RESEARCH PROPOSAL:

pathogenesis, immunological response and molecular basis of host-parasite interactions in scabies patients in Erbil Province

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Field of study: Biology, Parasitology.

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https://scholar.google.com/citations?hl=en&user=XWWQhcAAAAAJ.

Place of Working:

1- Field work: Erbil Province hospitals and dermatological Center of Erbil.
2- Lab work: Adv. Parasitology Lab, Department of Biology, College of Education, Salahaddin University-Erbil, Kurdistan Region, Iraq

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1- INTRODUCTION

Scabies is parasitic infection caused by a mite, called Sarcoptes scabiei var. hominis, (the itch mite), it is an oval, ventrally flattened mite with dorsal spines. The fertilized female burrows into the stratum corneum and deposits her eggs. Scabies is characterized by pruritic papular lesions, excoriations, and burrows. Sites of predilection include the finger webs, wrists, axillae, areolae, umbilicus, lower abdomen, genitals and buttocks (James et al.; 2011).

The immune system of human interacts with environmental, metabolic and endocrine factors as well as with infectious agents' bidirectional and is arranged genetically. Scabies is one of the most important parasitic skin diseases with global distribution and continues to persist all over the world at all-time despite the availability and using of many acaricides and therapeutic tools. Although the infestation is not life-threatening, it is a nuisance disease that is commonly found in health care facilities and can result in crisis, fear and panic. Scabies outbreaks can be difficult to control and may easily reoccur if not properly contained and treated (Beggs et al., 2005). Patients with scabies react to the infestation mainly by generating cell-mediated immune response and humoral immunity (Şenol et al., 1997).

More than 300 million cases of scabies were reported worldwide every year. Anybody might be in contact with the mite being able to catch scabies. This parasite can affect people from all socioeconomic levels, also age, sex, race or standards of personal hygiene not related to the infestation (Gurevitch, 1985). The female mite digs bore small tunnels in epidermis for lying the eggs and elicits a very itchy papule that is often excoriated. In some cases ulcerated papules, nodules and vasculitis develop as a result of other immunologic reactions in skin. An intact immunity entails all the forces and systems involved in recognition, specific response and removal of foreign

objects after they again enter into the body of the host. The cell-mediated immune reaction in the skin and the circulating antibodies act in a parallel manner in clearing of the mites, eggs and debris. Studies related to humoral immune response to scabies are limited whereas T-cell mediated immune response to scabies is well documented (Cabrera et al., 1993; Morsy et al., 1993; Arlian et al., 1994; Arlian et al., 2007). In the present study total white blood cell count, differential counts (lymphocytes, monocytes, neutrophils, eosinophils, basophils), the serum levels of IgG, IgM, IgA, IgE, C3 and C4 were evaluated in seventy four patients with scabies with no secondary infection or other parasitic infestations and compared with thirty non-infested healthy individuals as control group aimed to determine the immunological responses in scabies infestation.

The study aimed to clear the immune system response against the skin parasitic infestation with Sarcoptes scabiei and the effects of this parasite on total and differential leukocytes count, also, the role of complement proteins (C3 and C4) in controlling of the infestation were studied.

2- LITERATURE REVIEW AND BACKGROUND

About 26,000 species of crustaceans have so far been described and these inhabit biotopes in the marine, freshwater, and terrestrial environment (Marshall and Williams, 2002).

Subclasses of Ostracoda are exceedingly common in almost any freshwater ecosystems that contain green water plants (Mellanby, 1979).

Ostracods (formally called Ostracoda) take their name from the Greek 'ostrakon', which means 'a shell', and refers to the bivalve carapace that is characteristic of these tiny crustaceans, which resemble water fleas. They had

evolved by the early Cambrian, about 545 million years ago, and are found commonly as fossils. Ostracods are still living today in all aquatic habitats from the deep sea to small temporary ponds.

Most are between 0.5 and 1.5 millimeters long, but a few (e.g. Gigantocypris, right) grow to about 25 millimeters. Unlike most crustaceans, ostracods are not segmented, so that the head and body merge into one. They usually have seven pairs of limbs, or appendages, which are adapted for locomotion (swimming or crawling), grasping, cleaning the carapace, feeding, or as sensory organs. Some ostracods have eyes, others are blind, and all have setae (minute hairs) which protrude through the pores and are used for sensory purposes.

In Turkey, the first study on the Ostracods fauna of Anatolia was conducted by Hartmann (1964). While Ostracods in the hot spring of north Anatolia was reported by Gülen (1975) and in the freshwaters (Gülen, 1985). On the other hands, the study of freshwater Ostracods and their occurrence in Şamiar Lake was conducted by Külköylüǒglu (1998).

