Evaluation of demographic, clinical characteristics, severity, and clinical evolution of viral conjunctivitis at Eye Department of KCMC from January to May 2024

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ABSTRACT

Background: Viral conjunctivitis is a highly contagious eye infection affecting the cornea and conjunctiva, causing significant discomfort and visual impairment.
Objective: This study aims to evaluate the demographic and clinical characteristics, severity, and clinical evolution of viral conjunctivitis.
Method: A retrospective cross-sectional study conducted at the Kilimanjaro Christian Medical Centre (KCMC) Eye Department. Data collected from patient medical records, focusing on demographics, clinical presentations, diagnoses, and initial treatments over a five-month period. The study included all patients with hyperemic conjunctiva, while excluding those with a history of ocular trauma or features of bacterial/allergic conjunctivitis.
Results: A total of 57 participants were included, with a notable predominance of females (66.7%) and a significant representation of individuals aged between 50 and 64 years (29.82%). The overall mean age of participants was 39.72 years (SD = 16.17). Most patients were from the Kilimanjaro region (84.2%), particularly the Longuo ward (19.3%). Clinically, all participants exhibited redness of the eye, with other prevalent symptoms including excess tearing (94.7%), foreign body sensation (93%), and eye pain/irritation (91.2%). Severity classification indicated that 54.39% of cases were mild, with no statistically significant associations found between the severity of VC and age or gender. A comprehensive treatment approach was observed, with all patients receiving antibiotics, while 80.7% were treated with steroids.
Conclusion: These findings provide valuable insights into the epidemiological patterns and clinical manifestations of viral conjunctivitis in the Kilimanjaro region. Moreover, the observed seasonal variations in incidence highlight the importance of timely awareness campaigns to enhance diagnosis and management strategies.

Key words: Viral conjunctivitis, Conjunctivitis, Adenovirus

INTRODUCTION

Viral conjunctivitis is an eye infection characterized by inflammation of conjunctiva, primarily caused by adenoviruses (80% of cases). Other pathogens include herpes simplex and varicella-zoster viruses. Transmission occurs via direct contact with infected secretions or surfaces, making it highly contagious. It affects all age groups and outbreaks are common in crowded environments like schools and workplaces. Its management focuses on symptomatic relief and infection prevention. In Tanzania, especially around the Kilimanjaro Christian Medical Centre, outbreaks significantly impact public health. There is limited data on treatment protocols, highlighting the need for improved public education and research[1-8]. Though it affects all ages, it is particularly common among children and young adults[3]. In a case report done in North America, 125 cases were involved, a large proportion of patients (101) came from a single shipyard in San Francisco. The rest were townspeople and a few hospital employees, who had not been in contact with the eye clinic. They conclude that disease is contagious but not to an exceptional degree[9].

In a study done in China, the average age of the patients was 39.3 ± 14.6 years. There was no significant difference among the four different age groups (children- 3–12 years, adolescents- 12–18 years, adults- 18–60 years, and the aged- over 60 years), in terms of the proportion of mild, moderate, and severe cases. The majority of patients (30.2%) presented in winter followed by 29.9% during summer[3]. Also, a retrospective single-center case series study in Sydney Australia found that viral conjunctivitis patients mostly presented within a week. In this study, 368 eyes of 224 patients were diagnosed with viral conjunctivitis at the Sydney Eye Hospital from 1st January to 31st March 2017. The median age of patients

was 35.3 (range 7–82), and 59.8% of patients were males[10]. A cross-sectional study was conducted in Jinja-Hospital Uganda, 100 randomly selected respondents were involved, viral conjunctivitis was more prevalent in the age group of 25-40 years 50% (50), more in females 52% (52) than in males 48% (48) and it was associated with URTI 29% (29), more in urban places 71% (71), and was also associated with systemic conditions mostly in DM 20% (20)[11]. There is limited data on the demographic characteristics of viral conjunctivitis in Tanzania.

