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Nurses in the Kanban: are there news meanings of professional practice in innovative tools for hospital care management?

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Abstract *Kanban is a care management tool that values multi-professional work and intensive use of data and has been growingly used in Brazil to address overcrowding in hospital emergency services (HES). The researchers monitored the Kanban for ten months in multiple wards of a municipal HES, and their observations were recorded in field diaries and discussed in biweekly research team meetings. The empirical material was organized from two questions: Are there changes in "traditional attributions" of Kanban-operating nursing? Are Medicine-Nursing interprofessional relationships transformed? A strong nurse adherence to this tool was observed, coupled with greater specialization and fragmentation of their work: nurses working as diarists assume more traditional administrative functions, while those on-call develop more direct assistance to patients. Nurses consider that clinical decisions are still in the doctors' hands, although Kanban provides them with a stronger influence on such decisions. Nurses' role in the management of significant mass of clinical and operational data, central to Kanban's operationalization, strengthens their professional authority.*

Key words *Nursing, Emergency medical services, Patient-centered care, Kanban, Medicine-Nursing relationships*

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Introduction

Events of excessive demand, such as overcrowding and complaints about the quality of health care, manifest in various healthcare services. This is particularly visible in hospital emergency services (HES), either due to the waiting time to receive care or the unavailability of hospital beds for hospitalizations, resulting in a large number of patients lying on stretchers in the hallways for a long time. One of the consequences is the increased rate of illness among work staff due to stressful work environments and processes[1-5].

In this context, interventions aimed at improve the ability to identify risks, provide health care, and generate solutions in the HES are of great importance[4,6-8]. Hospitals have been experimenting new ways of managing care to rationalize the use of resources, and improve qualification of care towards multidisciplinary and interdisciplinary work, protocolization and intensive use of indicators to monitor and evaluate its success[9-11].

Various technological arrangements for the coordination of care have been used in Brazil and have been induced by the Ministry of Health to face such challenges, in particular from the National Hospital Care Policy[12].

Care technology arrangements are a set of technologies, best practices, and management instances, preferably applied in combination, that are intervention modalities aimed at the application of scientific knowledge for practical purposes in the management and production of health care[10,13-18].

Among the various devices used for interventions to improve the production processes of care and management of HES, we can highlight the "Kanban", implemented in different services under different formats[19-22].

Kanban is a bed management device that combines clinical priority management practices and visual tools that enable the qualification of care coordination by prioritizing and enhancing clinical decision-making and maximizing bed use, with a strong emphasis on multi-professional teams. The institutionalization of horizontal care has enhanced its action, that is, the daily presence of medical professionals and nurses for better coordination of clinical decisions and continuity of care. Kanban makes intensive use of real-time information produced and used by teams, as well as hospital clinical protocols[15,20,22,23].

Little has been addressed about possible impacts and reconfigurations of Kanban on health professional's practices and interprofessional relationships. This paper follows the line of international literature that emphasizes advanced practice nursing, or nurse practitioner, in emergency services[24,25]. What is known is that advanced practice nursing can improve access, reduce the number of patients, improve the quality of care, reduce the length of stay, and increase patient satisfaction[26,27].

What remains to be known are the possible transformations that Kanban can produce in the nursing profession: 1) whether there are changes in the "traditional attributions" of nursing in the division of labor; and 2) whether relationships with medicine are transformed in the operationalization of this arrangement.

Material and methods

The paper is part of a broader investigation that aimed to understand how professionals operationalize HES care management arrangements. A qualitative case study research[28,29] was conducted in this work.

The study was conducted at an Urgent and Emergency Care Hospital (UECH) of a municipal health network. It is a hospital unit certified as a teaching hospital, a reference for urgent and emergency care, meeting both self-referred demand, as referred by SAMU and the municipal UPAs. The technological arrangements proposed by the Ministry of Health's National Hospital Care Policy[12], such as reception with risk classification, bed, and care management (Kanban), are implemented in the hospital.

Kanban was chosen for the reflections intended in this text because of the central role of nurses in the "conduction" of the arrangement. Table 1 describes the main characteristics of the Kanbans made in the UECH.

