



The Prevalence of Scabies in District Abbottabad of Pakistan

Falak Naz Tariq¹, Hajira Bibi¹, Ibrar Khan^{1*}, Sidra Tul Muntaha², Aneela Rehman¹, Azam Hayat¹, Mujaddad Ur Rehman¹

¹Department of Microbiology, Abbottabad University of Science & Technology, 22010 Havelian, Pakistan

²Department of Zoology, Abbottabad University of Science and Technology, 22010 Havelian, Pakistan

Abstract

Scabies is a skin infection which is caused by pathogen *Sarcoptes scabiei*. It is a contagious disease which is transmitted from one to another person through direct contact but can also be transmitted due to sharing of things like towels, clothing etc. It was estimated that almost 300 million cases of scabies occur worldwide. It is characterized by itching, rash, sores and thick crusts on different body parts such as fingers, axilla, wrist, and genitalia etc. The burrow ink and handheld tests are mostly used to screen a large number of patients. The current study was conducted to analyze the 3 years trend of scabies epidemiology on Tehsil level in different health care units of District Abbottabad during January 2017 December 2019. During the study period total 44,569 cases were reported in District Abbottabad. Results have shown that Primary health care facilities have highest proportion of scabies (67.38%) and prevalence was highest during 2018 (37.90%). The Highest frequency (32%) of scabies occurred during summer with peak in July. Tehsil Abbottabad (67.21%) showed high prevalence as compared to Havelian (32.79%). Risk factors for scabies prevalence might be higher humidity, physical overcrowding, illiteracy, and low socioeconomic status. There is a positive association between number of cases of scabies, temperature, and humidity because these factors provide suitable conditions for parasite growth and their survival in human body. The current findings may help the government in making infrastructure for the health-care system development in future.

Keywords: Scabies, *Sarcoptes scabiei*, Northern Pakistan

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*Corresponding Author:

abrar@aust.edu.pk

1. INTRODUCTION

Scabies was first described by a medical writer Aulus Cornelius Celsus in his book named De medicina from 25 and 35 AD ¹. In 1844, an Australian researcher Ferdinand Ritter Von Hebra explained the life cycle of mite, the stages of its life cycle and he also demonstrate through his experiments that *Sarcoptes scabiei* is the cause of scabies ². Scabies is a skin disease. The ectoparasite *Sarcoptes scabiei* is the etiological agent of scabies. This parasite is an important member of family *Sarcoptidae* and belong to a class of *Arachnida*. The ectoparasite *Sarcoptes scabiei* has basically three main developmental stages, first it will mature from egg into nymph and then from nymph it will be converted into larva^{3,4}. Now the mite has laid the egg, after

2 to 4 days the larva will hatch out and approximately within 15 days the entire developmental process of mite's life cycle will be completed⁵. After sometime the immune reaction will start showing the symptoms like itching and skin rashes on different body parts of the host such as fingers, axilla, wrists, areola and genitalia⁶. The exact number of cases all over the world are not known but it was identified that about 300 million cases of scabies occur worldwide⁷. The high global rate of this disease was seen in hot, tropical countries of the world⁸. But the countries of cold climate such as Scotland and Israel also supported the evidence of high prevalence rate of scabies in cold season^{9,10}.