Viral conjunctivitis presents with redness, tearing, eye pain, and photophobia. It often includes swelling of the conjunctiva and eyelids, watery discharge, and blurred vision. Subepithelial corneal infiltrates may occur, leading to reduced visual acuity. Symptoms typically worsen over 1-2 weeks and gradually resolve over several weeks. In a case report done in North America, 125 cases were involved, it was described that viral conjunctivitis is primarily a conjunctival disease in most cases, the corneal involvement being secondary, and many patients with the typical conjunctival picture fail to develop keratitis but, in a few cases, punctate corneal changes can occur, the lesions are more likely to be from 0.5 to 1.5mm or more in diameter[9]. In a cross-sectional descriptive study conducted in Iran, 153 patients were involved, the most common clinical findings in patients were conjunctival injection (90.8%), eye discharge (86.6%), conjunctival haemorrhage (85%), tearing (80.4%), follicular reaction (75.8%), and foreign body sensation (67.3%). Also, there was a relationship between some clinical findings and a positive adenovirus genome test[12]. According to the standard treatment guidelines and national essential medicines list for Tanzania mainland, VC may be unilateral but usually bilateral. Its clinical presentation may include respiratory tract infection, watery eye discharge, burning, sandy or gritty feeling in the eyes, Diffuse pink or red conjunctiva due to subconjunctival haemorrhages, photophobia if the cornea is involved, normal visual acuity and preauricular lymphadenopathy. It appears in epidemics so there will be a history of contact with patients with a similar eye condition[13].

The severity of viral conjunctivitis can range from mild discomfort to severe visual impairment. Initial symptoms tend to worsen over 1-2 weeks, with the potential for subepithelial corneal infiltrates that can cause blurred vision. In most cases, symptoms resolve within 2-4 weeks, but in severe cases, symptoms may persist longer, necessitating medical intervention to prevent complications. In a retrospective single-center case series study done in Australia, 368 eyes of 224 patients diagnosed with viral conjunctivitis at the Sydney Eye Hospital from 1st January to 31st March 2017. Severity was defined as mild, moderate, or severe according to the documentation of clinical signs in the patient records, for hyperemia (mild-47% moderate-42%, or severe-11%), conjunctival follicles (mild-36.5% moderate-38.8%, or severe-24.7%), conjunctival papillae (mild-16.7%, moderate-58.3%, or severe-25.0%)[10]. While in a prospective cohort study conducted in Japan, out of the 32 cases, with a mean age of 38.4 years, 23 (72%) developed conjunctivitis in the contralateral eye, the severity of the disease varied widely after HAdV exposure, typically taking 5–12 days to incubate. The range of symptoms can vary from mild or subclinical ocular surface inflammation to severe conjunctivitis, characterized by significant sensitivity to light, excessive tearing, swelling of the eyelids, and chemosis[14]. According to the standard treatment guidelines and national essential medicines list for Tanzania mainland, viral conjunctivitis is usually self-limiting, but the irritation and discharge get worse in 3 – 5 days before getting better and symptoms can persist for 2–3 weeks[13].

Viral Conjunctivitis (VC) is a highly contagious eye infection that can cause severe discomfort, visual impairment, and complications like corneal scarring (when there is corneal involvement), this study can bridge knowledge gaps, fostering a holistic approach to managing viral conjunctivitis at KCMC and beyond.

Objective: Evaluation of demographic, clinical characteristics, severity, and clinical evolution of viral conjunctivitis at KCMC Eye Department from January 2024 to May 2024.

MATERIALS AND METHODS

This hospital-based retrospective cross-sectional study was conducted from January to May 2024 at the Eye Department of Kilimanjaro Christian Medical Centre (KCMC). It included all patients presenting with hyperemic conjunctiva during the study period, excluding those with ocular injury, trauma, or clinical features suggestive of bacterial or allergic conjunctivitis. The case definition of viral conjunctivitis was based on clinical presentation such as redness, tearing, photophobia, and itching confirmed through slit-lamp examination performed on all patients. Key examination findings included conjunctival injection although there was no any corneal involvement. Patient medical records were reviewed to extract demographic information (age, gender, occupation, socioeconomic status, and residential location) and clinical characteristics, including presenting symptoms and treatments received. Disease severity was classified as mild, moderate, or severe based on

the number of days since symptom onset. Treatments documented included the use of artificial tears, topical antibiotics, corticosteroids, and anti-allergic medications.

