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Health-Care-Associated Infections Management, sow the seed of good habits: a grounded theory study

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Abstract. *Background and aim of the work:* The reasons that condition and motivate adherence to good practices have a multifactorial nature. From the literature review, emerged different elements that interact within the operating context and represent a part of the variables that condition the "Best Practice". The aim of this research was to investigate the variables that influence adherence to operators' good practices. *Methods:* A qualitative study with Grounded Theory (GT) methodology was carried out, which leads to the establishment of a theory about basic social processes. This theory is based on the observation and perception of the social scene and evolves during data collection. Data collection took place through interviews with the participants, through an ad hoc semi-structured interview grid. The initial sampling consisted of 12 health workers, while the theoretical sample was made up of 6 health workers. *Results:* The analysis organization through the creation of schemes and diagrams has allowed to formulate different concepts including: false beliefs, knowledge and emotions experienced, that connect with the initial condition of Unconsciousness unaware; awareness of the consequences, team, welcome the new, which are connected to the intermediate phase of Revolution of the professional oneself; awareness of the limits, culture, responsibility, context, rigor and control that connects to the final state of Attentive Habit. *Conclusions:* The theoretical model develops through a path of growth and revolution that starts from the roots of an Unconsciousness unaware and brings with it the seed of a model. (www.actabiomedica.it)

Key words: HAI management, best practice, grounded theory, health workers

Introduction

The Health-Care-Associated Infections (HAI) represent, worldwide, one of the adverse events considered attributable to the sensitive outcomes of care. In the last decade, literature has presented the relationship between the care quality provided and treatment outcomes, therefore the sensitive care outcomes represent the effect and/or consequences of assistance interventions.

The ECDC Survey estimates that in Europe about 3.2 million patients fall ill due to infections contracted during their stay in health facilities and about 37 thousand of these die due to the consequences related to these infections. Furthermore, the HAI cause 16 million additional hospitalization days with the consequent increase in expenses for a total of 7 billion euros per year (1).

These are enough grounds for healthcare professionals, based on their knowledge and skills, to have a duty of significantly improve the standard of care through "HAI management behavior" (2). However, the good knowledge of the operators regarding the right practices often does not translate into appropriate behaviors in infective risk management.

The motivational factors and the perception of

the work environment that manifest in the set of conditions, influences, forces and cultural values of that environment, constitute a decisive element. The poor implementation of good practices is related to the lack of time and resources, the perception of negativity by other staff members and the stress following interventions (3). This makes clear that knowledge, awareness, control of actions and facilitation is not enough to change the behavior of poor adherence to hand hygiene (4).Literature argues that, to implement the use of the guidelines, it is necessary to create a favorable and positive work environment and promote effective communication between the various team members. The struggling in applying these guidelines in clinical practice, as part of the context of emergency, can be associated to various factors, including an inadequate organizational support activity (5).

Although there has been exponential progress in best practices, health professionals still develop low level of compliance with the standard measures for infection prevention. It seems to be related to individual aspects such as forgetfulness, lack of resources and devices, no retraining, lack of time, distorted cognitions and knowledge, and low risk perception (6). Therefore, the creation of innovative educational strategies that provide for an operators' different approach, promoting a greater awareness of good practices and the knowledge of the infective risk, becomes a necessity, since it has been demonstrated that the professionals who have greater awareness also have more knowledge (7).

The topic of the organization is also relevant regarding the relationship between *burnout* and rate of infections. There seems to be an association between the level of job satisfaction associated with *burnout* and the poor adherence to infection prevention measures, in particular hand hygiene (8, 9). When the organizational culture is positive, i.e., the work environment is safe and non-threatening and its members can talk, take risks related to improvement and are encouraged to express concerns and ideas for improvement, the infection rate is lower (10).

On the same line, the self-regulatory encouragement and management of the own effectiveness and planning capacity seem to have the greatest impact on change (11). Some improvement strategies support this target, such as those based on risk perception and the outcome of expectations. The barrier is the fact of inserting hand hygiene as an integral part of daily activity rather than the technical difficulty performing it. To reduce the risk of hospital infections it is, therefore, required to eliminate the ambiguities in the relationships between health workers and the institution through a compromise between individual responsibilities and the rules of local behavior in different professional fields (12). Self-regulatory encouragement and management of own planning capacity act on change by improving the perception of risk and the outcome of expectations.