The survival and infestation capability of mite remains until 24 to 36 hours even without host, especially in humid environment³. Usually 15 to 20 minutes are required for the mite to infect its host, so holding hand, sexual contact, breastfeeding and nursing children are at high of getting scabies from an infected person¹¹. Scabies disease is worldwide and is distributed as an endemic with high prevalence in urban and rural areas of developing countries because of poverty, overcrowding and mis-management^{12,13}. In this infection symptoms may be seen within two to four weeks after the infestation^{14,15}. But if a person has also been previously affected by this disease in that case the symptoms may be seen within two to three days after reinfestation^{16,17}. In case of Classic scabies an erythematous eruption of papules inside the burrows and very severe pruritus can be seen^{14,17}. The papules are large in number, erythematous, and usually have 1 to 2 mm diameter. Mostly the color of burrows may be whitish, grayish, reddish, or brownish serpiginous thread-like elevations are also sometimes formed, approximately 0.5 millimeters in width and several millimeters in length in the superficial skin¹⁸. Crusted scabies (also called as Norwegian scabies, scabies having crust formation, hyperkeratotic scabies, or Boeck scabies) these are highly dangerous forms of scabies and their main characteristic is that they have profuse proliferation of mites in the epidermis and widespread erythroderma having scales, crusts, hyperkeratosis and formation of gray to yellow-white papules, fissured plaques, and nodules¹⁹⁻²¹. Nodular scabies, is a clinical form of scabies, in this form pruritus occurs, erythematous nodules will also form and that are present on skin even after treatment of scabies^{17,22,23}. Bullous scabies, another rare clinical form of scabies, occurs mostly in elderly patients²⁴⁻²⁶. The main characteristic in this condition is that it has a bullous eruption also having papules and burrows, with nocturnal itching^{25,27,28}. On the basis of history, clinical diagnosis of classical scabies can be made (inflexible pruritus out of amount to noticeable changes in the skin with night-time irritation, concurrent invasion between domestic members and local interactions and clinical results (in typical sites erythematous papules, representative vertiginous holes)^{17,21}. The characterization of crusted scabies especially in an Immuno-compromised person is carried out by extensive, thick, hyperkeratotic papules, fissured plaques, and nodules. Diagnosis can also be done by microscopic examination of scrapings which are taken from skin scratches (erythematous papules or burrows, but not eczematous lesions) preferably in multiple sites, with a blade or curette in which the mite, ova or scybala can be seen^{15,29}. Addition of potassium hydroxide to the skin scraping on a slide in case of crusted scabies may help in the examination of the sample as it will soften excess keratotic debris¹⁶. Another approaches towards microscopy include "the adhesive tape test" as well as "the burrow ink test"^{16,30,31}. For the diagnosis of scabies dermoscopy is also an effective tool. The pattern of dermoscopy corresponds to the head (capitulum) and two pairs of frontal legs of the scabies mite having slight brownish or black triangular structure and structureless wavy lines which correspond to blown-up burrows giving the form of a delta wing jet with a contrail ("delta wing jet" mark)¹⁸. Scabies has many complications, due to scratching on skin there is a chance of entry of microorganisms. So, when skin barrier is disrupted, the secondary bacterial infections can occur. The mite is contributing in spread of bacteria because the *Streptococcus pyogenes* also known as group A streptococcus (GAS) and *Staphylococcus aureus* have been isolated from skin burrows of infected patients³².

The drugs of choice for the suppression of scabies mites are topical permethrin and oral ivermectin³³. Topical 5% permethrin cream has a success rate of 95 to 98% when used appropriately and highly effective for the management of scabies. The cream should be massaged slightly into the skin, applied overnight, and wash it after 8 to 14 hours use and this process should be repeated after one to two weeks^{34 18}. Clothes and bed sheets should be machine-washed with hot water ($\geq 50^{\circ}\text{C}$) and dried in a hot dryer to minimize transmission of the disease which are used within three days before treatment and until the treatment course is completed^{17,35}. Carpets and all furnished furniture should be vacuumed and the garbage bags should be directly and appropriately disposed off³⁰. By limiting the number of sexual partners and practicing strict personal hygiene, the risk of scabies can be minimized³⁴. In community-wide or

institutional epidemics mass drug treatment with oral ivermectin should also be considered¹⁸. An effective single dose of oral ivermectin 200 µg/kg has been shown³⁴.

This study aimed to determine the period prevalence and seasonal variations of scabies in district Abbottabad, Pakistan from 2017-2019.

2. MATERIALS AND METHODS

Study Area

The study was conducted in Abbottabad, Pakistan. Abbottabad is a district of Khyber Pakhtunkhwa province of Pakistan. It is about 135 km to the north of Islamabad (Capital of Pakistan) and 130 km east of Peshawar. It is found at altitude of 34.18 and longitude of 73.26. District Abbottabad is surrounded by District Mansehra at the North, District Haripur at the West and Southwest and District Muzaffarabad of Azad Kashmir on the east. An area of about 1,969 km² is covered by the District Abbottabad and is part of Hazara division. District Abbottabad is divided into two Tehsils i.e., Havelian and Abbottabad. According to the 2017 census, population of Abbottabad is 1,332,912 (981,590 of Tehsil Abbottabad and 351,322 of Tehsil Havelian). It is known to have humid subtropical climate. Annual rainfall of the region is about 1262 mm and total precipitation is about 81.6 MM.