The ethnographically-oriented methodological strategies adopted translated into a prolonged, continuous presence of field researchers to observe the staff's daily operationalization of the Kanban. This option resulted in a micro-political approach to care management and production[30], assuming that these processes are redefined and redesigned as institutional stakeholders use them.

Field diaries elaborated by the researchers at each field trip at different days and times of the week for almost a year were processed in the research group that met in seminars. In the first analytical systematization, the empirical material was organized into three major blocks: internal team relationships, team relationships with users

Chart 1. Kanban Device Characterization.

Name	Site	Description	Periodicity	Professionals
Pediatrics Kanban	Pediatric Room	Professionals sit freely around the room on chairs and tables. The nurse stays at the computer updating the spreadsheet and conducts the meeting, informing the patient's situation. Doctors get into some clinical aspect, and the other professionals, into some specific demand.	Daily 11h	Social Worker NIR Nurse Horizontal Nurse On-call Nurse Speech and Language Therapist NIR Doctors and Pediatricians
Pediatric ICU Kanban or Round	Small room in the ICU	Professionals standing or sitting discuss cases. Everyone has a voice. The nurse is the driver, informs the patient's situation regarding the procedures performed or not, medication and needs. Doctors talk about the case and exchange information between them. Other professionals act when there is demand.	Daily 11h30	Social Worker NIR Nurse Horizontal Nurse On-call Nurse Physical Therapist Speech and Language Therapist Nutritionist Psychologist NIR Doctors and Pediatricians
Pediatric Multi-professional Kanban	Playroom	All pediatric professionals, including ICU and semi-intensive care. The nurse leads from the census worksheet. The atmosphere among professionals is very quiet, with moments of relaxation.	Weekly 11h	Social Worker NIR Nurse Horizontal Nurse On-call Nurse Physical Therapist Speech and Language Therapist NIR Doctors and Pediatricians Nutritionist Psychologist
Green Axis Kanban	No fixed place	Nurses, doctors, and social workers are always present. Nursing conducts with the census, informing the patient's situation. The social worker explains the social situation, in particular, concerning discharge.	3 times a day	Social Worker NIR Nurse Horizontal Nurse On-call Nurse NIR Doctor Doctors Psychologist
Hospitalization Unit Kanban	Study room	Nursing conducts, informing the patient's situation concerning procedures implemented or not, medication and needs.	Daily	Social Worker NIR Nurse Horizontal Nurse On-call Nurse Physical Therapist Speech and Language Therapist NIR Doctor and Doctors Nutritionist Psychologist
Yellow and Red rooms Kanban	In the entrance corridor	The diarist nursing staff conducts and informs the patient's entry status, procedures performed, medication, and needs. Doctors talk about the case, exchange information between themselves, and indicate the possibility of referral.	Daily 11h 22h	Social Worker NIR Nurse Horizontal Nurse On-call Nurse Physical Therapist NIR Doctor Doctors Psychologist

it continues

Chart 1. Kanban Device Characterization.

Name	Site	Description	Periodicity	Professionals
Yellow Room Round	In the yellow room	The diarist nursing staff conducts, along with the diarist doctor who is on the computer and writes down goals and conducts. Both inform the patient's entry status, procedures implemented or not, medication, and other needs.	5 times a week	Horizontal Nurse On-call Nurse Pharmacist Physical Therapist Speech and Language Therapist Preceptor Doctor – diarist Resident Doctor Nutritionist Psychologist
Adult ICU Fast Hug - Kanban	In the ICU medical comfort room	A wheel where not everyone looks at each other and the climate is cold. The diarist nurse conducts and informs the patient's general status, tests, and changes. It is a discussion centered on the clinical case, with much medical leadership and rare participation of other professionals.	5 times a week	Horizontal Nurse On-call Nurse Pharmacist Physical Therapist Speech and Language Therapist Doctor – diarister and on-call Nutritionist Psychologist

Source: Technological arrangements for care management in a First Aid Hospital (FAPESP-PPSUS-CNPq).

and hospital management. From this material, scenes were selected as feedback to the teams in two shared seminars of researchers with hospital teams, which gave rise to new questions and the need for further meetings, now with specific professional groups (doctors, nurses, and non-doctors/non-nurses).

Table 2 describes the different data production techniques used. All shared seminars were recorded and later transcribed, with the consent of those involved, who signed the Informed Consent Form.

