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SCREENING ON THE MOST IMPORTANT ECONOMICAL CAMELS DISEASES IN THE TAIF DISTRICT, SAUDIA ARABIA (KSA)

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ABSTRACT

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Various type of camel diseases were reported in KSA, The present paper revealed field examination of main economical camel diseases at Al-Taif district. Out of 910 camel were examined microbiologically during 2012 from different area of Taif, for detection of Camel-pox, Salmonellosis and Trypanosomaisis. Camel-pox infections were 8% distributed according the areas 8.3%, 8.1%, 8.3% and 8.1% from east, west, north and south. The most notified were in months Jul., Aug., and Sept. as 11.2%. Salmonellosis infections were 9.1%, as 8.7%, 9.8%, 8.3% and 9.6% from east, west, north and south, the higher infections were in Jul., Aug., and Sept. as 10.9%. Trypanosomiasis infections were 11.4%, distributed as 10.9%, 12.3%, 10.2% and 12.1% from east, west, north and south respectively, but the more infections were in Apr., May, and Jun., as 13.2%. The collection of all infections morbidity were notified at Taif equal to 28.5%.

Key words: *Camel-pox, Salmonellosis, Trypanosomaisis.*

INTRODUCTION

Camel-pox (CMLV): Camel-pox virus is an Ortho-pox virus that is closely related to the vaccinia virus causes Small-pox of members of family Camelidae (Gubser and Smith, 2001). The disease can be transmitted to both humans and arthropods (Ezek and Kriz, 1983). The disease is an enzootic in almost all regions where camel husbandry is practiced, and was responsible for severe economic losses, characterized by a narrow host range, the capacity to induce giant cells in culture and to counteract host immune defenses. A reservoir host other than camels is unlikely to exist. (Sophie *et al*., 2011). Camel-pox virus spreads through contaminated environments, and control method would be of immense value to curtail the infection in the field (Veerahya *et al*., 2010). Slow-spreading mild form of camel-pox was involving range camels in the Eastern region of KSA. The morbidity rate was 10 % while the mortality rate was zero% (Al-Hendi and Abu El Zein, 1994). An eruptive moderate form of infection was reported in camels aged 3-4 years from Al-Ahsa region, KSA. The morbidity rate was 100% while the case mortality rate was zero (Abu El Zein *et al*., 1999). An outbreak occurred in Jazan region, KSA, of herds and 76% were clinically affected, the morbidity and mortality rates were 41% and 3.6%. The disease was characterized clinically pox lesions in some or all parts of the body, fever, weakness, enlargement of the lymph nodes, swelling of the face and head, lacrimation and abortion. The course of the disease ranged from 3-5 weeks (Omer and Abdel Hamid, 2007). CMLV infection is usually restricted to camels and causes localized and or generalized skin lesions. However, the outbreak involved camel handlers and attendants with clinical manifestations such as papules, vesicles, ulceration and finally scabs over fingers and hands. In camels, the pock-like lesions were distributed over the hairless parts of the body (Bera *et al*., 2011). PCR technique considers the faster and more sensitive molecular advanced technique for diagnosis of camel-pox virus (Salem *et al*., 2008).

Salmonellosis: Salmonellosis among camels had been reported, and caused by Sal. choleraesuis and the disease was per-acute with death within few days, in the acute form, affected animals have remarkable systemic reaction. The mortality rate of Salmonellosis was reached up to 10% and is of great public health importance. Conventional diagnosis revealed isolation and identification of 5 Sal. spp. with special interest to presence of Sal. enteritidis, Sal. typhi Sal. typhimurium and Sal. anatum, Multiplex PCR assay found to be rapid, economic and sensitive tool for

detection of the organism (Abeer *et al.,* 2012). Sal. spp. 4.4% were isolated from camels in the United Arab Emirates between 1987 and 1991. 4.3% spp. were isolated, in total, different serotypes were identified with Sal. saintpaul being the most frequent, followed by Sal. frintrop and Sal. hindmarsh. Sal. typhimurium was isolated from only 2 faecal specimens. All Sal. isolated from fecal samples originated from carrier camels, and those isolated from organs were secondary findings. The camels from which Sal. organisms were found died from diseases other than Salmonellosis (Wernery, 1992). Sal. infection was one of the most important diseases that affects all animals causes enteritis, abortion, and septicemia especially in young ones (Whitehead, 2009). Sal. typhimurium, is one of the most common causes of gastro-enteric Salmonellosis and economically special in camel calves (Wernery and Kaaden, 2002; Glücks, 2007). Septicemic Salmonellosis had been documented in dromedary camel calves (Anderson *et al*., 1995; Whitehead and Anderson, 2006; Whitehead, 2009).