A systematic review of the literature showed that interventions based on behavioral constructs (e.g. attitudes, intentions, self-efficacy) are more effective than interventions that only concern knowledge and awareness, while *positive reinforcement,* which is the key concept in the long-term behavioral approach, may prove to be less sustainable (13). It could be said that for a lasting effect, the interventions must go beyond a simple increase of knowledge and the promotion of good behavior, but should also include more organizational, perceptive, socio-cultural, cognitive and psychological determinants. Psychological constructs, such as the locus of control and mental models, seem to play an important role in the perception of the HAIs. This perception could be influenced by the personal tendency towards an "*external locus of control that tends to rationalize the attribution of the own behavior consequences to external causes and therefore not to recognize them as dependent on oneself" (*7).

Finally, another group of researchers considers that the professionals in a work group with a lot of experience, beside of colleagues with good explicit knowledge (codified and written), represented by the scientific research literature, can make a contribution expanding the experience and the professional competence. The results of this study show that tacit knowledge is drawn and integrated at different stages of the public health program planning process (14).

Based on literature, the aim of this research is to investigate how these topics manifest themselves in the health practice of a specific context, what are the reasons that hinder the use of available knowledge, what are the organizational conditions influencing them and

if the organizational structures responsible for HAI management have been implemented. Furthermore, it is claimed to analyze and understand a social phenomenon that occurs when health professionals adhere to good practices by implementing infective risk management behaviors.

Method

Grounded Theory method has been chosen due to the complex nature of the topic and because the research object is a dynamic and fluid process. This method lends itself to the study of situations and experiences in potential change (15).

There are not formal or substantial theories available about good practices in the HAI management, so researchers have intended to take a major vision through their own sensitivity to collect information and capture the main concerns and dynamics in the health workers' work environment. Grounded Theory studies begin with open questions, and researchers presume that they may know not much about the meanings that drive the actions of their participants (16).

This research study aimed to explore the following generating question:

What happen when the health professional stick the best practice of management of the HAI?

Grounded Theory (GT) is a method that allows a theory to emerge from data through a constant comparison of the evidence (17). GT is a general method (a family of methods, ed) of comparative analysis [...] and a set of procedures capable of (systematically) generate a theory based on data (18). This provides for a systematic, but at the same time, flexible process of simultaneous data collection and analysis, which leads to the development of concepts and/or a theory on a given phenomenon (15).

GT transcends description of data to conceptualize substantive ideas. Everything is data, including field work, qualitative or quantitative findings, other relevant literature, and other relevant theories. The wider the spread of data, the richer, more conceptual and more accurate the theory will become (19).

This method draws on different types of sampling: planned *initial sampling*, which consists in the choice of some cases according to the logic of the targeted or purposive sampling (20). And *theoretical sampling*, a particular type of selection of participants built during the research path and in which "the researcher collects new data to verify, saturate and expand theoretical categories" (21).

Memos, as a distinctive feature of the GT, constitute annotations in which the researcher takes the ideas, insights and reflections to elaborate in the various phases of data collection, and which are written immediately after the transcription, to record personal thoughts.

The analysis occurs through *initial coding* that consists in the creation of labels. The researcher reads the transcriptions and underlines groups of words associating them with a label that refers to the meaning of that particular. Subsequently the data is analysed through a *focalized coding,* which has the function of bringing together the labels previously identified after each interview. At the end of the merging, the researcher highlights the encodings that occur more frequently, hypothesizing categories, which must be validated by the subsequent phases. To do this the researcher will use an inductive approach, developing a constant benchmarking process. Another indication is to identify the relationships and structures between the categories and the mapping also through the technique of *messy situational map* (22).

The theoretical sampling phase takes place after the coding of the categories, to complete and reach their saturation. The categories saturation phase indicates the stop point of the process. Some categories can be elevated to an abstract level to form concepts, which can be integrated and linked to formulate the explanation theory of the phenomenon.

