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Major Article

Interprofessional perceptions and emotional impact of multidrug-resistant organisms: A qualitative study

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Background: Hospital-acquired infections caused by multidrug-resistant organisms (MDROs) are a threat to patient safety and hospital economy. Training in hygiene precautions is known to limit MDRO spread and patient morbidity. As infection prevention is a collaborative task, we developed an interprofessional educational intervention, including a reflective unit about MDRO. This article reports on the perceptions of professionals for MDRO management.

Methods: In 2017, we conducted 8 trainings, including facilitated group discussions focusing on the question how participants think others experience MDRO. Results were analyzed using a socio-constructivist qualitative approach.

Results: A total of 51 health care workers from 13 professions and 5 hospitals participated, generating 366 items for coding. Three main themes could be identified: (1) significant barriers in educating clinicians and informing lay persons, (2) emotional reactions–especially anxiety and anger–from the perspective of lay persons and professionals evoked by MDRO, and (3) perceived economic burden.

Conclusions: MDROs generate psychosocial side effects with an impact on health care management and on professional-patient relationships and interprofessional relationships. Specifically, emotions evoked by insufficient information and transparency play a major role. Therefore, hygiene trainings must not be limited to basic skills. In addition, they should be comprised of communication and educational techniques and evoke attentiveness for emotional stress.

Emerging prevalence of multidrug-resistant organisms (MDROs) has significant impact on patient safety, economic burden,[1,2] and global public health.[3] According to World Health Organization reports and United Kingdom reviews, deaths caused by MDROs are likely to exceed mortality rates caused by cancer by 2050.[4] In times of advancing medical diversity, aging multimorbid populations,[5] and ongoing inconsiderate use of antibiotics in medicine and livestock[6] health care providers (HCPs) and hospital managers have to deal with growing patient populations colonized and infected by MDROs.[7,8]

One strategy to prevent the spread of MDROs is the implementation of strict hygiene practices (eg, hand and surface disinfection), barrier precautions (personal protective equipment, isolation of patients), and for some microbes decolonization protocols, known to lower MDRO transmission and overall hospital-acquired infections. These strategies have to be promoted regularly in HCP education and postgraduate training for the best effect and quality in patient care.[9]

Some strategies to prevent infections can have negative side effects. As an example, isolation of patients and use of protective equipment (especially masks) can result in emotional stress, medical, social, and psychological side effects,[10-12] consecutively leading to impaired quality of care, patient safety, and even life quality after hospital discharge.[13,14]

Effective hygiene trainings are not limited to mere "handwashing" lessons. Moreover, they have to cover multiple dimensions[15] of knowledge (factual knowledge, skills, attitude, and behavior) focusing on microbiology, infection control, assigned communication proficiencies, and change in risk and workplace culture.[16]

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This article focuses on the qualitative results generated by a novel postgraduate training project in hygiene precautions named the Interprofessional Training in Infection Prevention (IPTIP) evaluating HCPs' perceptions of MDRO.

METHODS

For this study, the methods are presented according to the consolidated criteria for reporting qualitative research checklist, and the quantitative results of the IPTIP project are reported separately.

Study design

The IPTIP project followed a prospective mixed-method approach, with a socio-constructivist focus on qualitative data. As an interprofessional learning unit, the course development was conducted using the CanMeds role model,[17] the ICAP framework,[18] and didactic methods of the German Master of Medical Education program, especially the development strategy for medical curricula.[15] This didactic fundament was supplemented with learning sessions focusing on basic hygiene and safety procedures, such as hand disinfection, personal protective equipment,[9,19-21] and feedback algorithms.[22,23]

The IPTIP course was divided into 4 main parts, each consisting of a passive (eg, screen presentation), interactive (eg, discussions, peer-assisted objective-structured clinical examination), and constructive (eg, card survey, 1-minute paper) subunit: part 1 focused on infectious diseases and microbiology, part 2 focused on basic hygiene procedures, part 3 focused on communication techniques, and part 4 focused on special protective hazardous materials equipment. The detailed blueprint is shown in Figure 1. The data focused on in this article were sampled from the first interactive subunit using a facilitated discussion comparable to the focus group technique.[24,25] Therefore, this subunit simultaneously served as a collaborative learning instrument and for sampling of qualitative data.