Study Period

Study period for the Scabies in the district Abbottabad was 3 years. It includes the data from January 2017 to December 2019.

Study Design

Retrospective studies of Scabies reported during the study period was carried out in order to assess the morbidity of scabies infections in different health facilities of district Abbottabad during the study period.

Study Population

Study population includes all Scabies patients visited any of the 110 health care centers distributed all around the rural, urban as well as sub-urban areas of the District from January 2017 to Dec 2019.

Data Collection

Data is taken from the regional office of district health information system. Data contained the reported cases from 53 basic health units (43 from Tehsil Abbottabad, 18 from Havelian), 43 civil dispensaries, 4 civil hospitals, 1 DHQ, 1 MCH, 7 RHC, 1 TBC and 1 SHC.

Ethical Clearance

The study was conducted after ethical approval. For permission from the District Health Officer, affidavit and other documents were submitted in the office. Permission letters from the Abbottabad University of Science and technology and District health office were obtained in order to describe the retrospective Scabies morbidity data.

Diagnosis

The disease was diagnosed from symptoms in different health facilities. Moreover, dermoscopy was also used for diagnosing the scabies. During dermoscopy, the head (capitulum) and two pairs of frontal legs of the scabies mite having slight brownish or black triangular structure were observed, causing structureless wavy lines which correspond to blown-up burrows giving the form of a delta wing jet with a contrail ("delta wing jet" mark).

Analysis of Data

Collected data was examined with Microsoft Excel. In order to avoid complexity of the results sum of the six months reported cases was used as a single variable. Data was analyzed to find morbidity in different facility types, morbidity distribution in both the Tehsils of the district and monthly morbidity of Scabies.

3. RESULTS

During the last 3 years period from January 2017 to December 2019, a total of 44,569 confirmed cases of Scabies were reported in different health units of District Abbottabad. Of which, 29,954 cases were from Tehsil Abbottabad and 14,615 cases were from Tehsil Havelian. Prevalence of scabies during the study period was higher in Tehsil Abbottabad (67.21%) as compared to Havelian (32.79%). Type-D Hospital Havelian holed the highest prevalence (5.18%) while least prevalence was reported in CD Dakhan Passr (0.01%) Havelian. TBC (DTO Clinic) Abbottabad had no prevalence. With regard to time, prevalence in 2017 was 30.18%, in 2018 increased to 37.90% and reported to be highest while in 2019 again declined to 31.92% (Figure 1 & 2).

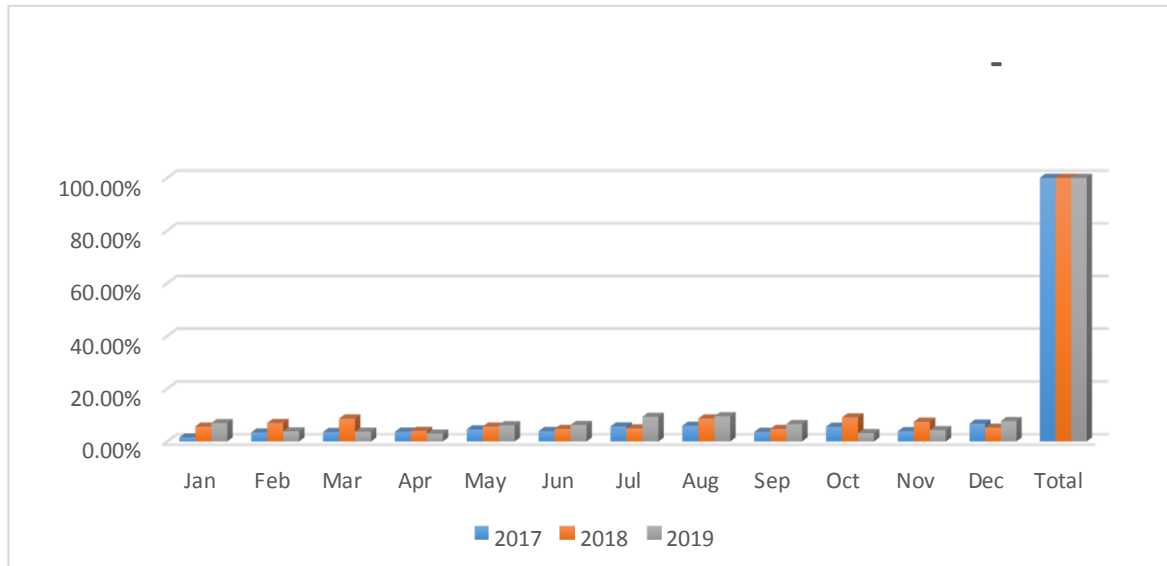


Figure 1. Trend of reported Scabies cases in Tehsil Abbottabad during the study period