Nurse-related records were extracted from the field diaries for the preparation of this work. Also, the transcripts of six shared seminars were used, either the one conducted specifically with nurses, or in the others, when other professionals made references to the work of nurses.

Results

Preservation or changes in the "traditional attributions" of nursing?

Kanban's logic is based on two main axes: a) interprofessional work to qualify the diagnosis and therapeutic project for each patient (clinical management); b) the intensive use of up-to-date, real-time patient information shared by the team, ensuring that all necessary referrals are streamlined for maximum turnover and use of beds (bed management). Nurse performance is fundamental in both lines. Over time, the relationship between clinical and bed management has changed in the dynamics of Kanban's functioning, affecting significantly nursing work, as the following observation illustrates:

(...) *she was talking about when* [Kanban] *started. The focus was a lot on care and, as a result, bed management* (…) *you accelerated, so-to-speak, the discharge of this patient, and streamlined his hospitalization time.* (…) *Over time, rooms were filling, and the hospital was "swelling"* (...) *the logic of clinical management for pure bed management was lost. A more shared multidisciplinary work was lost due to a great responsibility for the diarist nurse* (Field diary).

Analyzing nursing's internal processes, Kanban accelerated or escalated the specialization and fragmentation of nurses' practice. The nurses are divided into "diarist" and "on-call". The former, working every weekday at the hospital, are "horizontal", and in principle, should have close and continuous contact with a particular group of patients under their responsibility. The second group has more one-off or discontinuous contacts with hospitalized people. Diarists

Chart 2. Description of the research techniques used.

Technique used	Stakeholders and location	Objective
Participant observation	Teams involved in the operationalization of Kanban	Characterize the functioning of Kanban observing the relationships of teams, professionals and users and places
Seminários compartilhados	- Research Coordinators - Field Researchers - Hospital Managers and Coordination of the axes: green, critical, hospitalization, and adult and child ICU. - Internal Regulation Center - Professional Supervisions	Discuss with the institutional stakeholders the first analysis of the findings obtained from the participant observations.
Seminars shared with Nurses	Researchers and nurses: managers, clinic coordinators, diarists, on-call staff	Discuss with nurses the issues set in the seminars

Source: Technological arrangements for care management in a First Aid Hospital (FAPESP-PPSUS-CNPq).

are involved with "bed management", and are those who most realize how much administrative tasks were gradually taking up more of their daily work, to the detriment of clinical contacts with patients.

At the time, when we introduced Kanban (...) *we would go in, see patients one by one, make them a dressing, talk to the family, bonded with the family. It was another role, thoroughly taking care of the patient, to make him look good at discharge.* (...) *Then, this changed over time. So, to focus on reducing the patient's length of stay* (...) *we got lost. I didn't enter the ward anymore, to see the patient; I know more about him from head to toe, but I don't know anything about his face, nor about his relative, because I don't have time to talk to him.* (Diarist nurse, Shared Seminar).

A very positive assessment of nursing was perceived at the beginning of the observations concerning the incorporation of new technological arrangements for care management. Expressions of praise and satisfaction with the work that had been done since the incorporation of these arrangements were frequent. Kanban, nurses often said, during observations, "*contributed to organizing the flow to/from the hospital*"; allowed to "*harmonize, standardize*" practices; "*It was a watershed*." Before Kanban, "*we didn't know what was going on with the patients, what had been done, what they were waiting for.* (...) *Work was very fragmented and disorganized; the change was very significant*." (Field Diary).

Therefore, what was gaining greater visibility were the effects of micropolitics on the operationalization of Kanban on the work of nurses, hence the very striking division between the "diarists" and the "on-call workers". Some nurses acting in the same care unit have very different practices among themselves.

Purely administrative duties, which hold a large part of the day's work, keep them away from the clinical activity, to the point that they consider that the overload of such activities would compromise their performance in other realms of care. Moreover, on the contrary, they assess that the "on-call nurse" would be closer to the clinic and the patient (and the doctor), because they are exempt from the daily administrative activities.