A total of 5-8 HCPs participated voluntarily in 8 courses. They were recruited from 5 different hospitals and from 4 paramedic organizations. All participants were adults (aged 20-60) and postgraduates or in the last year of qualification. There was no preselection of the participants. Allocation to the 8 courses followed only 1 rule, that every group had to be formed by participants from at least 3 professions and at least 2 hospitals.

Approval of the ethics committee of the University Medical Center Freiburg and work council permissions of all participating hospitals were obtained. All participants provided written consent to attend the study.

Data collection was conducted during the course in the constructive lesson subunit of part 1. All courses were held in the same seminar room in the hospital of Radolfzell, Germany. Apart from the researcher and the participants, there were no additional individuals present during the course.

Data collection was accomplished by card surveys. Each participant received 2-3 "green cards" with a profession (physician, nurse, physiotherapist, midwife, technician, cleaner, and student), social group (patients, relatives, children, and general public), or institution (local government, national government, World Health Organization, and media) written on each card. The participants then reflected for 5 minutes on the question how members of the profession/institution/group experienced MDRO and wrote them down on the cards. Next, each participant attached the green card to a notice board and surrounded the reflection cards. Next, the participants discussed their impressions and experiences about the group/institution/profession, wrote them down on additional reflection cards, and attached new findings to the board. The direct presentation of the transcripts to the participants, clarification of questions, and discussion of possible interpretations was moderated by the course director, who also took field notes of the discussions. Each discussion group ended after 75 minutes. After 8 IPTIP courses, data saturation was achieved.

Fig 1. Blueprint of the IPTIP-Course. The course is divided into 4 subunits with 90 minutes each. Every subunit consists of a passive (blue), interactive (green), and reflective (orange) part. The blueprint shows example pictures of the interactive subunits with the MDRO discussion group (subunit 1), a feedback-tandem discussion (subunit 2), an objective structured examination circle focusing on hand disinfection, protective equipment, and feedback provision (subunit 3), and a hazmat (CRBN) suit training (subunit 4). This article reports on findings of the facilitated discussion groups only (interactive subunit 1, red frame). *CRBN*, Chemical Radiation Biological Nuclear; *hazmat*, hazardous materials; *IPTIP*, Interprofessional Training in Infection Prevention; *MDRO*, multidrug-resistant organism; *OSCE*, objective structured clinical examination.

Research team and reflexivity

The main investigator (S.B.) of the study and facilitator was a 39-year-old male senior consultant anesthesiologist, critical care physician, emergency physician, and hospital hygiene expert. Additional credentials included a medical degree (MD), diplomas for anesthesiology and critical care, certificates as a medical risk manager (ISO 31000/ONR 49003), instructor of the American Heart Association for Basic Life Support, Pediatric Advanced Life Support and Advanced Cardiovascular Life Support for Experienced Providers, and a pregraduate participant of the Master of Medical Education program (German Master of Medical Education program, cohort 13). His main working occupation at the time of the project was hospital hygiene, antibiotic stewardship, multiprofessional medical education (postgraduate physicians, medical students, operative nurses, nurses, and anesthesiology nurses), and operation theater management (secondary care hospital). Supervisors of the study included a male consultant (PhD) in neuropediatrics who was experienced in interprofessional medical education and qualitative research (T.L.), and a male hospital hygiene expert (MD, PhD, associate professor, head of department of hospital hygiene) with extensive research and practical experience in environmental and health care infection prevention and control (M.D.). Coders included a female trauma surgeon (St.B.) with experience in interprofessional education (American Heart Association instructor for Basic Life Support and Advanced Cardiac Life Support) and a male anesthesiologist (A.D.) in end-stage training with a master's degree in design. Both St.B. and A.D. were docents at the regional hospital academy for HCPs and were educators for medical students.

About one-half of the study participants were personally known by the main investigator prior to the IPTIP. Ten percent had regular contact before (eg, active subordinates or former students). The other half of the participants were first contacts. Coders were anonymous to all of the participants.

Additional and ongoing support to the whole education and research program development was granted by the local Academy for Health Care Professionals, the Institute of Hospital Hygiene and Infection Prevention, and peer reviews and mentoring by the German Master of Medical Education Program.

Analysis

In addition to the unmodified data transfer from the cards to Microsoft Excel (Microsoft Corp, Redmond, WA) documents, there was no further transcription of the data. S.B. analyzed the data according to Bradley et al[26] using a single researcher[27] iterative inductive approach. A.D., S.B., and St.B. applied codes independently to the data after instructions. Data-code matching was accepted with at least 2 of 3 coders allocating the codes to the data.