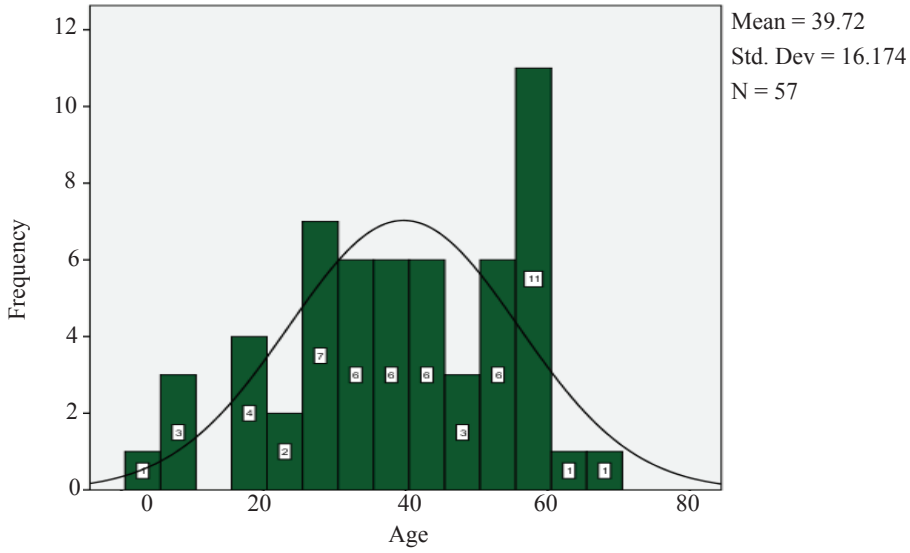
Analysis: Data were coded, cleaned, and analyzed using SPSS version 25. Descriptive statistics summarized demographic and clinical characteristics using frequencies, percentages, means, and standard deviations. Fisher's exact test assessed associations between categorical variables, while ANOVA compared the mean number of clinical characteristics across age groups. A p-value of <0.05 was considered statistically significant. Data quality was ensured through thorough cleaning, and findings were compared with previous studies to provide context and interpret relevance.

RESULTS

Demographics

A total of fifty-seven participants were involved in the study. Among these participants, 66.7% were female. Additionally, 29.82% of the participants were aged between 50 and 64 years. The ages of the participants ranged from 3 to 68 years (Figure 1), with a mean age of 39.72 years (SD = 16.17). The majority of participants came from the Kilimanjaro region, accounting for 84.2%, with a specific concentration in the Longuo ward, which comprised 19.3% of the participants.

Figure 1: Age of participants



Clinical characteristics

On clinical presentation, the following symptoms were observed in the participants: 57 (100%) reported redness of the eye, 54 (94.7%) reported excess tear production, 53 (93%) reported a foreign body sensation, 52 (91.2%) reported eye pain/irritation, 51 (89.5%) reported sensitivity to light, 49 (86%) reported eye itching, 47 (82.5%) reported eye discharge, and 22 (38.6%) reported having sticky eyelids in the morning. Additionally, 6 (10.5%) had periauricular lymphadenopathy, and 6 (10.5%) reported signs of upper respiratory tract infections. All patients presented with at least four clinical characteristics, with the majority, 36.8%, exhibiting seven clinical characteristics (Table 1), and there was no corneal involvement.

Table 1: Number of clinical presentations.

No. of clinical presentations	Frequency	(%)
4	2	3.5
5	7	12.3
6	6	10.5
7	21	36.8
8	16	28.1
9	5	8.8
Total	57	100.0

Table 2: Severity of viral Conjunctivitis vs number of clinical presentations Crosstabulation

		Number of clinical presentations						Total
		4	5	6	7	8	9	
Severity of viral conjunctivitis	Mild	1	5	5	9	7	4	31
	Moderate	1	2	1	8	6	1	19
	Severe	0	0	0	4	3	0	7
Total		2	7	6	21	16	5	57

Table 3: Eye itching vs severity of viral conjunctivitis crosstabulation

Mild Moderate			Severity of viral conjunctivitis			Total
			Mild	Moderate	Severe	
Itchy eyes	Present	Count	29	15	5	49
		% within severity of viral conjunctivitis	93.5%	78.9%	71.4%	86.0%
	Absent	Count	2	4	2	8
		% within severity of viral conjunctivitis	6.5%	21.1%	28.6%	14.0%
Total		Count	31	19	7	57
% within severity of viral conjunctivitis		100.0%	100.0%	100.0%	100.0%	