The on-call nurse is very close, he knows when the patient got worse when he got better, (…) *that the patient has changed. So he can say: are you sure? Other discharge situations, too: are you sure you can discharge now?* (...) *Now, the on-call nurse, you get this respect, many are respected, because they provide quality care, have technical skills, know how to lead the team, and keep their sector in order* (Diarist nurse, Shared Seminar).

Therefore, it is necessary to recognize the fragmentation and specialization of nursing practice resulting from the implementation of Kanban, to realize the subtler differentiation within the profession.

We knew everything about the patient. Nowadays, I know about the CT Scan, report, ultrasound, but I don't know about the skin and the abscess. (Diarist nurse, Shared Seminar).

This restructuring of nursing work in the Kanban dynamics has produced overload and stress in daily work, as pointed out mainly by

diarists. They feel more pressure to perform from different service professionals, both the administrative sector and the assistance team:

(...) *We are pressured from all sides.* (Nurse, Shared Seminar).

Then, we look at the medical records, we see that there are exams waiting, we have to open the schedule of all exams to know if they are on the agenda, if they are not, we reprint the exam, give it to the doctor for him to stamp for us to print it again (...) *If any multi-professional evaluation is pending, we have to look for this multi-professional team, be them doctors, physical therapists, whatever; and say, 'look, we are waiting for your evaluation, or the psychologist's', and we say, I asked for evaluation, which has already been done, all has to be ready, nice and square, when we get there to bed management* (...). (Nurse, Shared Seminar).

Thus, instead of the existence of new nursing professional practices, intra-professional roles and responsibilities are redistributed, leading to work dissatisfaction, especially among diarists, and, in their opinion, a deteriorated quality of care. As one nurse stated:

As a technical manager, do I sometimes lose sleep thinking about how the care is? Knowing that both nurse and I can answer for something that we know is our duty and stopped doing it.

Nursing and Medicine: new interprofessionality or reproduction of power relations?

Nursing is thought to be the apex of a chain of command and control of the nursing staff, with legal-formal, technical-based authority, due to the knowledge it acquires during the undergraduate course, so much so that "*it leaves the undergraduate program with a team of technicians to lead*" (Nurse, Shared Seminar). The issue of authority arises for the nurse concerning its own professional body. The study was interested to see whether and how the management arrangements studied resulted in new interprofessional relationships, in particular, if there would be new configurations of nursing authority, particularly with doctors.

Historically, the nursing staff has always had a great deal of responsibility for the recording and continued data production[9], which is central and becomes operational with higher intensity in the Kanban. If, on the one hand, this intensification results in more work overload and responsibility, on the other, it could be an element of "promotion" of nursing in the hospital context, its increased prestige, and authority vis-à-vis other professionals[31].

One of the central roles of nurses is to collect and organize information, specifically the organization of spreadsheets, a fundamental tool to facilitate Kanban, as they contain the information about each patient required for discussion and referral of measures, which has already been conceptualized as corresponding to their own "facilitating role"[32].

Spreadsheets are the backbone of Kanban meeting's dynamics, and, as nurses organize information, they assume a strategic role in bed management, and this is undoubtedly an essential realm of hospital nursing authority reinforced by Kanban's operating logic.

It's just that we end up with more information about everything that happens (...) *The horizontal* [or diarist] *nurse who is the holder of the information, the on-call nurse, often abstains and says "look, this is the diarist's responsibility".* (Nurse, Shared Seminar).

These professionals often assume the place of coordinating Kanban meetings, which could be understood at first glance as a reinforcement of their professional authority.

The [nurse] *leads the meeting, introduces all patients by name, those who arrived today, tells a little about each one's story, and tells more about the evolution of other patients* (...). (Field Diary).

There is, therefore, what the team values highly and calls "the pre-Kanban", that is, all the interprofessional micro-political articulation that precedes the Kanban meeting, and in which nursing, particularly diarist nurses, has an active role, evidencing the "facilitating role" as can be seen from the following observation:

I ask her how she conducts the meeting, and she tells me, "Before I get here, I make a summary – via medical record – via the system – of each patient. I arrive at the meeting with the complete worksheet and the necessary referrals planned. (Field Diary).

Several manifestations indicate dissatisfaction and conflicts in the relationship with doctors. It seems that they often feel they are doing their actions at the service of doctors to make their work easier. The study reveals a facet of the nurse's work (and cause for much dissatisfaction) that is to play the role of "information bridge", but could be called "working as a message boy" among multi-professional staff and doctors, or among the doctors themselves.

