PAPER DETAILS

TITLE: DETERMINING THE LEVEL OF KNOWLEDGE, AWARENESS, AND PERCEPTION OF

TELEMEDICINE IN PHYSICAL MEDICINE AND REHABILITATION PHYSICIANS

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Determining the Level of Knowledge, Awareness, and Perception of Telemedicine In Physical Medicine and Rehabilitation Physicians

Fiziksel Tıp ve Rehabilitasyon Hekimlerinde Teletıpla İlgili Bilgi, Farkındalık ve Algı Düzeyinin Belirlenmesi

ABSTRACT Objective:

Telemedicine applications are becoming increasingly common. Our aim in this study was to measure the knowledge, awareness and perception levels of physiatrists on this subject.

Material and Methods:

This study was planned as a cross-sectional survey study. Physiatrists actively working in Turkey were asked to fill in the questionnaire created by the researchers, prepared with google docs and shared via email/WhatsApp/Telegram platforms.

Results:

The questionnaire was answered by a total of 109 physicians, 54 women (49.5%) and 55 men (50.5%). 63.3% of physicians stated that they knew telemedicine partially. Physicians who knew how to remotely apply physical examination was 10.09%. The disadvantages that physicians mostly agreed on were the increase in the risk of malpractice (73.4%) and the decrease in professional satisfaction (76.1%). 71.6% of physicians believe that physical contact increases the feeling of trust in the patients and positively affects the success of the treatment. Orthopedic and neurological rehabilitation came to the fore in the most difficult areas to evaluate in telemedicine. Neuropathic pain was a less challenging area with 36.6% of physicians.

Conclusion:

There is a lack of knowledge of our physicians about the content, application areas, responsibilities and jurisdictions of the concept of telemedicine. Our physicians think that their professional satisfaction will be less in this system with a higher malpractice risk. Potential barriers should be analyzed well and the system should be well planned so as not to victimize physicians and patients in physiatry practice. Our study will be a guide in this context.

Key Words:

Telemedicine, Physical Medicine and Rehabilitation, Physiatry

DOI: 10.53394/akd.1145271

ÖZ

Amac:

Teletip uygulamaları giderek yaygınlaşmaktadır. Bu çalışmadaki amacımız fiziksel tip uzmanlarının bu konudaki bilgi, farkındalık ve algı düzeylerini ölçmektir.

Gereç ve Yöntemler:

Bu çalışma, kesitsel bir anket çalışması olarak planlanmıştır. Türkiye'de aktif olarak çalışan fizik tedavi uzmanlarından araştırmacılar tarafından oluşturulan, google docs ile hazırlanan ve e-posta/WhatsApp/Telegram platformları üzerinden paylaşılan anketi doldurmaları istendi.

Bulgular:

Anketi 54 kadın (%49,5) ve 55 erkek (%50,5) olmak üzere toplam 109 hekim yanıtlamıştır. Hekimlerin %63,3'ü teletip'ı kısmen bildiğini belirtmiştir. Uzaktan fizik muayene yapmayı bilen hekimlerin oranı %10,09'du. Hekimlerin en çok üzerinde uzlaştığı dezavantajlar ise malpraktis riskinin artması (%73,4) ve mesleki memnuniyetin azalması (%76,1) idi. Hekimlerin %71,6'sı fiziksel temasın hastalarda güven duygusunu artırdığına ve tedavi başarısını olumlu etkilediğine inanmaktadır. Teletipta değerlendirilmesi en zor alanlarda Ortopedik ve Nörolojik Rehabilitasyon ön plana çıkmıştır. Nöropatik ağrı, doktorların %36,6'sı ile daha az zorlayıcı bir alan olarak saptandı.

Sonuc:

Hekimlerimiz arasında teletip kavramının içeriği, uygulama alanları, sorumlulukları ve yetki alanları konusunda bilgi eksikliği bulunmaktadır. Hekimlerimiz malpraktis riskinin daha yüksek olduğu bu sistemde mesleki memnuniyetlerinin daha az olacağını düşünmektedirler. Fizik pratiğinde hekimleri ve hastaları mağdur etmemek için olası engeller iyi analiz edilmeli ve sistem iyi planlanmalıdır. Çalışmamız bu bağlamda yol gösterici olacaktır.