Sample

This study began with a purposive sample of health professionals who work in a critical unit of a north Italy public Hospital. The enrolment criteria was: to be a health worker (doctor, coordinator, nurse, social health worker, specialist, student) of the healthcare team analysed or a non-health operator (cleaning, administrative) who were part to the analysed context and agreed to participate in the research.

Data collection took place through interviews to the participants, with an ad hoc semi-structured interview grid, on the basis of analysed literature. The setting was agreed with the participants and an authorization to participate in the study was requested.

The interviews lasted between 30 and 50 minutes and were audio-recorded. The audio recording was transcribed verbatim by a member of the research team. All respondents were asked for the possibility of a second meeting

Data Analysis

The *initial coding* of the first interviews, considered provisional and preliminary, took place thorough the in-depth transcripts reading and underlining groups of words associated with labels, which referred to the meaning of that particular segment. Subsequently, *focused coding* regrouped the previously identified labels after each interview. At the end of the merging, the most frequent encodings were highlighted, suggesting categories, which were validated in the subsequent phases. The following interviews led to the saturation of the categories identified above.

The categorical structure was validated as it proved to be robust (Table 1)

The formulation of the concepts took place through the creation of schemes and diagrams also to organize the most abstract ideas. Some categories have been elevated to concepts, in particular: emotions experienced, team, context and responsibility. Other concepts were formulated starting from reformulation of labels that explain better the concept.

Ethical considerations

The study respected the primary ethical principle of research, i.e., the respect for human dignity. This includes respect for people, attention to their well-being and equity. The study involved a sample of operators giving a semi-structured face-to-face interview. The participants gave their consent to the participation in the study and the processing of personal data after reading an information note.

Results

Sample

The **initial sample** was composed of 12 operators. In particular, 1 nursing coordinator, 6 nurses, 3 doctors, 1 social health worker, 1 external cleaning operator, chosen for convenience. All operators had a rank of service at the Intensive Care Unit for more than 2 years, a chronological age from 31 to 58 and a total rank of over 9 years. The theoretical sample consisted of 6 operators. All operators had rank in the Intensive Care Unit for more than 1.5 years, a chronological age from 26 to 65 and a total rank of above 9 years. The **theoretical sample** was composed by 1 physician, 3 nurses, 1 external cleaning operator, 1 employee (Table 2).

1. HAI management, throw the seed of good habits

The model (Figure 1) is characterized by three conditions, that professionals claim to experience in

Table 1. Identified key categories

Category	Definition
Emotions experienced	Operator's emotions and feelings
Team relationship	Relational dynamics between the professionals of the healthcare team
Professional self	Operators' expert professional identity
Professional practice	Operators' activities in the organization
Adherence to good practices	Changes in the behavior of adherence to good practices and methods
Context	The scenario where the actions take place
Responsibility	Accept responsibility for the consequences of the actions

Table 2. Demographic characteristics of study sample. Grey section indicates the theoretical sample.

Id n°	Age	Gender	Profession	Length of service (years)
1	57	F	Cleaning Staff	15
2	48	F	Coordinatore	28
3	38	F	Nurse	14
4	42	M	Physician	16
5	31	F	Nurse	9
6	45	M	Physician	11
7	46	F	Nurse	22
8	36	M	Infermiere	10
9	46	F	Nurse	22
10	51	F	Physician	25
11	58	F	Healthcare Assistant	31
12	40	F	Nurse	22
13	41	F	Cleaning Staff	30
14	38	F	Nurse	10
15	33	F	Nurse	11
16	65	M	Physician	41
17	46	F	Nurse	15
18	26	M	Office Worker	8