Trypanosomiasis: Trypanosomiasis caused by Try. evansi, presented in most areas where camels were found, and cause remarkable loses on animal production in all tropical and subtropical areas (Higgins, 1986). The incidence of the of Trypanosomiasis was 33% (Al-Ani *et al*., 1998). The disease was the most important single cause of economic losses in camel rearing areas, causing morbidity up to 30.% and mortality 3.% (Njiru *et al*., 2001). Trypanosomiasis had been reported that, may occur in acute and chronic forms (Boid *et al*., 1996; Singh *et al*., 2004; Schuster, 2006; Sehrawat and Singh, 2006). However, the most impact of the disease comes from the chronic form. The acute form is blamed for the high fatalities, while chronic form resulted in huge production losses, abortion, premature birth, infertility, anemia, emaciation and recurrent fever (Singh *et al*., 2004; Abdalla, *et al*., 2006). An overall infection was determined as 11.25% by Try. evansi (Bhutto *et al*., 2010).

The present work was carried out to clear-up the most important economical camel diseases which affect the herds health at Taif district, KSA.

MATERIALS and METHODS

Study field: The total camels examined were 910 during 2012 from Taif district, Taif area was divided according to the direction, camels under investigation were in number: 230, 235, 205 and 240 from East, West, North and South of Taif respectively. The animal for investigation also distributed according the months into 4 month seasons (Jan. + Fed. + Mar.), (Apr. + May. + Jun.), (Jul. + Aug. + Sept.) and (Oct. + Nov. + Dec.). All camels under research were followed up by Clinco-Microbial methods for detection of Camel-pox, Salmonellosis and Trypanosomiasis.

Diagnosis patterns:

Camel-pox:

- Blood collection: The blood samples of the examined animals were blood samples, with anticoagulant, for virus isolation, the buffy coat be placed immediately on ice and processed as soon as possible. In practice, the samples can be kept at 4°C for up to 2 days prior to processing. Serum samples were collected stored at –20°C.

- Skin lesions collection: Skin biopsies and organs were collected for virus isolation and histopathology. For the PCR, approximately 30–50 mg of tissue sample were taken and placed in a Cryo-tube, kept at 4°C for transportation and stored at –20°C until processed. Tissue samples collected for virus isolation placed in a virus transport medium, (Tris-buffered tryptose broth), kept at 4°C for transportation and stored at –80°C until processed. Collection the tissue specimens into ten times the sample volume of 10% formalin buffer.

- Transmission electron microscopy (TEM): TEM is a rapid method to demonstrate Camel-pox virus in scabs or tissue samples.

- Polymerase Chain Reaction (PCR): Fast and sensitive method for the detection of Ortho-pox Viral DNA. A generic PCR assay allows the detection and differentiation of Spp. of the genus Ortho-pox virus because of the size differences of the implications (Meyer *et at*., 1994).

- Enzyme-linked Immune-Sorbent Assay (ELISA): ELISA test was carried out to detection of antibodies against Camel-pox virus in serum (Azwai *et al*., 1996; Peffer *et al*., 1998).

Salmonellosis:

- Serum collection: Blood sera of the tested animals were collected and held at 4°C for a short period.

- Fecal collection: Feces samples were collected in a sterile screw-cap.

- Serum identification (ELISA): An indirect ELISA, comprising antigen-coated plates, for the detection of IgG in serum (Nicholas and Cullen, 1991).

- Bacterial identification: Feces were inoculated in Selenite F broth at 37-38°C for 12 hr. Cultures in Sorbitol MacConkey and Deoxy-cholate agar (Becton Dickinson) were performed. Biochemical identification was done using API 20E (bioMe´rieux), (Isenberg, 1992), and serological identification of Salmonella spp. was performed (Popoff, 2001).