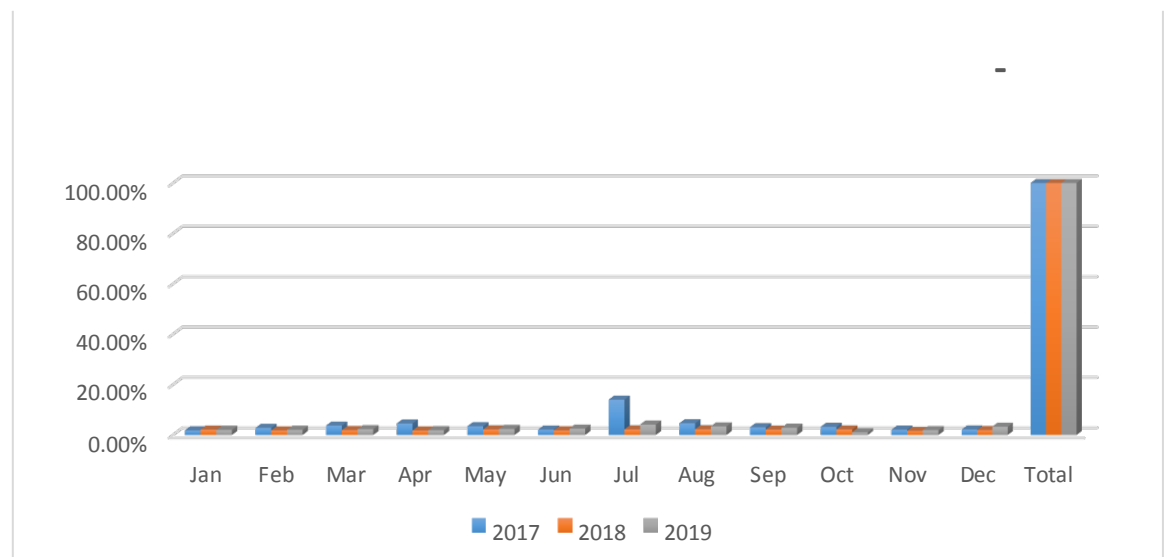


Figure 2. Trend of reported Scabies cases in Tehsil Havelian during the study period

Prevalence of scabies in Distt. Abbottabad was highest (32%) in summer, June to August due to more humidity in the month of July. During autumn, Sept and Oct, it declined to 16%. In winter (Nov-Feb) prevalence was increased to (30%) due to low temperature and physical overcrowding. Then in spring (March-May) the prevalence again declined to 22% (Figure 3).