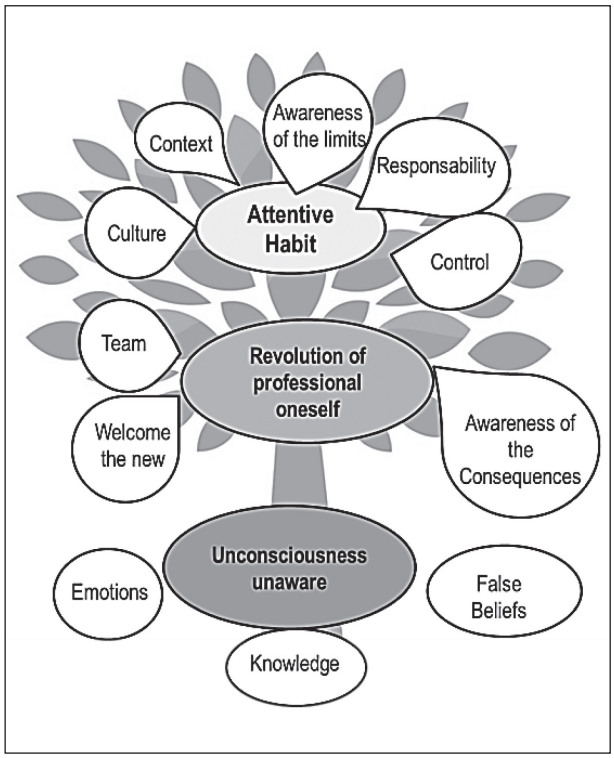

Figure 1. Theoretical Model

the HAI management process and which represent the expression of the evolution and growth process of health workers, allowing their transformation from a condition of seed "unconsciousness unaware", to a condition of "careful habit through a professional and personal revolution", individual and collective.

1.1 Unconsciousness unaware

Their testimony gathers the beginning of a process, of a transformation: "*Then, during the day, I paid more attention…"* and even: *"There is only here and for me it was a discovery ...". "I felt limited"*. The state of "unconsciousness unaware" affects the growth process of the operator; he brings his baggage of "knowledge, false beliefs, emotions experienced" which he must confront with and "sow the seed of good habits".

The concept of **false belief** expresses the ability of some operators, in certain situations, to attribute the causes of the problem to another: *"they are born sterile", "we are experts", "it has always been the other"* and, with the activation of a defence mechanism, self-protection, they justify their behaviour: *"this does not happen", "it is never someone's fault"*.

The concept of **knowledge** reflects the operators' perception about his level of training, sometimes improved simply because he *"increases the experience" "beyond the study"*, in other cases because, followed and properly trained, *"they taught me "*.

The concept of **emotions** is built in a mixture of feelings experienced by the operators during the care activity through which their personality is forged and shaped. A negative experience can determine: *"fear", "anxiety", "scare", "sense of guilt", "bitter taste"*, towards something not much known, causing in the professional *"anger", "insecurity"* and *"shame"* that lead the operator to question himself and a necessity of change. The process leads to the discovery of new solutions and a personal and collective satisfaction. With the implementation of the change, the professional arrives to positive feelings of *"safety", "satisfaction", "discovery"* and *"protection"*.

1.2 Revolution of professional self

The revolution of the professional self is the central part of the process where are highlighted three

concepts that contribute to bend the conditions. The first concept is **"Team"** that involves the system of values, identities, professional status and each professionals' way of working; it is a process of growth, education and continuous learning. A professional said, *"It is not that you put your head in the sand or say… also because the problem is within the group, not individual"*.

The second concept is the **awareness of the consequences** that manifests through reflection on oneself, personal experiences and attribution of a meaning to own actions, to evaluate the ability to perceive and understand events, actions, consequences. About this, a professional said *"for us, infections are fundamental because we have understood something fundamental, the patient can die"*.

Welcome the new, the third concept, is the process of change experienced by professionals, as reported by an interviewed, *"adapting to the evidence has certainly been a great innovation"* and that leads to tangible results and to simplify the work for all members of the team. As reported by a professional *"it has greatly facilitated our work, team work, I guess…"*.

1.3 Attentive habit

The attentive habit is the result of an articulated path. The operators, intended as individuals and then cohesive within the team, mature a sort of modality integrated into their work, generated by various factors among which emerges: **"The Context"** of intensive care. As reported by a professional *"The place makes the mentality... in the consultations those small details perhaps throw a seed and something grows; but I have to say that I only learned it here, unfortunately"*. The **"Responsibility"** of the individual also emerges. A nurse said, *"It had become a fundamental thing, I must say, at least as far as I'm concerned, since then, there has been an important awareness"*, put in place to achieve the outcomes. Another nurse: *"Because then, at a certain point, it also becomes a bit of a personal challenge... because you say: "Ah yes, for that yes... ok, now I have to change gloves... now"*.