Coding showed that "emotions" and "affects" were of higher importance than presumed. Therefore, a second deductive approach in 2 steps was conducted, matching the data with Paul Ekman's main emotions (anxiety, anger, joy, sadness, and disgust)[28] and in a second step with their graduations regarding their intensity, according to Ekman's Atlas of Emotions.[29] Again, coding was accepted with 2 of 3 codes, agreeing on the perceived emotion and their intensity.

Analysis was conducted using the MAXQDA Software (VERBI GmbH, Berlin, Germany). Coding was performed using Microsoft Excel (Microsoft Corp).

RESULTS

Participants' characteristics

Recruitment of HCPs was conducted via promotion by ward managers, hygiene experts, link nurses, e-mail, and hospital intranet announcement. A total of 51 HCPs participated in 8 courses from July-December 2017. There were no drop outs or refusal to participate. Fifty-one HCPs (37 women) from 13 different professions (13 physicians, 9 paramedics, 8 nurses, 5 operating room nurses, 4 physiotherapists, 4 hygiene nurses, 2 clinical pharmacists, 1 practice nurse, 1 hospital workplace safety specialist, 1 biotechnologist, 1 medical teacher, 1 medical reporter, and 1 anesthesia nurse) participated.

Coding process

During decontextualization (assigning tags to the survey cards), 366 items for 3 main groups (HCPs, lay persons, and institutions) were coded. A total of 13 codes and subcodes could be identified by the iterative coding process (Fig 2): lack of resources, overestimation of MDRO risk, underestimation of MDRO risk, guilt, lack of proficiency in professionals, lack of knowledge in lay persons, transparency, loss of control, cultural and lingual barriers, economy, augmented health sector, barriers to implementation, and clinical tribalism (the active separation of professional groups from another). Emotional codes (anxiety, disgust, anger, joy, and sadness) were coded separately using a post hoc deductive approach.

After decontextualization (uniting tags and recurring meaning units), exclusion of dross (only 1 card) and condensation of meaning units and categorization showed the following themes:

INSUFFICIENT COMMUNICATIONS, IMPLEMENTATION, AND EDUCATION STRATEGIES

The need for adequate education and overall knowledge about MDRO and managing them were frequently suggested by the participants. For HCPs of all professions multiple times "*uncertainness*" and "*deficits in knowledge and skills*" were mentioned leading to under- and overestimation of risks with unnecessary barrier precautions ("*Better I take more than less protective equipment*") on the 1 side, "*ignorance*" and "*low discipline and no consequences*" for precautions on the second and avoidance ("*I will go in that room later*") on the third side.

Participants also mentioned that basic hygiene education differs dramatically between professions in depth, quality ("*reality vs exam*") and time spent ("*massively diverging education time*") and also within professions with "*different MDRO management between preclinical care and hospitals, between hospitals, within hospitals, between wards, and within wards.*" Interestingly, the interprofessional character of MDRO management played a role with nurses educating medical students and residents ("*All what I know about hygiene, I learned from nurses and not from physicians*" and "*It's an interprofessional thing, but not taught interprofessionally*").

For implementation, "*communication deficits,*" "*medical and linguistic language barriers,*" "*uncertainty which information method to use,*" and "*difficult informational work*" were mentioned to play a challenging role in transferring knowledge to medical staff, patients, and visitors, especially to children.

Similar findings of insufficient general knowledge, deficits of information about MDRO could be obtained for patients. In contrast, need for "*transparency*" and advice was detected in lay persons of all subgroups (patients, relatives, reporters, and politicians). In nonmedical hospital staff (cleaners and technicians), MDROs were repeatedly linked to "*uncertainness,*" incomprehension, or even contra productive "*pseudo knowledge,*" leaving staff with contradictory advice or unanswered questions ("*Is it contagious?*", "*Why should I wear this stuff [protective garments]?*") resulting in stress, over-, and underestimation of medical risks. For politicians and press, these deficits were associated with the overestimation of the risk of MDRO and perception of a general threat for the population followed by accusations ("*guilt*").