Anahtar Kelimeler:

Teletip, Fiziksel Tip ve Rehabilitasyon, Fiziyatrist

INTRODUCTION

The restrictions imposed by the Covid-19 pandemic and the extraordinary intensity of the healthcare system have also affected many elective patients' access to healthcare. The telemedicine system covers all kinds of remote health services by meeting on common ground with the fields of medicine, telecommunications and information (1). World health organization (WHO) emphasizes that telemedicine uses information systems and communication technologies to overcome physical barriers, and increase access to health care services (2). Telemedicine in progress brings its own barriers, legal and ethical considerations to consider. When evaluating information technologies (IT) in health care, not only the technology itself but also the interaction between the technology, environment and human behaviors must be taken into account. Evaluation thus has to be unique by the community but also be broad enough to include standards for human being rights and health (3).

Developing technology brings multiple e-health interventions within the diagnosis, monitoring, and managing of diseases. Different forms of these interventions like teleconsultation, teleradiology, teledermatology, telepathology, even technologies like mobile applications, mobile devices, digital therapy, and artificial intelligence or machine learning can all be named under the telemedicine umbrella. Despite the almost 20 years of experience, the appropriate adoption and use of telemedicine in daily practice worldwide has been slow (4). Not surprisingly there has been a rapid improvement in telemedicine development after the Covid-19 outbreak (5). In Turkey, remote reporting of teleradiological imaging examinations is currently actively practiced and medical information is created. Teleradiology can be defined as non-synchronous or asynchronous applications of telemedicine (6). The term asynchronous means that the stored data can be processed at any time to produce information. The synchronous applications require real-time implementations for users. With the pandemic process, the tele-health project action plan was announced by the Ministry of Health of the Republic of Turkey in parallel with its pioneers in the world. One of the 3 main branches mentioned in the pilot application was physical medicine and rehabilitation. The application is planned as a pioneer in hospitals that continue to operate as pandemic hospitals. At present, the studies to establish the infrastructure of the synchronous telemedicine system are continuing. Our aim in this study is to measure the knowledge and awareness levels of physiatrists on this subject and to measure the advantages-disadvantages and comfort perceptions about clinical applications.

MATERIALS and METHODS

This study was planned as a cross-sectional survey study. The research was approved by the local ethics committee (Date 22 January 2021; reference number, 107/76). The study was carried out according to the ethical standards specified in the 1964 Helsinki Declaration. The physical medicine and rehabilitation physicians working actively in Turkey were asked to fill in the questionnaire created by the researchers. The questionnaire was formed mostly by the literature previously reported but expanded with the arrangements for the physiatry in particular (7-9). The questionnaire was prepared to collect information on four different topics. The first part is prepared for basic socio-demographic data (4 questions). The second part has been aimed to determine the level of knowledge and awareness about telemedicine (8 questions). In the third part, questions evaluating the perception of the advantages and disadvantages of telemedicine are included (14 questions). In the fourth section, questions about clinical applications of telemedicine in the physiatry practice were asked (10 questions). The questionnaire was prepared through google docs and delivered via e-mail/WhatsUp/telegram platforms that are specific for the physiatrist. The questionnaire had first came out on April 2021 and beheld active till December 2021. Reminders and encouragement to join the study were supplied by the researchers from time to time (twice a month). Since the questionnaire has been settled to show up only for the ones who give online approval, all the responders were asked to approve the enlightened consent form firstly when they reach out to the survey.

Statistical Analysis

The information gathered from the survey was analyzed by Statistical Package for the Social Sciences (SPSS) 22. Descriptive analyses were used for percentages and frequencies. Comparison of subgroups was done with chi-square tests. P value above 0.05 was considered significant.

RESULTS

The questionnaire was shared twice a month in groups (during 8 months time) with physiatrists via electronic platforms. There were a total of 683 physicians in the groups but the survey answered only by a total of 109 physicians, 54 women (49.5%) and 55 men (50.5%). Responce rate was 15.9%. The socio-demographics of the responders were shown in Table I. The mean age of the responders was 36.69±8.43 years. The vast majority of the physicians were not using telemedicine in routine practice (84.4%).