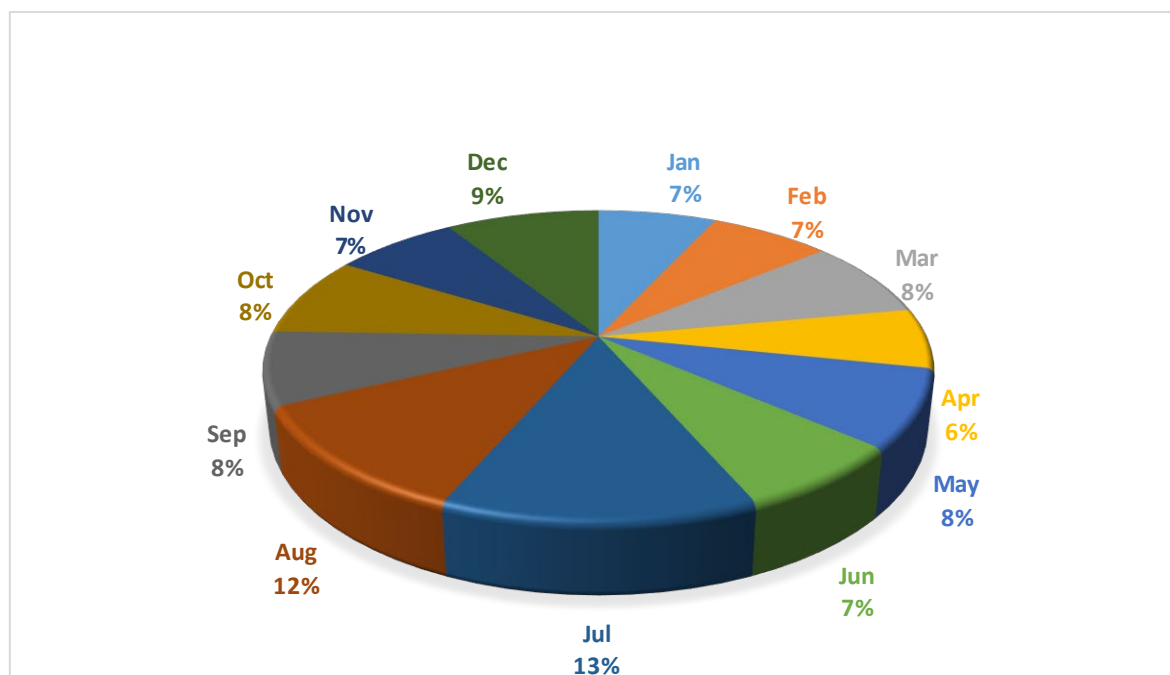


Figure 3: Monthly (Seasonal) morbidity of scabies in District Abbottabad

Proportion of Scabies reported cases during the study period was more in Primary health facilities (67.38%) as compared to Secondary and Tertiary health facilities (32.62%). Highest prevalence was observed in the Basic health units of both Tehsils, Abbottabad (27.24%) and Havelian (14.21%). Followed by DHQ (25.39%) in Tehsil Abbottabad and civil dispensaries (CD) (6.94%) in Tehsil Havelian. CH (0.64%) in Tehsil Abbottabad while SHC (0.42%) in Havelian reported least Scabies prevalence. No prevalence (0%) was observed in TBC, Tehsil Abbottabad. Number of cases reported during the study period in different Health care centers of both Tehsils are presented in tables.

Table 1. No. of reported scabies infection in Tehsil Abbottabad

Year	2017	2018	2019
Facility Type	Jan-Dec	Jan-Dec	Jan-Dec
BHU	4663	4280	3198
CD	1081	1059	1196
CH	70	134	82
DHQ	477	6519	4318
MCH	33	175	135
RHC	742	692	1099
TBC	1322	7521	5634

Table 2. No. of reported scabies infection in Tehsil Havelian

Year	2017	2018	2019
Facility Type	Jan-Dec	Jan-Dec	Jan-Dec
BHU	2543	2106	1685
CD	1028	977	1087
CH	2267	215	458
RHC	526	660	876
SHC	2815	949	1425

4. DISCUSSION

The current study was aimed to evaluate the 3 years trend of scabies prevalence in Abbottabad district on tehsil level, in Pakistan from January 2017 to December 2019. The overall prevalence of Scabies in these 3 years in tehsil Abbottabad was 67.21% and in tehsil Havelian 32.79%. Similar studies were conducted in Kuwait ³⁶, Egypt (4.4%) ³⁷, Nigeria(4.8%) ³⁸, Iran in 2008 (1.7%), North Western Ethiopia Amhara region (33.5%) ³⁹, Gonder 22.5% ⁴⁰, Southern Ethiopia 11% ⁴¹, Cameroon 18.5% ⁴², Nigeria 10.5%⁴³, Salmon Island 19.5% ⁴⁴, Malaysia 31% ⁴⁵. As compared to above findings the prevalence in our study was higher. Similarly studies conducted in Bangladesh ⁴⁶ and Sierra Leone ⁴⁷ was 62% and 67% prevalence respectively. In our study the high prevalence might be associated with a number of risk factors for example, all individuals have an equal chance of getting scabies at any socioeconomic level but people living at overcrowded areas have greater chance of getting scabies ⁴⁸.

