RESEARCH ARTICLE

Age Estimation of Skeletal Remains of 100 Barzanian Mass Graves at Busaya Afif-2 Desert in Muthnna, Iraq

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ABSTRACT

Background and objective: The identification of victims and an anthropological examination of mass graves are essential steps toward the documenting of scientific findings and the pursuit of justice. Exhumation, anthropological analysis, and individual victim identification were the primary objectives of this research project, which was conducted in a mass grave in Busaya which is located in the Muthanna governorate.

Methods: The inquiry involved the uncovering of the bodies of the victims as well as the excavation of their graves. After interviewing witnesses and collecting their testimony, researchers finally got out into the field to begin their investigation. After locating the locations, excavations were carried out on them using the protocols that are well accepted in the scientific community. In the laboratory of the medico-legal institution in Erbil, the leftover skeletons were examined in order to establish the gender of the individual, as well as their age and other details.

Results: The grave included 100 bodies, 100 (100%) were males. The results of age estimation reported that the number of young adult bodies 20-30 years old were 40 cases (40%), while 17 cases (17%) was 30-40 aged victims, 10 (10%) was for 40-50 and 50-60 years ages. The rest included 2 (2%) for 15-20 years, and 1(1%) for 60-70 years age group of victims.

The results of stature revealed that all cases had stature more than 166-170 cm. All the remained bones were recorded in detail for more documentation.

Conclusion: These findings presented the results of an anthropological investigation into a vast Barzanian cemetery located in the Muthanna Afif-2 desert in the southern area of Iraq. Males at the age between 20-30 made up the vast majority (if not all) of those who lost their lives.

Key Word: Mass graves, forensic Anthropology, Identification, skeletal remains, Barzanian victims. Administration **and Management.**

Introduction

Identification of skeletal remains from mass graves is a common task for forensic experts in the course of looking into human rights crimes. This is a challenging task no matter how much time has gone since the burial. According to the Geneva Conventions, the major goals of these investigations are to identify the victims and restore their remains to their families (1).

Typically, a positive identification is made by contrasting the skeletons' results with the pre-mortem information about the missing person. General anthropological factors, particular bone pathological and traumatological qualities, such as bone illnesses, deformities, and injuries, as well as medical and dental histories are all included in these data. Identification requires knowing a person's sex, age, height, and other physical traits. The process of individualization may also benefit from life histories and witness accounts, particularly information on the victims' attire and personal items, states at the time of death, and manner of death (2).

The long time between death and recovery of the skeleton, detrimental impact on witnesses' memories, the quality of preserved distinctive data, and the fact that mass graves contain skeletons from homogenous groups, such as young men wearing Kurdish clothing, reduce the likelihood of obtaining such information for war victims (3).

In some circumstances, such as when only one person is interred in a grave or when the skeleton remains are articulated, it is simple to determine how many people are represented by a given skeletal assemblage. Some academics concentrate on identifying the person in these situations by making assumptions about their sex, age, height, and, in some cases, ethnicity or demographic affiliation. Individuals, however, are frequently not retained as distinct units (4).

This is because age determination is widely employed in archaeological work, when excavating ancient and historic skeletons, as well as the survival of these tissues (when most soft tissues would decay) (5).

Age at death and year of birth determination in forensic situations are essentially two sides of the same problem. The most popular techniques are sometimes referred to as age-at-death procedures because many of them were created for use in archaeological anthropology. Rarely can an archeologically discovered person be placed in an exact chronological context (unless, for example, by tombstones,

inscriptions on coffins, coffin plates, etc.). However, in forensic instances, age at death is frequently converted into the likely year of birth (or a range for this), as this is a piece of information that may be recorded and so lead to identification (6, 7).

The basic premise of the majority of forensic anthropological techniques is that an individual's biological age roughly corresponds to their chronological age. The biological age refers to how aging affects our body and how this may be seen, whereas the chronological age is our calendar age, which we identify in years. In general, age assessment approaches work by finding specific skeletal characteristics associated with aging, classifying these characteristics into stages or scores, and then calculating an estimated age interval from these values (8).