Table I. Sociodemographic properties of physiatrists

	Responders n (%)	
Age (years), mean±SD	Mean±SD:36.69±8.43	
Sex		
-Female	54 (49.5)	
-Male	55 (50.5)	
Institution of employment		
- Public Hospital	39 (35.8)	
- City hospital	35 (32.1)	
- Private hospital/clinic	19 (17.4)	
- University Hospital	16 (14.7)	
Do you provide health services with		
telemedicine?		
-Yes	17 (15.6)	
-No	92 (84.4)	

Physicians' knowledge and awareness about telemedicine were shown in Table II. While very few physicians thought that they knew what telemedicine was (16.5%), the vast majority reported that they knew only partially (63.3%).

The number of physicians who know how to apply medical applications (physical examination, laboratory evaluation, imaging evaluation, etc.) related to the musculoskeletal system and diseases remotely via telemedicine system were only 11 (10.09%) unfortunately. Physicians who were familiar with the technological infrastructure and tools (computer, camera, microphone, application and applications, etc.) required for the telemedicine system were 73.4%. While no physician received any training on telemedicine applications at the faculty of medicine, only 3 (2.8%) physicians stated that they attended the courses after graduation. A great majority of physicians did not know their legal responsibilities and jurisdictions as a physician in the telemedicine system (75.2%). The percent of physicians who do not know whether the clinical practices performed with telemedicine are within the scope of the compulsory professional insurance was also quite high (89%).

Perceptions of the advantages of telemedicine were figured in Table III and the disadvantages and potential barriers were shown in Table IV. More than half of the physicians stated that telemedicine facilitates patients' access to physicians and medical services. Almost 75% of the physicians agreed that patients those living in rural areas should have priority access to telemedicine. According to responders telemedicine ensures more effective use of time for patients rather than physicians, 54.1% and 33% respectively. 74% of physicians stated that telemedicine would be a protective instrument from physical violence. The barrier most agreed upon by physicians was increased malpractice risk (73.4%) and decreased occupational satisfaction (76.1%). Most of the physicians (71.6%) believe that physical contact increases the feeling of trust in patients and positively affects the success of the treatment. Therefore, the perceived success of the treatment in the telemedicine system is lower. Another prominent barrier we identified was that physical examination requires one-to-one contact, it is not correct to do it remotely (61.5%). Consistent with the previous statement they agreed that telemedicine applications should be prioritized for patients who have previously been physically/face-to-face evaluated in a healthcare facility (67.9%). Although we could not detect a prominent opinion in terms of verbal/psychological

Answer

n (%)

Table II. The results of physicians' knowledge and awareness about telemedicine

	Answer	II (70)
I know what telemedicine is, its scope, and its application	Yes	18 (16.5)
areas.	Partially	69 (63.3)
	No	22 (20.2)
I know how medical applications (physical examination,	Yes	11 (10.1)
laboratory evaluation, imaging evaluation, etc.) related	Partially	54 (49.5)
to the musculoskeletal system and diseases can be	No	44 (40.4)
applied remotely with the telemedicine		
I am familiar with the technological infrastructure and	Yes	30 (27.5)
tools (computer, camera, microphone, application and	Partially	50 (45.9)
applications, etc.) required for the telemedicine system	No	29 (26.6)
I received training on telemedicine applications during	Yes	0
my medical education	No	109 (100)
I received training or attended courses on telemedicine	Yes	3 (2.8)
applications after graduation	No	106 (97.2)
The clinical practices I will do with telemedicine are	Yes	6 (5.5)
within the scope of my compulsory professional	No	6 (5.5)
insurance	No idea	97 (89)
I know my legal responsibilities and jurisdictions as a	Yes	2 (1.8)
physician using telemedicine.	Partially	25 (22.9)
	No	82 (75.2)

Perception level of potential advantages of telemedicine ■ strongly agree ■ agree ■ no idea ■ don't agree ■ strongly not agree It is safer in terms of physical violence against the physician. Telemedicine is by no means an effective practice.. It is an application where time can be used effectively in terms of patients. It is an application where time can be used effectively in terms of physicians. Telemedicine should be a priority for patients in large cities (where there are fewer physicians relative to the.. It should be a priority for patients in areas such as rural 9,2 12,81<mark>,</mark>8 areas where access to healthcare providers or... It facilitates patients' access to physicians and medical