Table 4: Correlations among variables

		1	2	3	4	5	6	7	8
1	Number of clinical presentations								
2	Itchy eyes	-.2							
3	Excess tear production	-.04	-.1						
4	Eye pain/irritation	-.45**	-.13	.2					
5	Sensitivity to light	-.51**	.03	-.08	.50**				
6	Eye discharge	-.52**	.21	.30*	.02	.14			
7	Sticky eyelid in the morning	-.64**	-.09	.19	-.01	.15	.27*		
8	Foreign body sensation	-.39**	-.11	.24	.40**	.35**	.05	.08	

*Note = 57, **P<0.01, *P<0.05*

Severity and clinical evolution

The severity of viral conjunctivitis was classified as mild if symptom onset occurs within 2 to 3 days, moderate if it occurs within 4 to 6 days, and severe if symptoms appear after 7 days. Most participants (54.39%) had mild viral conjunctivitis (Figure 2). Most participants were aged between 20 and 34 years (Figure 3), and there were more females than males in the study (Figure 4). When evaluating the relationship between the severity of viral conjunctivitis and different age groups using Fisher's exact test, the P-value was 0.13. This indicates that there is no statistically significant association between the severity of the condition and the age groups within the study population. Similarly, when examining the association between the severity of viral conjunctivitis and gender, the Fisher's exact test yielded a P-value of 0.62. This result also suggests that there is no statistically significant association between the severity of the condition and gender among the participants. There was no statistically significant association between the severity of viral conjunctivitis and various clinical characteristics. The P-values for the characteristics were as follows: eye itching (0.14), persistent redness (not applicable as it was constant), excessive tearing (1.00), eye pain (1.00), sensitivity to light (0.09), eye discharge (0.69), sticky eyelids (0.59), foreign body sensation (0.69), periauricular lymphadenopathy (1.00), and upper respiratory tract infection (1.00). All 57 patients (100%) received antibiotic treatment, while 46 patients (80.7%)

were treated with steroids**.** Additionally, 12 (21.1%) patients received artificial tears, and 5 (8.8%) were administered anti-allergic medications. When assessing the relationship between the severity of viral conjunctivitis and the type of medication administered, the p-values were 0.89 for steroids, 0.35 for artificial tears, and 0.24 for anti-allergic medications, indicating no statistically significant association. A one-way ANOVA was conducted to compare the number of clinical characteristics among six age groups. The results indicated no significant differences between the groups ($p>0.05$).