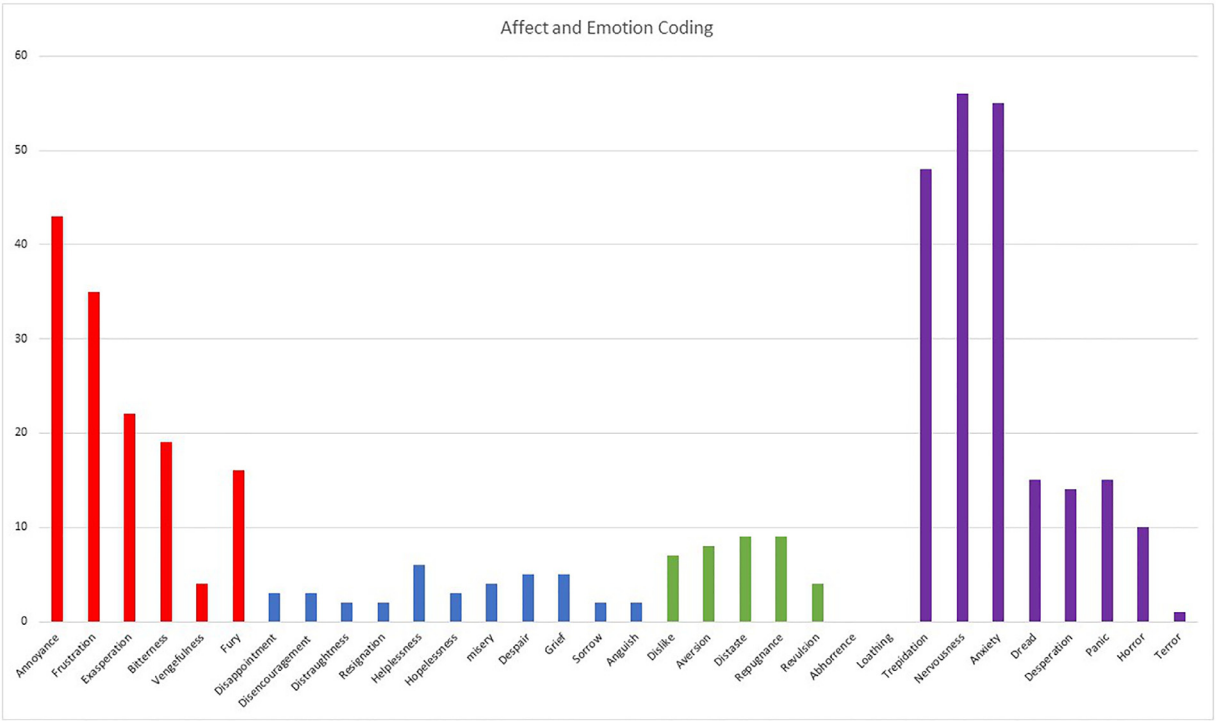

Fig 2. Overview about deductive emotional codings according to Ekman's Atlas of Emotions. Quantitative count of codings are shown on the y-axis. Intensity of the emotion are shown on the x-axis (left, low intensity; right, high intensity) with differentiation between anger (red), sadness (blue), disgust (green), and anxiety (violet). Joy could not be coded. Findings show most codings for low intense anger and anxiety.

Some contributions focused on the transfer of information from professionals to lay persons ("*Don't know what method to communicate*") but when mentioned nurses were perceived to be the main professional group informing relatives and patients about MDRO.

IMPACT ON HOSPITAL RESOURCES

Participants mentioned the serious impact of MDRO on time and financial resources in the view of health care professionals, hospital management, and in hospital economy over all. For staff, lack of time ("*extra work,*" "*difficult and long-lasting information work,*" "*effort,*" and "*time pressure*") was perceived to be dominant for management, politics and health systems impairment of finance ("*costs*") and medical resources ("*shortage of specialists*") were detected. For all professions and groups, "*frustration,*" "*helplessness,*" and overwhelming conditions ("*It's only one problem of many*") were mentioned to be present. Partially, these findings overlap with emotions and affects.

EMOTIONAL IMPACT OF MDRO

Deductive coding showed anxiety and anger to be dominant emotions perceived by participants to play a major role for other persons, followed by disgust and sadness (Fig 3).