Kiliç (2000) studied the Ostracoda fauna of the Black sea coasts of Turkey. He identified twenty four species and three subspecies, twelve of them were new records for Ostracoda fauna of Turkey.

Pieri (2020) updated the checklist of ostracods from inland waters and small islands of Sicily and noted their distribution and ecology.

In Iraq, Al-Da'amy (2005) carried out a taxonomic and ecological study on Ostracods in middle water bodies of Iraq near Baghdad and recorded 11 species including describing of two new species.

Generally, in Kurdistan Region studding of aquatic invertebrate fauna is rather poorly documented, and as it's known there are many rivers, lakes, and streams in Kurdistan Region in the North of Iraq, but studies and researches about these water bodies are few. Ali (2007) recorded one species of Ostracoda which is *Cyprinotus incongruens* in Greater Zab River.

3- PROBLEMS REGARDING IRAQ DATA

1. The studies of Ostracods in Kurdistan Region are very poor and there is lack of information about many Inland water areas.
2. Describing of new species without comparing with the international data's present and inability for any comparison since there is preserved and identified type specimens.
3. Adding of some species to Iraqi fauna depending of poor describing and lacking of lots of important morphological characters as well as ultra-structural and molecular composition.
4. Lack of ecological factors affecting the faunal distribution of these creatures.

4- AIMS OF THE STUDY:

The present study aims at the following:

1- Estimating the factors affecting the prevalence of scabies in Erbil.
2- Determining the composition, abundance, distribution and immunological response of scabies in the studied area.
3- The molecular basis of human susceptibility to scabies and gene polymorphism.

5- MATERIALS AND METHODS:

MATERIALS AND METHODS

2.1. Patients and Control

The study involved 74 patients attended a private clinic in Erbil from November 2014 to March 2015. Their ages ranged from 6- 45 years with a mean of 25.54±2.37 years. Scabies was suspected if a patient has a suspicious skin lesion accompanied by itching for at least one week. Information was collected from each case through direct interview and a questionnaire form and the age was detected. Concerning controls, 30 healthy persons were selected with matched age group with the patients.

2.2. Lab diagnosis

Confirmation of the diagnosis was done by skin scraping which was performed by placing a drop of microscope immersion oil over the lesion and scraping off the epidermis over the suspected site of scabies infestation. The specimen was then placed on a microscope slide and examined by light microscopy for the demonstration of mites or eggs (Gurevitch, 1985). Thirty healthy individuals were selected as control group; they were matched with patients by age group.

2.3. Blood sample collection

Venous blood samples (7 ml) were collected from patients and control group using sterile disposable syringes. Blood samples were divided into two parts, 2 ml were collected into ethylene diamine tetra acetic acid (EDTA) containing tubes for estimation of total white blood cell count (WBC) and differential leukocyte count. The other part (5 ml) were collected into plain

universal tubes and allowed to clot, then centrifuged at 3000 rpm for 15 minutes to separate the serum which dispensed into sterile Eppendorf tubes and stored at -20 °C to be used for immunological investigations (Mancini *et al.*, 1965; Nutman, 2007).

2.4. Methods

2.4.1 Determination of total and differential leukocyte count

White blood cell and differential counts including absolute lymphocytes, monocytes, and granulocytes counts were measured by coulter counter (ACT, 5 diff, USA, 2007) for patients and control group.

2.4.2 Determination of serum immunoglobulins (IgG, IgA, IgE and IgM) and certain complement components (C3 and C4)

Five µl of serum were added to wells in an agarose gel using radial immunodiffusion plate containing monospecific antisera for IgG, IgA, IgM, C3 and C4, the sample diffused radially through the gel and the substance being assayed forms a precipitation ring with the specific antisera after 72 hours of incubation except for IgM which was determined after 96 hours. Ring diameter was measured and reference values were correlated to reach actual concentration. IgE was evaluated by ELISA kit (Mancini et al., 1965; Walton et al., 2010).

2.5 Molecular Examinations

Add your notes ……..

2.6Statistical analysis

Data were analyzed by SPSS (statistical package for social science) version 19. Results were expressed as (Mean± S.E.). Statistical differences were determined by independent sample T- test. P-value < 0.05 was considered statistically significant.

6- TIME TABLE:

Activity	Place	Period	Notes
Sample Collection	Hospitals	April 2022-March 2023	
Physiological and immunological examinations.	Parasitology Lab	April 2022-March 2023	
Immunological Examinations	Microbiology Lab	February-September	
Molecular Study	Microbiology + Private Lab	September	PCR technique.

Budget

The budget of the present work is from self-paid.

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