They don't look for the speech therapist's assessment in the chart. They ask us what she said if she didn't provide the information to him herself. (Nurse, Shared Seminar).

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(...) *The surgeon is standing right there at his side. Then I say it's the surgery. So I have to talk to the surgeon, and the surgeon is right there, listening to me. But they don't talk to each other. I say, 'doctor ... you should ...* (Nurse, Shared Seminar).

Surprisingly, nurses often put themselves in the position of conflict mediators, especially among medical professionals.

[Citing a situation where there was a conflict between doctors] *'But he didn't ask for an exam? Exam? But the patient is pediatric. Why does the surgeon have to order an exam? Ah, but* [he] *was the one who evaluated the trauma, he removed him from the protocol, so he has to ask for an exam!' So I go to the pediatrician. Doctor, he asked if you wouldn't mind going there to repeat the exam, Me? But this patient is not mine; I just removed him from the protocol! The same thing happens with orthopedics.* (Shared Seminar).

In any case, the nurses reported having "gained some power" from the implementation of Kanban.

"Here is the empowerment of nursing", said a nurse to the researcher. According to her, this is due to the management, which is the "bigwig" of this place, which places nurses in strategic coordination spaces, and that makes nurses (not only the coordinating nurses) respected. They claim that this "culture" is already so strong that it no longer depends on who (political party) takes over the management". (Coordinator, Shared Seminar).

(...) *the nurse showed great security and authority in conducting the meeting, knew the cases in detail, and prompted very quietly and horizontally doctors for pending referrals of hospitalized inpatients.* (Field Diary).

At the same time, and almost paradoxically, nurses also relativize this empowerment by stating that the physician still has the power of decision.

We don't discuss assistance in the Kanban, we just report the diagnosis to the doctors, so that they tell them what to do with it. We give the diagnosis and pass 'the ball' to the doctor. The doctor has the final say. (Nurse, Shared Seminar).

However, they consider that, in some contexts and depending on the situation and the doctor, they can share the decision, or at least influence the clinical decision.

Because if we didn't have this flexibility at the time, it could be that the patient was discharged because it was already scheduled. So, in many situations, we say, 'oh, don't you think it's better to do it differently?' Some doctors accept this suggestion because we are closer there. (Nurse, Shared Seminar).

Discussion

The adoption of Kanban in the studied hospital illustrates the managerial process to which the health sector has been submitted all over the world. It is known that managerialism principles aim at strengthening economic management, efficiency, and effectiveness of public activity, although their achievements vary among countries and services[32]. The Kanban, in particular, is a "local" mechanism (as it is located within the hospital) that performs a dual function associated with managerialism principles: undoing (clinical and bed) management processes based on monoprofessionalism and self-regulation, and introducing governance mechanisms specific to organizations, whose effectiveness is expected to be due to adaptability and flexibility compared to management tools external to health organizations (top-down). In other words, Kanban aims to reconfigure interprofessionality, focusing on greater information sharing and decision making, and achieving greater effectiveness by bringing decision-making closer to professionals.

The direct consequence is having to look at the effects of Kanban on health professions. The discussion presented here focuses on nursing, insofar as health work reconfigurations tend to favor analyses of the medical profession[33-36].

A relevant discussion aspect concerns the bipartition of traditional nurse activities between direct patient clinical care (on-call nurse) and the bureaucratic-administrative functions (diarist nurse). The latter refer to both the "steps" required to increase bed turnover and the collection and organization of information that will be used at team meetings. The nurse has always accumulated these two attributions, although, in recent decades, some debate regarding the crushing of time devoted to direct care to the bed has emerged because of the more bureaucratic and administrative responsibilities[37]. The point is that Kanban allows an intra-professional differentiation, which fits into the literature on hybrid professionals (or hybrids). Hybrids are central to the realization of managerialism, as they lead managerial rationality into cultures and professional identities, rather than being imposed from outside[38]. There has been no consensus in the debate about the practical ability of hybrids to operate the expected changes in work processes, thus, in the "professional thinking" mode. One reason concerns the hybridized professional group: Hybrid doctors generally reinforce their power because, besides technical-scientific com-

petences, other doctors and professionals also recognize management skills[39]. In contrast, hybrid nurses struggle to assert themselves above all in their relationship with other professional groups, as they are not recognized as having competences for this role[40,41], which may configure reactive management roles.