Anxiety

Perceived anxiety could be detected for all persons and institutions presented to the participants, especially for patients' and relatives' experiences, the emotion of which was coded repeatedly with low and high intensity. For relatives, anxiety was mainly perceived to be present because of the lack of information ("*Is a treatment possible?*", "*Is it dangerous for me?*", "*Is it contagious*?") for themselves, but "*panic*" or even "*terror*" concerning the relative they are worrying about for other reasons ("*Is my family member about to die now?*"). For patients, this was consistent, but attached by a high level of stress for being separated from others ("*loneliness,*" "*I do not want to get in contact with you*") and a significant impact on their "*own prognosis.*" For nonmedical staff and medical staff in training avoidance ("*I do not want to get in that room!*") in fear of "*death*" was present. In postgraduate medical staff, less-intense anxiety, mainly owing to uncertainness and only slight consideration for "*self-endangerment*" was detected. For institutions, MDROs were perceived as a major "*threat to public health.*"

Anger

Anger was coded several times for nonmedical institutions (eg, government), patients, and relatives in all intensities. Lay persons were considered to be angry about the colonization or infection of patients because of "*sloppiness*" and "*avoidable mistakes*" in patient care was linked to the fear of getting "*infected,*" too. Patients were perceived as feeling anger for "*social isolation*" and less qualitative care and support for ("*I am left alone*"), which is also linked to sadness. HCPs and nonmedical staff in contrast were mentioned to feel anger for hospital stakeholders, especially for "*staff shortage*" and "*time pressure.*" For the public, press, and politicians, similar codes could be detected, so that in the eyes of the participants, anger is focused on hospitals for not caring enough about MDRO management. Partially intense anger was mentioned, especially for local politicians perceived to expect "*zero-tolerance rates*" and searching responsible persons to punish ("*Guillotines fall and heads roll*").

Sadness

Sadness was coded for relatives and patients concerning "*helplessness,*" social isolation, reduced self-worthiness ("*shame*"), and for hospital staffs' failure to prevent MDRO transmission. For patients,

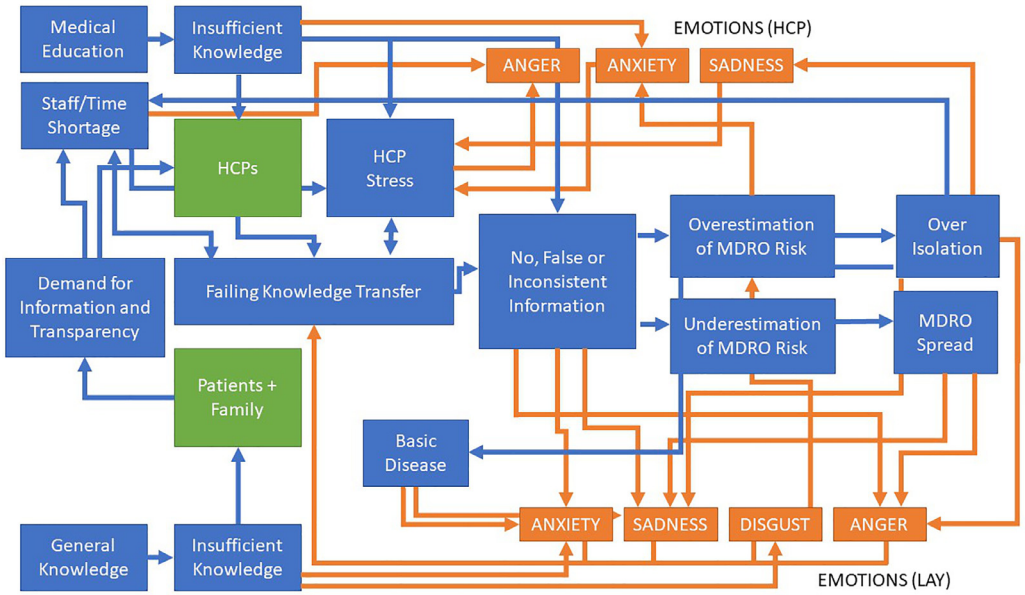

Fig 3. Synopsis of interaction of the MDRO main themes. Health care providers face MDRO with insufficient knowledge and resource (staff and time) shortage resulting in stress and anger. Staff and time shortage are aggravated by the demand for information and transparency by lay persons (patients, relatives, nonmedical staff, and trainees) and results in feeling angry for stakeholders, management, and politics failing to compensate. The failure of knowledge transfer (partially by education, partially by staff shortage) leads to no, false, or inconsistent information to relatives and patients, nonmedical staff, and staff in training, resulting in over- and underestimation, again, resulting in over isolation or insufficient barrier precautions leading to MDRO spread. Over isolation of patients was linked to sadness in terms of compassion. On the side of patients and their families, MDRO face insufficient knowledge creating demand for information (which is not covered effectively by staff as mentioned earlier). Together with the underlying patient's disease, this leads to anxiety, disgust, and sadness. With no, false, or inconsistent information by medical staff, over- and underestimation result in anger for those not capable to provide information and transparency and may have a direct effect on the prognosis (eg, for side effect by over isolation or further bacterial transmission to other patients). *HCP*, health care provider; *MDRO*, multidrug-resistant organism.