Table III. Advantages of telemedicine

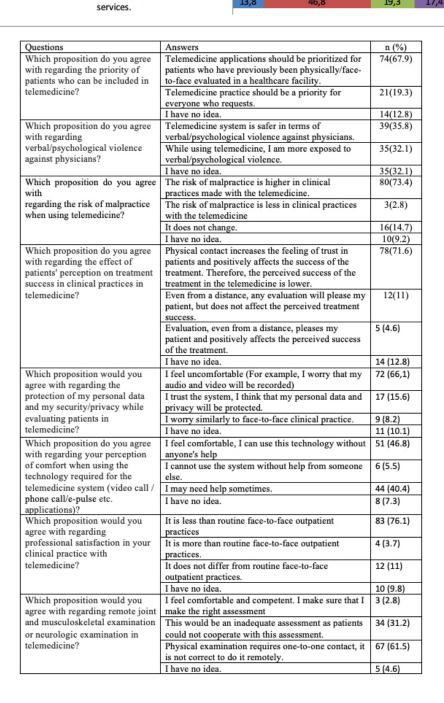


Table IV. Disadvantages and potential barriers of telemedicine

violence against physicians, not to be underestimated majority of the physicians (32.1%) reported the fear of being exposed to verbal/psychological violence. Another loudly stated anxiety was that they would feel uncomfortable about the protection of personal data and security/privacy (66.1%). One further notable barrier was nearly half of the physicians' incapability of using the system without help from someone else or at least requiring some help (5.5% and 40.4%, respectively). We have remade the analyses with the crosstabs in the view of gender, age (young and elder by the cutoff 40) and workplace differences but there were no meaningful differences on behalf of the opinions except the women's hesitations on the verbal violence against them.

According to our results, women physicians seem to have trouble ending up with a decision about the issue (p=0.032). Tables V-VI represents the comfort level and difficulty in clinical applications, respectively. It seems that physicians would feel uncomfortable while arranging any treatment or document in telemedicine. The most noticeable uneasiness was seen in the pediatric patient group (83.5%). The most difficult task to evaluate in telemedicine was found to be orthopedic and neurologic rehabilitation followed by regional pain syndromes. Neuropathic pain seems to be less of a concern in telemedicine, with 36.6% of physicians.

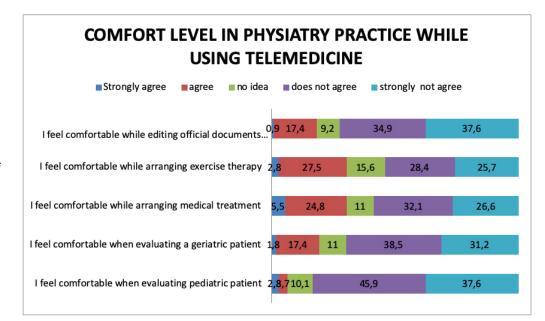


Table V: Comfort level in physiatry practice while using telemedicine

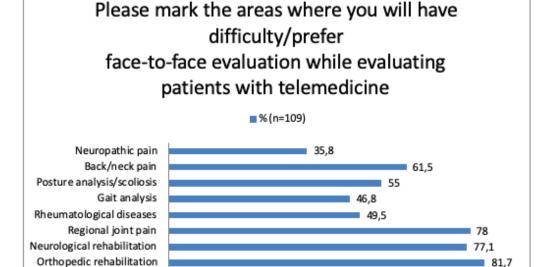


Table VI: Areas of difficulty in physiatry practice when using telemedicine

DISCUSSION

As far as we know, this study is the first comprehended telemedicine knowledge and awareness survey applied in physical medicine and rehabilitation physicians particularly. Physiatrists reported telemedicine was useful for patients and had some potential advantages for themselves but were less satisfied or faced with malpractice. Physiatrists also agreed on physical examination can not be applied remotely and reported this as the reason for patients' low satisfaction. Physiatrists' struggled areas were reported as rehabilitation (orthopedics or neurologic) followed by regional pain syndromes (knee, shoulder, hip, etc). Our results were consistent with the other studies' results on the knowledge of telemedicine. Previously 96.6% of physicians reported low or very low levels of knowledge about telemedicine (8). Another study revealed 46.1% of the physicians among various specialties have low knowledge levels about telemedicine (7). We found very few physiatrists thought they knew what telemedicine was (16.5%), and the vast majority (63.3%) stated that they knew it partially.