Now, the empirical findings of this study seem to prove doctors' resistance, if not indifference, to the increased bureaucratic skills that diarist nurses (hybrids in this case) acquire in Kanban.

The findings also allow us to observe another relevant aspect of the discussion of hybridization. Diarist nurses did not change their hierarchical position in the hospital (vertical mobility) compared to other nurses and other professional groups. This reinforces resistance, if not the indifference of them all, to the attempts to assert management control that diarist nurses are claiming in the Kanbans. In a nutshell, evidence suggests that nursing hybridization without formal alteration of the emergency service organization chart has limited effects. On the other hand, it is not clear what effects are possible if the formal alteration of the organization chart reinforces the role of hybrid professionals.

Other evidence reveals that the fact that nurses have official, not just unofficial, and negotiated control, is not necessarily a central element in their interprofessional assertiveness[37]. The most striking example of this finding is the workload and discontent of diarists for taking on the so-called "administrative" activities, living an even more radical departure from direct patient care, an activity more associated with on-call personnel, due to their proximity to doctors and their relief of such more routine activities.

Nursing's responsibility for the real-time collection, recording and systematization of information, an essential element to Kanban's functioning, gives it an active role and visibility in the device's conduct, although this leadership is not seen, by the category, as necessarily an increased power vis-à-vis the doctors, who would still mostly hold the clinical decision and case conduct.

In preparing for the Kanban – "the pre -Kanban" – when all the necessary articulations are made for the meeting to be swift, the nurse remains irreplaceable, among other things because it is the professional with more permanence in the hospital, which circulates the most, and holds the most information, and that is where its professional power lies, sometimes invisible but fundamental and irreplaceable. That, we might say, was already a feature of the profession that remained unchanged with the Kanban.

What could be said is that Kanban takes on two meanings for nursing, as it provides nurses with a more significant role in the work processes, specifically in bed management, but, at the same time, distances them from the ideals on which the nursing practice has become professional, and considers it to be its distinctive mark compared to medicine. Participation in Kanban shows nursing professionalism at a crossroads: between the bureaucratic control of organizations and the empowerment of the application of its knowledge before medicine.

Conclusions

Kanban has caused essential changes in nurses' professional practice, although there is still ambiguity about how much new interprofessionality has been produced when considering the relationship with doctors. The relatively recent adoption of the device may not yet allow for a more far-reaching assessment of possible ongoing transformations. Ambiguous perceptions are found the nurses as to how much Kanban has, in fact, provided a new interprofessionality, in which they would have a more horizontal relationship with doctors, influencing more the conduct of cases, or would be living only an exacerbation of "doctors' secretaries" function, mainly carrying out support activities for those professionals and other professionals on the team. The fact that nurses are the "keepers" of information and play a crucial role in enabling the real-time use of a large mass of clinical and operational data – the backbone of Kanban's logic – undoubtedly gives these professionals more visibility, and the recognition of its indispensability when it comes to improving hospital care. We might say, metaphorically, that the Kanban has been producing small quakes in the territory of interprofessionality, but not a seismic shake capable of producing a radical reshuffle of the long-held power relationships still dominant in the hospital.

Collaborations

LCO Cecílio: conception, design, analysis, and interpretation of data, drafting of the paper and its critical review, and approved the version to be published. AA Chioro dos Reis and T Correia: contributed to the conception, design, analysis, and interpretation of data; drafting of the paper and its critical review; read and approved the final version of the manuscript. R Andreazza: performed the empirical research; contributed to the design, analysis, and interpretation of data; drafting of the paper and its critical review. SM Spedo: contributed to the conception, design, analysis, and interpretation of data; drafting of the paper and its critical review. NLM Cruz and LS Barros: performed the empirical research; critical review and read and approved the final version of the do manuscript. G Carapinheiro: contributed to the design, analysis, and interpretation of data; drafting of the paper and its critical review; read and approved the final version of the do manuscript. MC Schveitzer: performed the critical review; read and approved the final version of the do manuscript.

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