sadness, anger, and anxiety were often coded together. For medical staff, sadness was coded in terms of "*compassion.*"

Disgust

Disgust was only coded for the point of view of patients, relatives, and nonmedical staff avoiding persons carrying MDRO ("*I don't want to be in that room*"). There were no codes for professionals, except for trainees.

Joy

Joy was not coded.

DISCUSSION

To our knowledge, this is the first study on MDRO combining a facilitated discussion group for data sampling with interprofessional postgraduate education to address attitudes in the management of MDRO. Three main themes based on saturated sampling of information from 51 HCPs of 13 professions in 8 courses in a multicenter setting were found to play a major role in management of MDRO. A synopsis is shown in Figure 3.

First, there are significant barriers in the education of HCPs and in the transfer of information to patients and relatives. HCPs, especially nurses and physicians, face the dilemma of uncertainty because of subjective, insufficient pre- and postgraduate education and high workload, and with being responsible for giving advice to others. These gaps in knowledge, attitudes, and proficiencies are well described in the literature for nurses,[30,31] physicians,[32-34] and health care workers in general.[35,36] Knowledge about MDRO and antibiotics in lay persons have shown to be even worse,[37] although awareness for antibiotic resistance in general is rising due to different educational programs.[38]

With these relevant deficits, relatives, patients, trainees, and nonmedical health care workers need to be and expect to be educated by other professionals for risk stratification and MDRO management. However, with advisory professionals feeling uncertain themselves, or not being capable to transfer their knowledge,[39] it is likely that the education of others is inconsistent, contradictory, or does not happen at all. Consequently, more confusion (eg, different protocols), uncertainty, and over- and underestimation of risks with inadequate hygiene and barrier precautions (underestimation of risk, further microbial spread, overestimation of risk, over isolation with avoidable side effects)[10,12] can lead to a significant threat to patient safety and are triggers to intense experience of emotions. Aside from skills in hand hygiene and protective garments and implementation of uniform MDRO management, medical education should focus on the knowledge and attitudes of the HCP toward MDRO and their communicative proficiency to transfer it correctly to patients, relatives, trainees, and the public.

Second, HCPs experiencing emotional effects themselves have to deal with emotions and the effects of lay persons and trainees influenced by anxiety or anger concerning MDRO and are triggered by insufficient or contradictory knowledge and high expectations aggravated by politicians and the press.[40]

Anxiety, sadness, and anger experienced by patients have been described previously,[41-43] mainly by quantitative analysis and observations in patients, but not in the perception of HCPs empathizing in others. Unfortunately, there is no clear differentiation if these emotions are evoked by the MDRO diagnosis, isolation precautions, or the combination. Our data suggests that anger concerning MDRO is directed to those believed to be responsible as reported by Brooks et al.[44] For health care workers, anger is perceived towards management and establishment for insufficient financial, material, and personnel support. On the side of patients, anger is perceived for lack of information and the failure of professionals to prevent MDRO from spreading and evolving. As a conclusion, external factors are believed to be responsible for MDRO transmission.

Interestingly, disgust played an inferior role in the collected data. It was only coded for lay persons, leading to the questions, if there is not any disgust in health care workers or if it was not correctly detected in our approach. New data suggests that the multifaceted emotion serves 3 main functions:[45] avoidance of pathogens, mate choice, and social interaction. The first function should be present in health care workers but was only coded in nonmedical staff and trainees. This leads to the questions, if and how disgust gets abandoned through medical education and if this may be a factor for underestimation and "*ignorance*" of barrier precautions and hygiene protocols.[46-48] However, disgust may have not been mentioned due to social desirability in the artificial training setting.

Health care workers aware of these emotions do not only face their own and knowledge deficits of others, they also encounter their own and others' emotional reactions. Training in hygiene precautions and MDRO management has to be accompanied by reflection and communications skills to address evoked emotional effects.