Trypanosomiasis:

- Blood collection: From each animal, 5 ml blood with anticoagulant was collected aseptically and

thick blood films were performed determine the prevalence of Trypanosomiasis.

- Examination of blood: Identification of Try. evansi was made on the basis of morphological characteristics (Chandler and Read, 1961). Different techniques had been used for the diagnosis of Trypanosomiasis (Dia *et al.*, 1997; Chaudhary and Iqbal, 2000; Singh *et al.*, 2004).

Data Analysis: Data were summarized and analyzed using SPSS version 16 computer program. Data were analyzed using Epi Info version 6 statistical software and for further compared using Chi-square test at critical probability of $p<0.05$ (Coulombier *et al.*, 2001).

RESULTS

Table 1: The prevalence of collected specimens distribution from Taif District, KSA.

Months period During 2012	Taif Area								Total	
	East		West		North		South			
	No.	%	No.	%	No.	%	No.	%	No.	%
Jan.+Feb.+Mar.	51	24.5%	45	21.6%	52	25%	60	28.8%	208	22.9%
Apr. + May. + Jun.	50	22.8%	65	29.7%	55	25.1%	49	22.4%	219	24%
Jul. + Aug. + Sept.	69	25.5%	70	26.2%	58	21.7%	70	26.2%	267	29.3%
Oct. + Nov. + Dec.	60	27.8%	55	25.5%	40	18.5%	61	28.2%	216	23.7%
Total	230	25.3%	235	25.8%	205	22.5%	240	26.4%	910	100%

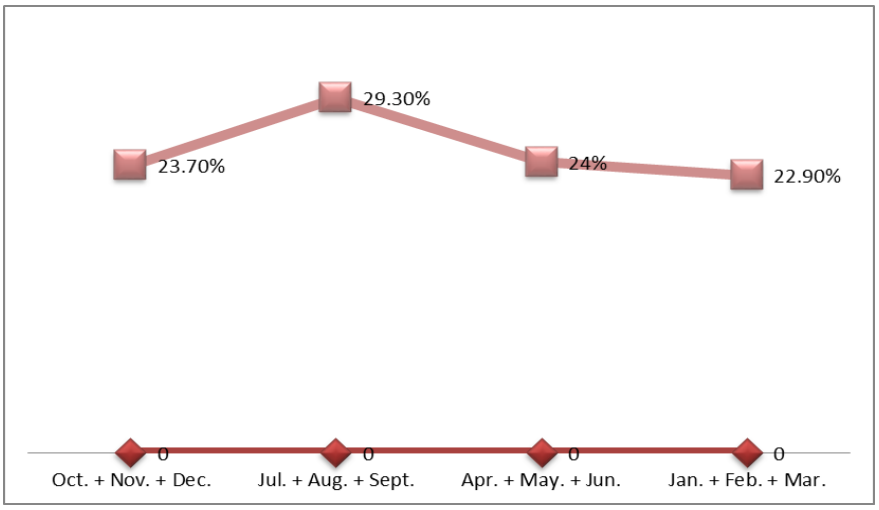

Diagram 1: The prevalence of collected specimens distribution from Taif District, KSA

Table 2: The percentage of Camel-pox infections in Taif District, KSA

Months period During 2012	Taif Area				Total
	East	West	North	South	
	%	%	%	%	%
Jan. + Feb. + Mar.	5.9%	4.4%	5.7%	6.7%	5.8%
Apr. + May. + Jun.	8%	7.7%	7.3%	6.1%	7.3%
Jul. + Aug. + Sept.	10.1%	11.4%	10.3%	12.9%	11.2%
Oct. + Nov. + Dec.	8.3%	7.3%	5%	6.6%	6.9%
Total	8.3%	8.1%	7.3%	8.3%	8%