Quite a few physiatrists (10.09%) reported that they knew how to apply medical applications (physical examination, laboratory evaluation, imaging evaluation, etc.) related to the musculoskeletal system and diseases remotely via telemedicine. A recent review provides a detailed virtual musculoskeletal examination with a specific set of guidelines to enhance the information obtained when evaluating the shoulder, hip, knee, ankle, and cervical and lumbar spine, which can be refined according to the capabilities of the patient and examiner (10). Iyer et al., acknowledged the limitations of a remote examination and discuss maneuvers that cannot be performed remotely. They emphasized a needed framework for the standardization of the remote physical exam (11). We can argue more than a standard virtual examination with the developing technology. A motion-based machine learning software seems to be a potential substitute for a shoulder range of motion examination (12). Besides lack of knowledge of remote examination details, the rate of physicians who were confident in their remote physical examination was quite low, only 2.8 percent. 31.2% of physiatrists thought that patients could not cooperate with the examination. Physiatrists also reported that physical examination requires one-to-one contact, it is not correct to do it remotely (61.5%). The most frequently reported barrier of telemedicine among rheumatologists was the inability to perform a proper physical examination (13). In a recent study 36.2% of general practitioners (GP) were not satisfied with the specific assessments of the hand, shoulder, spine, hip, knee, and ankle; and 51.0% thought that their patients were not satisfied with the current quality of remote musculoskeletal consultations. Of note, 77.6% of GP's said that they were more likely to request additional investigations, and 75.6% stated that they were more likely to refer patients to a specialist after a remote musculoskeletal consultation (14). Clinicians prefer face-to-face consultations at the initial visit to establish a doctor-patient relationship; telemedicine can be a reasonable option for long-term patients where physical examination may not be needed (15). For example close monitoring of patients on biological therapies, telemedicine can be a useful tool to reduce the number of

clinical visits (16). Our results were consistent with the previous studies since 67.9% of the physiatrists agreed that telemedicine applications should be prioritized for patients who have previously been physically/face-to-face evaluated in a healthcare facility.

According to our study, more than half of the physicians stated that telemedicine facilitates patients' access to physicians and medical services, also a time saver for them. Physiatrists also reported that telemedicine was effective in general and beneficial. Especially for the patients living those living in rural areas should have priority access to telemedicine. Time effectivity and cost-effectivity were major benefits of telemedicine to rural communities and consumers (17). Previously reported that, video-assisted orthopedic consultation to a remote clinic is more cost-effective rather than traveling for consultations (18). Donelan et al., reported that virtual video visits were preferred to office visits by patients for convenience and travel time (19). Poor access to digital services and additional weak technology support in rural areas also should be kept in mind on the contrary for patients' perspectives (20).

Major medico-legal barriers which were stated mainly by physiatrists were fear of malpractice (73.4%), anxiety on behalf of the protection of personal safety and privacy (66.1%). A recent review, repeated mostly the same concerns: informed consent, protecting data and confidentiality, malpractice, and liability (21). To embodiment the physicians' concerns about exposure to malpractice risk, Fogel AL et al., published cases of medical malpractice related to telemedicine from the LexisNexis legal case database (22). Whether telemedicine introduces a new form of malpractice or is not too different from the normal one being present, is still controversial. Reviewers summarised the protective approach for malpractice as extended insurance coverage and civil responsibility (21). While there were references to the importance of the protection and privacy of patients' personal data in reviews, in our study, physicians were concerned about their own data and violence against own privacy like unauthorized video and audio recording (20, 21). Data protection and privacy of both patients and physicians must be ensured by an authority and guaranteed by law. Even cybersecurity should be considered and provided (23).

Remote applications naturally provide a shield against physical insults; we reported 74% of physicians stated that telemedicine would be a protective instrument from physical violence. Workplace violence against physicians is an arising threat of medical practice across the globe (24). A study from Turkey reported that physicians were exposed to verbal and psychological violence more than physical violence (25). Previously telehealth has been explored in terms of its potential to be protective or useful against domestic violence (26). However, violence against a physician on telemedicine has never been mentioned in the literature before. We reported that 32.1% of the physicians reported the fear of being exposed to verbal/psychological violence while 35.8 % reported that telemedicine is safer in terms of verbal/psychological violence against physicians. Nonetheless, just as many physicians remained undecided. A study from Jordan revealed that male doctors are more exposed to violence or workplace abuse (27). In our study women physicians seem to be mostly undecided whether telemedicine is a protector or provoker against verbal or emotional violence.