With respect to institutional settings high prevalence was observed in Basic Health Units of both Tehsils while CH in Tehsil Abbottabad and SHC in Tehsil Havelian reported least Scabies prevalence. TBC in Abbottabad had no Scabies prevalence. With regard to tehsil, frequency of reported scabies was higher in Abbottabad which is administrative Tehsil of the District Abbottabad. The difference in the prevalence rates might also be associated to density of population, overcrowding, poverty, level of education, level of health, changes in sociodemographic characteristics of study population and climatic changes. The high prevalence was observed in communities and settings where overcrowding and poverty was very high ⁴⁹. The difference in prevalence might also be associated with time, season of study, weather and environmental conditions ⁵⁰.

During these three years the prevalence of scabies was high (32%) in summer with peak in July (13%). This might be associated with the climatic conditions because climate is one of the most important factor and it plays a very important role in scabies cases throughout the world ⁵¹. Pakistan is a country which is characterized by several seasons like summer, winter, spring and autumn but our results proved that scabies was most prevalent in summer when the temperature is hot. These results are in accordance with the studies conducted in Iraq and many other tropical countries ⁵²⁻⁵⁴. In autumn, sudden decline (16%) was observed. Then again in winter prevalence was increased to (30%) because during this season, fertility of the mites - determined by the number of eggs in the mite burrow - is reportedly higher ⁵⁵. And their off-host survival is enhanced by the higher humidity and lower temperature ^{45,56,57}. Moreover, increased physical crowding of individuals during the cold season may contribute to seasonality of scabies ⁵⁵. In spring a sudden decline in prevalence (22%) was observed.

There is a positive association between number of cases of scabies, temperature and humidity because these factors provide suitable conditions for parasite growth and their survival in human body ⁵⁸. In developing countries scabies is one of the most prevalent skin diseases which may be associated with poverty and overcrowding ⁵⁹⁻⁶¹. Similarly, a study conducted in Nepal on skin infections showed that infections and infestations are very common in Asian and African region ⁶²⁻⁶⁴. In developing countries due to hot and humid climate people are more prone to skin infections along with scabies ⁶⁴. In current study high prevalence (37.90%) of scabies was observed in 2018, may be this is due to high humidity level in atmosphere because of above normal monsoon rainfall in month of July in district Abbottabad while in July 2017 the monsoon rainfall was below normal, prevalence was (30.18%) and in July 2019 rainfall was close to normal respectively and prevalence was (31.92%). So, humidity is an important factor which can promote the survival of *S. scabiei*.

In Pakistan an interview was conducted among general medical physicians which demonstrated that there is lack of knowledge about various aspects of scabies so an effective and proper awareness is needed to identify and for the treatment of scabies properly ⁶⁵. The World Health Organization has declared scabies as a neglected disease but still there is need of formal programs for its control in developing countries of the world ⁶⁶. So more health awareness programs and health care is needed to control the scabies in developing nations of world specifically in rural areas to prevent scabies from spreading ⁶⁷.

5. CONCLUSIONS

In the current study, summer season has a large number of reported scabies cases as compared to other seasons. There is a positive association between number of cases of scabies, temperature and humidity because these factors provide suitable conditions for parasite growth and their survival in human body. After analyzing three years trend of scabies in the Distt. Abbottabad, it is recommended that Government should give primary health-care centers more facilities, as reporting in these facility types are higher than secondary and tertiary one. Government should also start scabies awareness programs in Teh. Abbottabad where most of the population is rural and do not have enough knowledge regarding the issue. This will upgrade the lifestyle resulting in decline of scabies. The problem faced during the study was lack of general information (age, gender etc.) and symptoms of the scabies. So, Information storage department should sort out some solution, this will help the researchers in analyzing the epidemiology of disease more perfectly. Along with these Regional forests department should start a campaign of planting more and more trees in the District Abbottabad to make the environment clean. In conclusion, this study will facilitate the government in making infrastructure for the development of health system in future. Moreover, it will also provide data regarding estimation of scabies to researchers, health-care workers and different NGOs at national as well as international level. Our study will help different pharmaceutical companies and suppliers in distribution of their products. It will also facilitate surveys, nationally and internationally.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

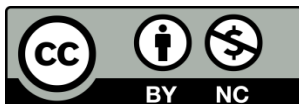
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