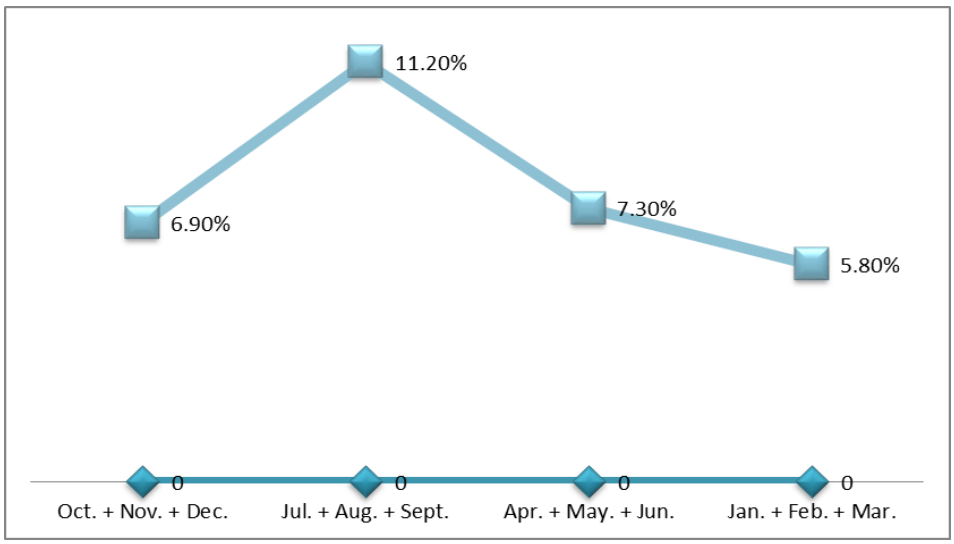

Diagram 2: The percentage of Camel-pox infections in Taif District, KSA

Table 3: The percentage of Salmonellosis infections in Taif District, KSA

Months period During 2012	Taif Area				Total
	East	West	North	South	
	%	%	%	%	%
Jan. + Feb. + Mar.	5.9%	6.7%	5.8%	6.7%	6.3%
Apr. + May. + Jun.	10%	10.8%	9.1%	12.2%	10.5%
Jul. + Aug. + Sept.	10.1%	11.4%	10.3%	11.4%	10.9%
Oct. + Nov. + Dec.	8.3%	9.1%	7.5%	8.2%	8.3%
Total	8.7%	9.8%	8.3%	9.6%	9.1%

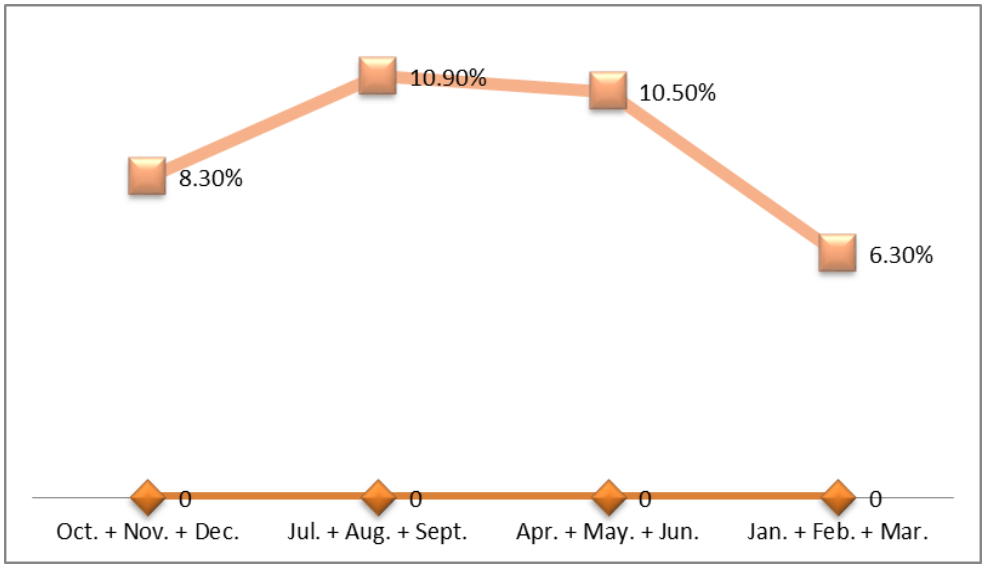

Diagram 3: The percentage of Salmonellosis infections in Taif District, KSA

Table 4: The percentage of Trypanosomiasis infections in Taif District, KSA

Months period During 2012	Taif Area				Total
	East	West	North	South	
	%	%	%	%	%
Jan. + Feb. + Mar.	7.8%	8.9%	7.7%	8.3%	8.2%
Apr. + May. + Jun.	12%	13.8%	12.7%	14.3%	13.2%
Jul. + Aug. + Sept.	13%	14.3%	10.3%	14.2%	13.1%
Oct. + Nov. + Dec.	10%	10.9%	10%	11.5%	10.6%
Total	10.9%	12.3%	10.2%	12.1%	11.4%