It emerges the need to **confront oneself with the own limits**, to have the knowledge of the tools needed for the change and to use every resource available. This process is identified in the individual and in the team as an element of conflict and, at the same time, of growth. As reported by a nurse: *"we had put into practice all we could, also, clearly, informing ourselves with the consultants... and in any case also working with literature... but there was nothing to do ..."*.

The inadequate management of infections, according to the operators, is related to the **culture.** As reported by one of them: *"...and unfortunately I still believe that there is not real culture in the departments"*, *"but why there is not the mentality? is a question of attitude, not time ...because, also, now that I am going down... I am able to pay attention and it costs me very little... now it is a habit, a healthy habit ..."*.

There also emerged the awareness that with **commitment** it is possible to improve or even change the cultural aspects that determine the behaviour of health workers: *"But I think that with the lead, something can be done"*, *"small precautions may throw a seed and something grows"*.

Control and rigor is perceived as a needed motivation to improve the operators' level of attention towards infections related to care: *"Maybe there is less fear now about the judgment of superiors …there might be a higher level with respect to the base"*. The control and rigor exercised between health workers, is perceived as an important element in the formation and maintenance of attentive habit: *"we work a lot in trying to manage the wrong attitudes of others... It is not easy, however, we try"*, *"where you work well, anyway, there is always something to improve for sure, and when there is something that rings a bell, probably something wrong has been done on our side, we question ourselves anyway"*

Discussion of the results

The model has tried to delineate the process that takes place in the operator when he implements good practices. From the data collected it seems that the operator moves from the state of the initial condition of "unconsciousness unaware", influenced by "false beliefs", "knowledge" and "emotions experienced", to "attentive habit" through the "revolution of professional oneself".

The results of the research seem to confirm previous observational studies (7) where there is a close correlation between the awareness of good practices

and the knowledge of infective risk, enough to make the authors conclude that greater awareness produces more knowledge.

Another confirmation highlights a strong motivational need of individuals to strengthen good practices. In fact, despite the high level of standardization of procedures, an internal level of self-regulation, responsibility and 'attentive habit' also emerges. The authors conclude that self-regulation encouragement seem to have-greater impact on change strategies, based on the perception of risk and therefore on the awareness of the consequences (11).

In line with the systematic review previously mentioned, the research data seem to confirm the study of the authors, which admit that, in order to improve adherence to good practices, interventions based on behavioural constructs would appear to be effective above all interventions that concern only the increase of knowledge and awareness. Among the techniques considered effective, the authors attach great importance to spontaneous behaviour, involving non-reflective behavioural responses modelled by the perceptions of the context and the environment, as in the case of careful habit (13).

Some authors have been interested in the theory of habit, emphasizing the importance of establishing automatic associations between behavioural implementation and contextual hints when such behaviours should be implemented as repeatedly stressed by those interviewed in the research. In addition, is highlighted the so called "tacit knowledge", as a facilitator of adherence to good practices and known as field experience (14).

From the literature it also emerges that determinant roles influencing adherence to good practices seem to be the organizational culture that promotes change according to scientific evidence and a thinking culture that promotes and protects through time the temporal resources needed so that change can happen (8).

Conclusions

Research data can explain health workers' adherence to good practices in the case of this critical unit set in a north Italy public Hospital. The results of the research admit the operators' tendency of implementing good practices as a result of an attentive habit, understood as a conscious automatism bound to the culture, the belonging context, control, rigor, awareness of the limits and an increased responsibility for the practice. The habit of good practice seems to be the result of a process that begins in an unconsciousness unaware which grows from false beliefs, inadequate knowledge and strong emotions experienced. Then it finds a transformation through the revolution of the professional self, equally influenced by a strong relationship in the team, the awareness of the consequences and a tendency of the operators to welcome the new members.

Since this is in-depth research, the reported data cannot be generalized and can only concern the studied context, even if the results confirm the main studies traced in the literature on the topic. The study can contribute to a better understanding of the phenomenon of adherences to good practices. It would be interesting, with further research, to investigate the condition of careful habit, trying to understand if this is a static or an ever-changing situation. Future research could therefore investigate the ways in which careful habit is maintained. Further investigation could concern the condition of revolution.

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article

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