Third, economic harm to the health system by MDRO influences further economization and impairment of education. Especially for MRSA economic impact, this was repeatedly described.[1,49-51] With time-consuming isolated patients, growing staff shortage, and expanding medical diversity, education and qualification gets impaired further,[52-54] leading to a doom loop. Additionally, the economic link to anger and anxiety on the patient's side must be pointed out: either time consumption of caregivers to talk down angered patients and relatives or economic harm afterwards because of angered customers and slur of hospital reputation.

Threatened economic stability is a main factor evoking anxiety in stakeholders and establishment. However, this stability is fundamental for profound education and satisfying time resources to manage MDRO and to prevent unnecessary emotional incidents.

We conclude that MDRO is straining medical staff, being short on resources, and experiencing its own helplessness, according to uncertainness, gaps in knowledge, and communication methods, challenging demands and expectations of emotionally affected lay persons and nonmedical staff ("transparency"), initiated emotional reactions and their time resource consuming consequences (eg, talk down angry relatives or comforting sad patients).

Compensatory anger is growing on stakeholders, and politics expected to provide resources, which are mostly not available.

On the side of lay and nonmedical staff, uncertainness paired with anxiety leads to high demand for information, not satisfactorily answered by medical professionals expected to do so. This leads to further anxiety and anger on HCPs, stakeholders and government.

Credibility

There are some limitations to this work.

First, the data retrieval was conducted by card surveys intended to evoke attitude in an educational setting. There was no direct observation of the participants for expressed emotions. Mismatches of verbal and nonverbal communication during the IPTIP were not detected. To do so, video- and audio recording would be helpful for deeper coding of para- and nonverbal expressions. Furthermore, observation of simulations or even real interactions of HCP-patient interactions would create higher ecological validity.

Second, the principal investigator, the coders, and their former interaction may be biased by their own clinical experiences, facing the problems of hygiene implementation every day. However, the moderator's experience and expertise may have been a key for deeper investigation of the professionals' answers and points of view revealing more details, maybe difficult to be explored by medical lay persons. In additional, the influence of the investigator, being a supervisor for some of the participants, may be questioned. Despite flat hierarchies and the commitment to guarantee for a safe discussion environment it is imaginable, that there are aspects left out (eg, for shame or social desirability) or uncovered (eg, for trusting the group). To our interpretation, it seems reasonable that on the basis of high standardization of the discussion groups the "golden mean" between the possible (but not verified) social dependencies in favor to deeper insight in the topic of MDRO due to personal expertise was beneficial to the results.

Third, the emotional aspects were tags interpreted by the coders on the base of survey cards. Although coded by the "2 of 3" method in a standardized setting, it is not clear if the subjectively perceived affects and emotions were correctly and extensively recognized, fully remembered, interpreted, and completely reported by the participants who are influenced by MDRO themselves. Additionally, the use of Ekman's Atlas of Emotions[29] grounding on his not generally accepted theories on emotion[28] is only an indicative approach for hypothesis generation. For deeper emotional research, far more fundamental and professional methods (eg, facial expression, paraverbal, and nonverbal signal codings) during focus groups and facilitated discussions are needed for consolidation.

Fourth, despite a multicenter approach, our work concentrated on German interprofessional voluntary postgraduates participating. Aside this possible selection bias and with culture affecting emotional expressions and recognition,[55] further work in other environments, nations, and cultures have to be conducted to clarify generability.

Conclusively, this work is limited by several factors leaving opportunities for further investigation and triangulation using alternative approaches with higher ecological validity, especially in the extensive field of emotional research.

Dependability

The high standardization of data acquisition with a reproducible verified saturation of codes was checked multiple times with different inductive coding approaches, and there was no alteration to the sampling process. The decision to leave the inductive code of emotion (with initial anger and anxiety being inductive codes) in favor to the deductive coding according to Ekman's base emotions was intended to increase validity for the emotional aspects.

CONCLUSIONS

To our knowledge, this is the first work concentrating on the point of view of postgraduate HCPs for other persons and members of institutions regarding MDRO. The results show 3 main themes: (1) insufficient knowledge, communication, and implementation strategies concerning MDRO, with a demand for lay people to receive information by frequently overburdened HCPs, (2) emotional impact of MDRO experienced by lay persons and health care workers additionally to be compensated, and (3) economic harm to the system closing and aggravating a vicious circle among all themes. With some limitations for generalization and transferability owing to the initial study design and coding, the results give a broad overview on the described themes for people experiencing MDRO and their management, giving various opportunities for future research, development of hygiene curricula, and educational approaches.

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