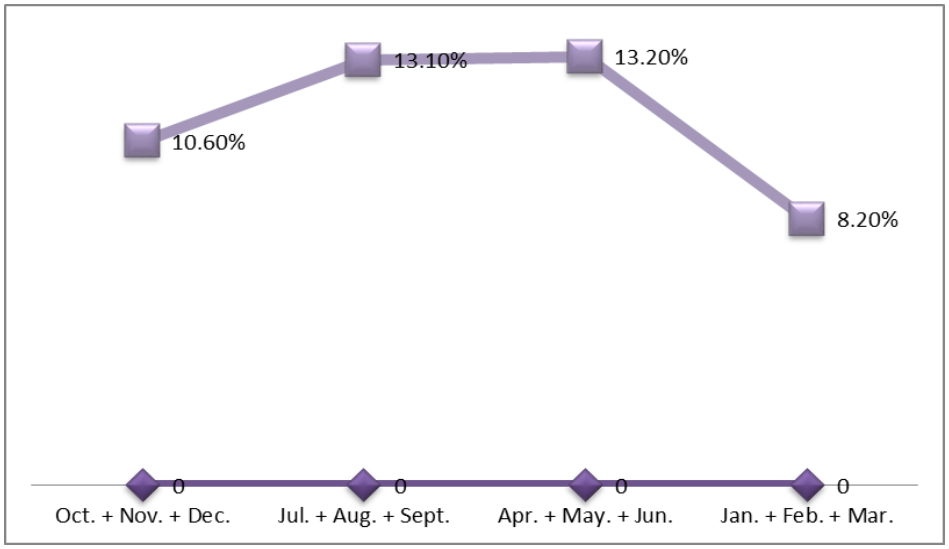

Diagram 4: The percentage Trypanosomiasis infections in Taif District, KSA

Table (1) and diagram (1) showed the prevalence of collected specimens distribution from Taif District, KSA, the total camels 910 were examined, the specimens were collected from East, West, North and south as 25.3%, 25.8%, 22.5% and 26.4% respectively. The more specimens from camels 29.3%were collected at (Jul. + Aug. + Sept.)

Table (2) and diagram (2) showed the percentage of Camel-pox infections at Taif District, KSA, total Camel-pox infection was 8%, the predominant infection were in East and South as 8.3%, the appearance of infection were in (Jul. + Aug. + Sept.) as 11.2% was the highest.

Table (3) and diagram (3) showed the percentage of Salmonellosis infections at Taif District, KSA, total Salmonellosis infection was 9.1%, the predominant infection was in West 9.8%, the appearance of infection were in (Jul. + Aug. + Sept.) as 10.9% was the highest.

Table (4) and diagram (4) showed the percentage of Trypanosomiasis infections at Taif District, KSA, total Trypanosomiasis infection was 11.4%, the predominant infection was in West 12.3%, the appearance of infection were in (Apr. + May. + Jun.) as 13.2% was the highest.

DISCUSSION

The current work indicted that the total morbidity of the screening diseases was 28.5% of the examined infected camels which; camel-pox 8%, Salmonellosis 9.1% and Trypanosomiasis 11.4%. The higher morbidity of infection were Trypanosomiasis 13.2% in months (Apr. + May. + Jun.), Camel-pox 11.2% in months (Jul. + Aug. + Sept.) and Salmonellosis 10.9% in months (Jul. + Aug. + Sept.), the infections were spread in the areas West, East and south, but north was the lowest area for infections.

The total Camel-pox infection was 8% and the predominant infection were in East and South 8.3% were in (Jul. + Aug. + Sept.) as 11.2% was the highest. More infections were in summer months, that

indicated the weather help in spread of infections. Slow-spreading mild form was involving range camels in the Eastern region of KSA. The morbidity rate was 10 % while the mortality rate was zero (Al-Hendi and Abu El Zein, 1994). Abu El Zein *et al*. (1999) indicated that the morbidity rate of camel-pox was 100% while the mortality rate was zero. An outbreak occurred in Jazan region, KSA, 76% were clinically affected, the morbidity and mortality rates were 41% and 3.6% in summer season.