Figure 2: Severity of viral conjunctivitis

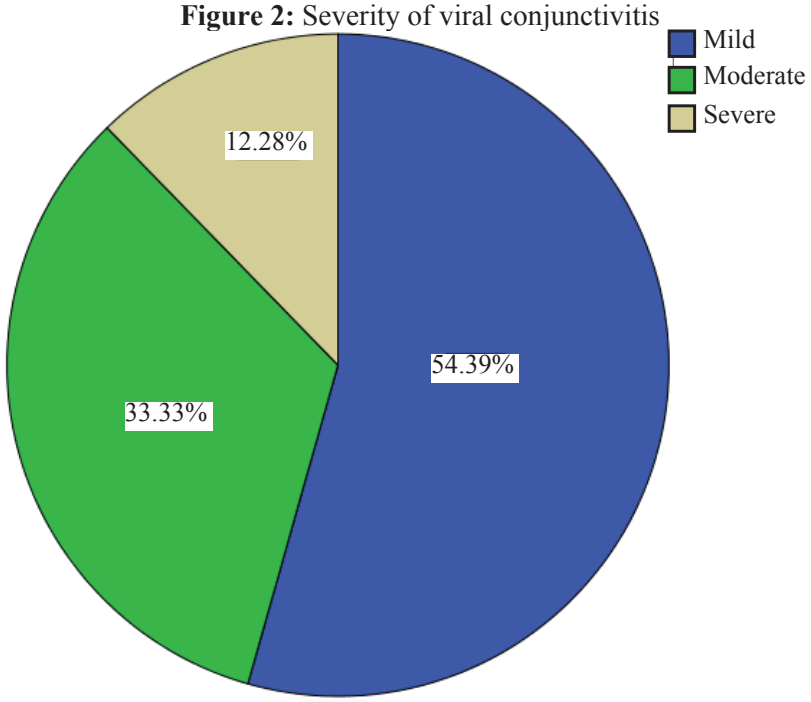


Figure 3: Severity of viral conjunctivitis by age group

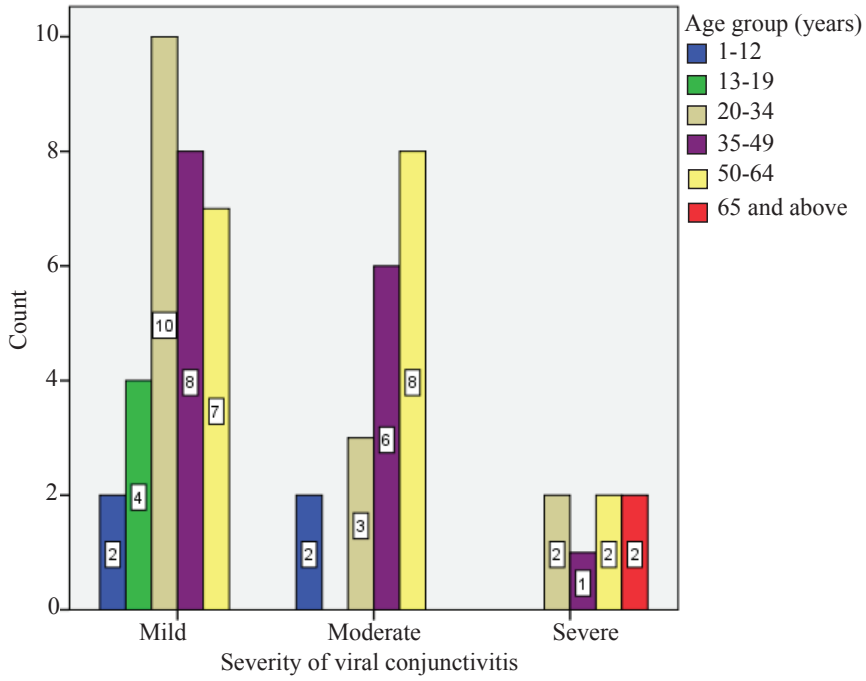
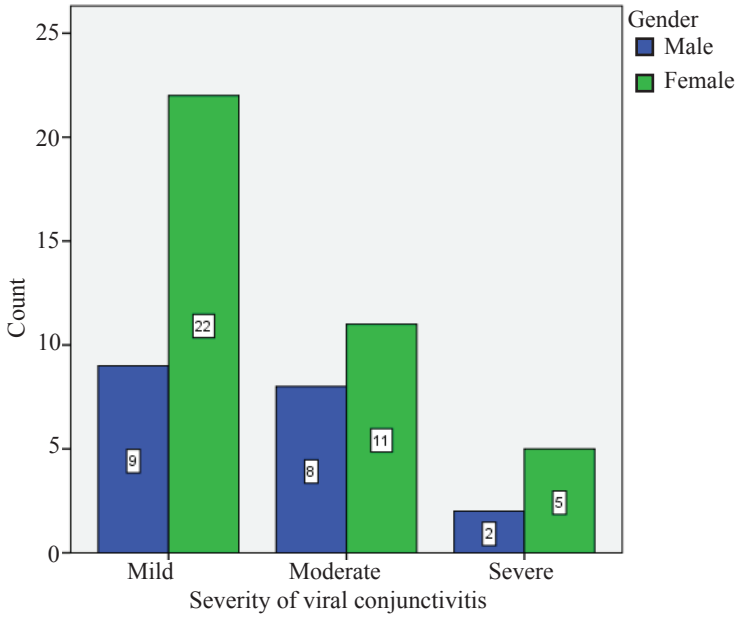


Figure 4: The severity of viral conjunctivitis by gender



DISCUSSION

This research enhances the understanding of viral conjunctivitis epidemiology in the Kilimanjaro region. Findings show a higher prevalence among females (66.7%) and individuals aged 50-64 (29.82%) years, aligning with global trends. The predominance of female cases may indicate gender-related differences in exposure, hygiene, or healthcare-seeking behaviors. The mean age of 39.72 years suggests middle-aged individuals are particularly susceptible, consistent with studies from Iran. These demographic insights are crucial for designing targeted public health interventions and awareness campaigns, ensuring effective prevention and management strategies for vulnerable populations[3,11,12].