The use of biochemical studies, isotope, heavy metal, and radiocarbon analyses, as well as other techniques that are relevant to various tissues, have all been developed more recently (although most methods still focus on skeletal and dental tissues) (9).

 Administration and Managing information. There will be a need to maintain information on available human resources and supplies, contact information for trained teams, and a database of the number of dead and their identities. Municipal leaders may be contacted with inquiries about specific persons; an individual or team should be assigned to manage such information. The best persons specific for the administration specialty. Leaders should appoint people to handle identification of the deceased; public information and communication; recovery, storage, and burial/cremation of bodies; support for families; and logistics (timely location and provision of needed supplies and resources). Identifying resources. Locate and arrange for the use of storage facilities and supplies before the pandemic arrives. Items you will need include body bags, protective clothing, tools, and communication equipment. Develop and maintain a roster of staff and volunteers. Implementing an action plan. Arrange for the management of dead bodies in collaboration with other agencies in your district or community. Disseminating information. Leaders must provide accurate information to families and the community regarding the identification of bodies. Logistics is the process of getting the correct supplies, equipment, and people to the correct place at the correct time. A logistics leader or team should be appointed to ensure smooth implementation of any plan. Transport of bodies from place of death to

mortuary, storage facility, or burial site Transport of workers to work sites Secure communications equipment for field workers, site managers, and the headquarters or coordinating office Supplies and other resources, including coffins, body bags, labels, dry ice, portable sources of electricity, and water. Assistance from local and regional technical specialists such as morticians and funeral home directors. Equipment for the maintenance of records, such as log books, inventory lists, and cameras (to photograph unidentified bodies). (10)

The aim of this study is to age estimation of skeletal remains of Barzanian mass graves at Busaya Afif-2 desert in Muthanna, Iraq.

Methods

Study setting and design

The current examination was planned as a descriptive examination of the Busaya. Barzanian mass grave. Beginning in November 2011, the fieldwork involved gathering testimony from witnesses, describing the site, and excavating. The morgue investigation was carried out in March 2022.

Witnesses and Testimonies for Finding the Grave Sites

The witness accounts were still the most crucial and trustworthy source of

information for the general or precise site location of the two graves notwithstanding the emotional influences on their comments. The validity of the witnesses' testimony in this study depended on whether they had been spared murder victims.

Site Evaluation and Description

An initial trip to the putative location was performed to map the area to be excavated before the excavation began. Above all, it was made sure that any surface debris had been removed from the area. The graveyards were in the governorate of Muthanna desert.

Excavation

The two gravesites' locations were determined, and the three main measurements width, length, and depth were as accurately estimated as possible. Any significant evidence, such as bullets, jewelry, or other items, was searched for on the ground's surface. The soil was first scraped away, then carefully probed with picks and shovels, and finally with trowels and brushes.

Osteological Examination

The goal of osteological analysis was to identify a skeleton by inferring its age,

gender, and stature. In osteological studies on inhumations, a count of the "minimal number of persons" (MNI) was carried out as a routine approach to determine how many individuals were there based on the articulated and disarticulated human bones. By adding up all long bone ends and other early adulthood, the MNI was computed. The formula for the maximum femur length, which was created using contemporary Portuguese samples and larger bone pieces retrieved, was used to estimate stature. The MNI was thought to contain the most of these skeletons. The MNI mostly fell short of the actual number of skeletons buried at the site (11).

However, it can indicate the bare minimum of people buried there, as determined by science. Using conventional aging methods, age was ascertained. Age estimation depends on the pelvis being present and employs several stages of bone formation and degeneration to determine how old a person is (12). Age is divided into two categories: juvenile victims, or those under the age of 18, and adult victims, or those who are at least 18 years old. Standard osteological methods, such as those outlined by (13), were used to determine gender. Gender determination was only possible once sexual traits had formed throughout late puberty and early adulthood in both males and females and depended on the preservation of the skull and pelvis (14). Applying the formula for the maximum femur length created from contemporary Portuguese data allowed for the estimation of stature.