Total Salmonellosis infection was 9.1%, the predominant infection was in West 9.8%, the appearance of infection were during the summer months as 10.9%. Salmonellosis were affected all animals, birds and human but the more percentage of infections appeared in summer season due to the circumstances of the moving of the animals (Abeer *et al*., 2012). All Sal. isolated from fecal samples originated from carrier camels, and those isolated from organs were secondary findings (Wernery, 1992; Whitehead, 2009; Mohler *et al*., 2009). The major risk factor that predisposes neonates to infection and sepsis was failure of passive immunity transfer. Sal. typhimurium (Wernery and Kaaden, 2002; Glücks, 2007). Sal. typhimurium, is principally associated with gastroenteritis, it occasionally leads to septicemia (Anderson *et al*., 1995; Whitehead and Anderson, 2006; Whitehead, 2009).

The percentage of Trypanosomiasis infections at Taif, was 11.4%, and the predominant infection was in West 12.3%, the appearance of infection during the following months (Apr. + May. + Jun.) as 13.2% was the highest. The predominant incidence in spring due to the replication of insect which help in transmission of the parasites. Trypanosomiasis cause remarkable loses on animal production in all the tropical and subtropical areas and ranked first in economic importance, in morbidity and mortality (Higgins, 1986). The incidence of the of Trypanosomiasis was 33% (Al-Ani *et al*., 1998). The disease had been reported in many countries where the camel inhabits, having an enzootic character in majority of them causing high morbidity and mortality (Lukins,1992; Njiru *et al*., 2001; Singh *et al*., 2004), infection by Try. evansi was 11.25% of camels in Pakistan (Bhutto *et al*., 2010).

CONCLUSION

This current study revealed that the prevalence of the most economical camel disease at Taif district; Pox, Salmonellosis and Trypanosomiasis were 8%, 9.1% and 11.4% respectively. The infection were predominated in summer. Conventional PCR and multiples PCR are rapid sensitive test.

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دراسة حقلية علي أمراض الإبل الأكثر أهمية اقتصاديا المؤثرة على الثروة الحيوانية بمنطقة الطائف، المملكة العربية السعودية

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كشفت الدراسة الحالية مجال اهم أمراض الإبل الاكثر تأثيرا علي الثروة الحيوانية والاقتصاد في منطقة الطائف، المملكة العربية السعودية. تم فحص عينات 910 من الابل بالطرق الميكروبيولوجية خلال عام 2012 من منطقة الطائف، للكشف عن الاصابات بالأمراض التالية: جدري الابل، السالمونيلا والتريبانوسوما. كانت عدوي جدري الإبل 8٪ موزعة حسب المناطق 8.3٪، 8.1٪، 8.3٪ و8.1٪ من الشرق، الغرب، الشمال والجنوب، وأعلي نسبة اصابة كانت في الأشهر يوليو، أغسطس، وسبتمبر كانت أعلى الإصابات بنسبة 11.2%. عدوي السالمونيلا كانت اجمالية 9.1٪، وزعت كالتالي 8.7٪، 9.8٪، 8.3٪ و 9.6٪ في الشرق، الغرب، الشمال والجنوب، وبينت اعلي نسبه العدوي في اشهر يوليو، أغسطس، سبتمبر 10.9٪. كانت الإصابات بواسطة تريبانوسوما 11.4٪ إجمالي، موزعة على النحو 10.9٪، 12.3٪، 10.2٪ و 12.1٪ في الشرق، الغرب، الشمال والجنوب على التوالي، ولكن كانت العدوى في اشهر أبريل ومايو ويونيو، حيث وصلت لأعلي نسبة عدوي 13.2٪. تبين ان مجموع العدوي للأمراض المدروسة في الطائف تقدر 28.5٪، والتي بالقرب من اصابة ثلث القطيع، سيكون له دور هام في الخسارة للثروة الحيوانية للإبل والمجال الاقتصادي أيضا.