The geographic concentration of participants from the Kilimanjaro region, particularly in the Longuo ward (19.3%), raises questions about the local environmental and socio-economic factors that may contribute to the higher incidence of viral conjunctivitis. It is also possible that this higher incidence is related to the proximity of the hospital in that area. Previous studies have indicated that urban areas and densely populated settings increase the risk of viral transmission due to close contact and potentially poorer hygiene conditions[11]. Byaruhanga, *et al*[12] reported similar findings in Uganda, where urban residency was associated with a higher prevalence of viral conjunctivitis. Therefore, it is crucial to investigate the specific environmental and infrastructural conditions in the Kilimanjaro region that may facilitate the spread of VC. Additionally, the reported incidence of VC being higher during certain seasons aligns with the findings from the study in China[3].

Notably, the presence of upper respiratory symptoms in 10.5% of cases reflects the documented association between viral conjunctivitis and respiratory infections[13]. Additionally, the occurrence of periauricular lymphadenopathy, though relatively low, underscores the systemic implications of viral conjunctivitis, corroborating findings from other studies[15].

Our study's data showing that the majority of patients exhibited multiple clinical characteristics further emphasizes the multifaceted nature of VC. The varied symptomatology and high rates of prior antibiotic use among patients suggest a need for enhanced diagnostic clarity to avoid unnecessary treatments, as many cases are viral in origin[10]. Overall, this research underscores the need for targeted public health measures and awareness regarding VC's clinical manifestations.

Furthermore, the prospective cohort study by Kimura *et al*[14] emphasized the potential for contralateral eye involvement post-adenoviral exposure, underscoring the contagious nature of viral conjunctivitis. This highlights the importance of monitoring patients closely, particularly during the incubation period, as the severity can vary significantly.

The analysis of symptom correlations revealed significant negative correlations ($p<0.01$) between the number of clinical presentations and eye pain, sensitivity to light, discharge, sticky eyelids, and foreign body sensation. These findings indicate that as symptom severity increases, the total number of distinct clinical features may decrease. This could be because some key symptoms tend to co-occur, meaning when a few hallmark signs (like pain, photophobia, sticky eyelids) are present, they may dominate the clinical picture, making the total

count of different symptoms appear lower as a patient with severe pain and photophobia might not report minor symptoms like tearing or itching.

In our study, there was no corneal involvement observed, consistent with findings from a North American case report involving 125 patients, where viral conjunctivitis was primarily conjunctival. It was described that corneal lesions may occur in some cases, they are typically mild, secondary, and not present in many patients with classic conjunctival symptoms[9].

The treatment modalities employed primarily antibiotics, steroids, and artificial tears reflected a broad approach to managing symptoms rather than targeting the viral aetiology, which is consistent with the standard treatment guidelines. This finding suggests a need for future studies to explore more targeted therapeutic interventions to improve patient outcomes in viral conjunctivitis.

A key limitation of this study due to its retrospective design, individual symptoms and examination findings were not consistently graded or documented in the patients records. As such, the severity classification was based solely on the duration of symptoms at presentation.

CONCLUSIONS

This study provides valuable insights into the epidemiological patterns, clinical manifestations, and management of viral conjunctivitis in the Kilimanjaro region. The higher prevalence among females and the middle-aged population underscores the need for targeted public health interventions. Our findings also stress the multifaceted nature of VC, with diverse symptoms and varying severity, reinforcing the necessity for accurate diagnosis and appropriate management strategies.

RECOMMENDATIONS

To effectively address VC, public health initiatives should focus on raising awareness about the disease's symptoms and prevention methods, particularly among vulnerable demographics. Further research is recommended to investigate environmental factors contributing to VC incidence in the Kilimanjaro region and to explore targeted therapeutic interventions that may enhance patient outcomes. Regular monitoring and education on hygiene practices can also help mitigate viral transmission during peak seasons.

Authors contributions

The research proposal was conceived and written collaboratively by all four authors: Bwire J, Tarimo A, Makupa W and Muro F. Each author contributed to developing the study design, methodology, data analysis, and manuscript preparation.

Disclosure

This research was conducted without any monetary grants or sponsorship from any organization.

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