Tenford et al., reviewed how telehealth may work in the field of physical medicine and rehabilitation. Reviewers gathered the evidence for patients with cardiac diseases, orthopedic problems, neurologic diseases, and musculoskeletal conditions may get benefit the telemedicine. Physiatrists may use telehealth to deliver care to patients with impaired mobility and those living in locations with reduced access (28). Even though patients seem satisfied and take advantage of telemedicine since they are incapable or disabled, we reported that physicians would feel uncomfortable while arranging any treatment in telemedicine. The most noticeable uneasiness was seen in the pediatric patient group (83.5%). The most difficult task to evaluate in telemedicine was found orthopedic and neurologic rehabilitation followed by regional pain syndromes. Neuropathic pain seems to be less of a concern in telemedicine, with 36.6% of physicians. There is a lack of knowledge on behalf of the comfort levels of physiatrists on specific tasks via telemedicine. Physiatrists deal with different and various types of patients. Especially rehabilitation is a huge area that anyone can be needed from cradle to grave. One size fits all approach is not suitable even in real-time physiatry practice, whereas telemedicine without standards and convenient protocols seem quite a challenge for physiatrists. In the study with 14 physiatrists, even though clinicians reported satisfaction on telemedicine, researchers pointed out that they focused only on outpatient musculoskeletal and sports medicine practices; other patient groups may have different health care needs that would be better served with face-to-face visits (29).

There are some limitations of this study. We concluded a cross-sectional survey and completed it in approximately 8 months time. Responders' perceptions may be affected by time changes, for example, violence against physicians is quite a hot topic in Turkey and accumulated life experiences may affect perceptions. Selection bias should be mentioned since we used e-mails and electronic platforms to reach the participants; the selected ones may have been more familiar with the use of technology Although we reached the largest number of physiatrists in the literature, initially we aimed to reach more of them. Our results with this number of participants cannot be generalized, but we think that it will still give an idea. The reluctance of physicians to participate in surveys may be a separate research topic. On the other hand, even though telemedicine applications in hospitals are increasing day by day, we reached fewer physicians with experience. Nonetheless, we believe the findings of this study still provide useful insights for the standardization of telemedicine.

CONCLUSION

In conclusion, telemedicine is quite a new area and is still in progress. This novel area with relatively little knowledge needs to be searched properly and our report will be a touchstone for further reports. Physiatrists need to be enlightened about ethics and legal rights. Physical examination is the most important determinant of patient management and proper diagnosis. Remote implementations of physical examination seem to be a major factor in both patients and physicians satisfaction or discomfort. Barriers and limitations of the system must be well defined. Our report, consistent with the previous literature, states that telemedicine can be a helpful tool for both patients and physiatrists, can save money, save time, and can offer a pinpoint solution for some patients. However uncontrolled and inappropriate use may create disappointment for both patients and physicians. Satisfaction does not mean always benefits for patients, and does not mean comfort always for the physicians. Matching the correctly selected patient with a well-structured telemedicine system maximizes the expected benefit. Our report will be a guide in this content to set standards.

Ethics Committee Approval:

This research complies with all the relevant national regulations, institutional policies and is in accordance with the tenets of the Helsinki Declaration, and has been approved by the Çukurova University ethics committee (Date 22 January 2021; reference number, 107/76).

Informed Consent:

All the participants' rights were protected and written informed consents were obtained before the procedures according to the Helsinki Declaration.

Author Contributions:

Concept – N.M.K., G.K., İ.T; Design -. N.M.K., G.K., İ.T; Supervision - N.M.K., İ.T.; Resources - N.M.K., G.K.; Materials - N.M.K., G.K., İ.T; Data Collection and/or Processing - N.M.K., G.K.; Analysis and/ or Interpretation - N.M.K., G.K.; Literature Search - N.M.K., G.K., İ.T.; Writing Manuscript - N.M.K., İ.T; Critical Review - N.M.K., G.K., İ.T.

Conflict of Interest:

The authors have no conflict of interest to declare.

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