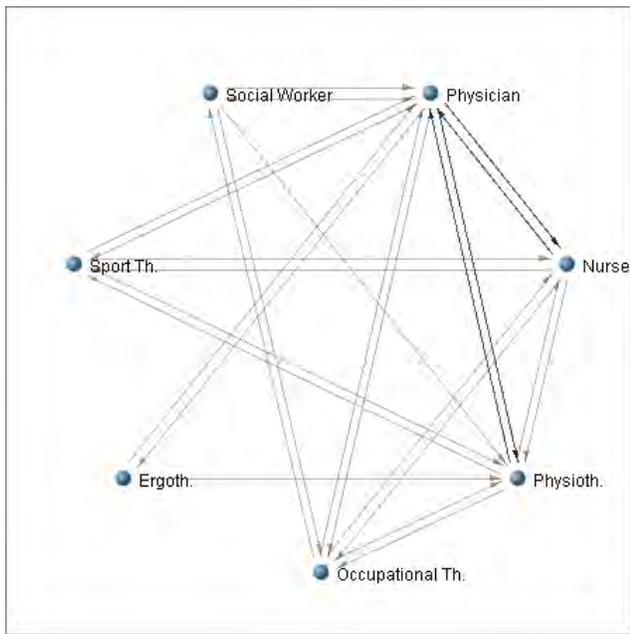


Figure 1. The network diagram of the average communication of the interdisciplinary team meeting. The more shaded edges representing higher amount of utterances in communication.

RESULTS

We performed the statistical analyses with SPSS Statistics 18® predictive analytic software. The inter-rater reliability was assessed by the correlation of the two raters' records, the average Spearman's rank correlation coefficient $\rho = 0.838$ ($p < 0.05$). The average measure intra-class correlation is 0.859, and it is higher than 0.547 for all dimensions (specialists). By this, we can appoint a strong inter-rater reliability.

The results are drawing a picture of the interdisciplinary rehabilitation team by its communication pattern during the team meetings. As it can be seen on the network diagram (Figure 1), that the physicians are in center of the communication network: sending and receiving are the most utterances. The physiotherapists are in close and frequent interaction with the physicians, and thus their conversation dominates the team meeting. An important result is that the nurses' role in communication is not as salient as it would have been expected by the importance of their work in rehabilitation. And also the specialists who are not working for the specified ward are less active in the team meeting (e.g. ergotherapist). These results are represented by the network measures too (Table 2.). The density of the communication network is 0.619 (62,9% of the possible connections appeared). The leading position of the physicians is underpinned by the highest closeness measure = 0.167, and also by the highest betweenness measure = 11.0 in the team. The ergotherapist, the social worker and the sport therapist have the lowest three closeness and betweenness measures, what is congruent with

Specialist groups	Closeness	Betweenness
Physician	0.167	11.00
Nurse	0.125	0.667
Physiotherapist	0.125	3.00
Occupational Therapist	0.125	1.334
Ergotherapist	0.100	0.0
Sport Therapist	0.111	0.0
Social Worker	0.111	0.0

Table 2. Network measures computed by AGNA.

their almost peripheral position in the communication network.

CONCLUSION

The results are showing the leader position of the physician in the rehabilitation team, which is a formal role as the coordinator of the rehabilitation process [6], and in our study it is underpinned by the communication data. The possible two weak points of the interdisciplinary team are (1) the weaker than expected communication link between the nurses and the other professionals (especially between the nurses and the physiotherapists), and (2) the nearly marginal role in the meeting of the specialists who are not employees of the specific ward. The possible changes toward correcting the weak communication links may lead to a faster developing, and better functioning shared mental models is the team, that may provide more effectiveness, and patient safety. These results can also be explained by the fact, that the interdisciplinary team meeting and the philosophy of the interdisciplinary team work is a new development in the institute [8]. The method for the quantitative communication analyses of medical teams have been developed and successfully used in this field research of medical rehabilitation team. This method, as a communication behavior measurement protocol could be applied in different domains of teamwork, and also it is going to be completed in the near future with a quantitative and qualitative analysis method of the content of discussions in interdisciplinary team meetings.

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