Analysis of Data

The data was summarized and presented graphically using the Microsoft Excel application. As part of a descriptive statistical analysis of the collected data, percentage values were calculated.

Results

The age distribution in the mass burial of victims is shown in Figure 1. We recorded 100 men casualties. Men made up 100% of the grave's 100 bodies.

Table 1: The age distribution in the mass burial of Barzanian victims.

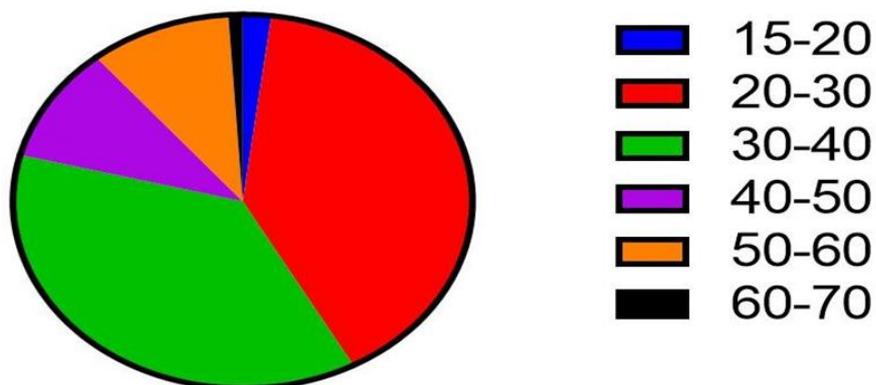| Age group	Estimated age
15-20	2 (2%)
20-30	40 (40%)
30-40	17 (17%)
40-50	10 (10%)
50-60	10 (10%)
60-70	1(1%)
Total	100 (100%)

Figure 1: Age estimation of Barzainan mass graves victims according to their age group.

Figure 2: The process of exhumation and bone collection of the Barzanian mass grave and collecting in lab for age estimation.

The distribution of victims in the mass burial is shown in Figure 1. All victims were men, found in the grave out of 100 remains.

The age distribution of the site is shown in Figure 1. Young ages made up the majority of the victims in the mass grave. Between the ages of 20-29, there were 40 (40%) and 30-40 was 17 (17%), 10 (10%) was for 40-50 and 50-60 years ages. Furthermore, lower prevalence was 2 (2%) for 15-20 years, and 1(1%) for 60-70 years age group of victims respectively.

According to the data and testimony, the most noticeable statures were between 160 and 170 cm (Figure 2).

Discussion

Recording as much information as possible about the bones that were present and missing from each cadaver was accomplished with the use of a specialized form developed by ICMP. Due to the fact that the majority of the bones had decayed, this task was extremely challenging and required an excessive amount of labor. We made an effort to ascertain the gender of all of the bodies, but some of them could not be used for that purpose due to cultural or religious reasons. Because the goal of the operation was to wipe out the Barzanian clan, which had been producing Kurdish leaders since the 1930s, the vast majority of those who were killed were men.

They were sent to the southern part of Iraq in 1975, but in the 1980s, Saddam's army captured up to 8,000 Barzanian males and killed them in mass graves in the southern region of Iraq. They had previously been evacuated there (15).

The skeletal remnant was the problem for age determination despite the utility of the technology that was applied for age identification. The efficacy of the results is determined by the victims' remaining bones, therefore the skeletal remnant was the challenge for age determination (16).

As a result, there were some cases that was difficult to be recognized due to the degeneration of the bones.

Conclusion

The most recent study provided anthropological identifications for the deceased found in a mass burial in the Muthanna Afif-2 desert. The pieces of evidence proved beyond a reasonable doubt that the mass grave contained the remains of male Barzanians who had been detained by Saddam's army in the 1980s. The victims who were murdered were men, and it was believed that their ages ranged anywhere from 15 to more than 60 years.

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