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ERGONOMIC RISK ASSESSMENT OF MUSCULOSKELETAL DISCOMFORT OF POULTRY WORKERS IN NIGERIA

AVALIAÇÃO DO RISCO ERGONÔMICO DO DESCONFORTO MUSCULOESQUELÉTICO EM TRABALHADORES AVÍCOLAS NA NIGÉRIA

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ABSTRACT

Purpose: Poultry farming is important to Nigeria's economy in providing employment opportunities for many Nigerians. Studies on poultry workers' exposure to ergonomic risks causing musculoskeletal discomfort are sparse. The study aims to assess the prevalence of ergonomic risk-related musculoskeletal discomfort among poultry workers using the combined Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) and Rapid Entire Body Assessment (REBA). **Design/methodology/approach:** A purposively selected group of seventy-two poultry workers in Ibadan, Nigeria, participated in this study. Socio-demographic data, including gender, age, working hours, work experience, and daily tasks, were collected. The CMDQ was used to determine discomfort levels in various body regions, while REBA was employed to evaluate the ergonomic risks associated with their working postures. **Findings:** It was revealed that poultry workers frequently experience discomfort in the lower back, shoulders, knees, and upper back, with varying severity levels. The CMDQ revealed that some workers reported mild to severe discomfort in key body areas, which may impact the productivity and overall well-being of the workers. The REBA scores revealed that 65.3% of the workers faced medium ergonomic risk, 29.1% faced high risk, 2.8% faced low risk, and 2.8% faced very high risk, necessitating various categories of intervention. **Research, practical & social implications:** There is a need for urgent ergonomic intervention in the poultry farming operations studied. This may require workstation redesign, ergonomic training, posture correction, and regular health assessments to reduce ergonomic risk. These measures, if implemented, will enhance worker safety, reduce musculoskeletal discomfort, and improve the overall productivity of poultry workers.

Keywords: Ergonomic assessment. Musculoskeletal discomfort. Postural risk. Poultry worker.

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RESUMO

Objetivo: A avicultura é importante para a economia da Nigéria, proporcionando oportunidades de emprego para muitos nigerianos. Estudos sobre a exposição de trabalhadores avícolas a riscos ergonômicos que causam desconforto musculoesquelético são escassos. O objetivo deste estudo foi avaliar a prevalência de desconforto musculoesquelético devido a riscos ergonômicos entre trabalhadores avícolas, utilizando uma combinação do Questionário de Desconforto Musculoesquelético de Cornell (CMDQ) e da Avaliação Rápida de Todo o Corpo (REBA). **Metodologia/abordagem:** Setenta e dois trabalhadores avícolas selecionados intencionalmente em Ibadan, Nigéria, participaram deste estudo. Dados sociodemográficos, incluindo sexo, idade, jornada de trabalho, experiência profissional e tarefas diárias, foram coletados. O CMDQ foi utilizado para determinar os níveis de desconforto em várias regiões do corpo, enquanto a REBA foi empregada para avaliar os riscos ergonômicos associados às suas posturas de trabalho. **Resultados:** Constatou-se que os trabalhadores avícolas frequentemente sentem desconforto na região lombar, ombros, joelhos e parte superior das costas, com diferentes níveis de gravidade. O questionário CMDQ revelou que alguns trabalhadores relataram desconforto leve a grave em áreas-chave do corpo, o que pode impactar a produtividade e o bem-estar geral dos trabalhadores. Os escores do REBA revelaram que 65,3% dos trabalhadores enfrentavam risco ergonômico médio, 29,1% enfrentavam alto risco, 2,8% enfrentavam baixo risco e 2,8% enfrentavam risco muito alto, o que exige diversas categorias de intervenções. **Implicações para a pesquisa, práticas e sociais:** Há necessidade urgente de intervenção ergonômica nas operações de avicultura estudadas. Isso pode exigir redesenho do posto de trabalho, treinamento ergonômico, correção postural e avaliações de saúde regulares para reduzir o risco ergonômico. Essas medidas, se implementadas, aumentarão a segurança do trabalhador, reduzirão o desconforto musculoesquelético e melhorarão a produtividade geral dos trabalhadores avícolas.

Palavras-chave: Avaliação ergonômica. Desconforto musculoesquelético. Risco postural. Trabalhador avícola.

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Introduction

In Nigeria's agricultural sector, poultry farming plays an important role in providing employment and serving as a reliable source of poultry meat for citizens. However, poultry workers are often susceptible to ergonomic risk factors arising from repetitive manual tasks, awkward working postures, prolonged standing, and poorly designed workstations (Milania et al., 2021). These cannot be separated from poultry operations such as bird feeding, cage cleaning, and egg picking, which often require frequent bending, twisting, and forceful exertions. Studies have shown that engaging frequently in such activities may increase the occurrence of Work-related Musculoskeletal Discomforts (WMDs) among workers. Despite these occupational challenges, ergonomic assessment of poultry operations remains limited, and empirical evidence connecting task-specific work postures to WMDs among poultry workers in Nigeria is scarce. Davis and Kotowski (2007) indicated that WMDs affecting the back, shoulders, and upper extremities are among the most prevalent injuries experienced by farm workers and hired labourers. However, investigations into whether these same ergonomic risk factors are equally applicable to individuals working within the poultry sector are sparse.

A high degree of task repetitiveness is common in manual poultry activities, which may exert significant strain on certain areas of the body. The localized stress may increase through the continual repetition of similar motions, making poultry workers susceptible to musculoskeletal discomfort over time. These physical tasks not only affect the health and wellness of employees but also impair the overall productivity of workers (Battini et al., 2011).

In the broader context of animal-producing farms, including poultry, hogs, sheep, etc., the work environments have been shown to account for more than two-thirds of projected restricted workdays and approximately half of all estimated lost-time injuries within the agricultural sector (Meyers, 2001). Despite the prevalence of such injuries, there remains a notable limitation in ergonomic risk assessment practices within the sector in Nigeria. This gap highlights the need for further attention to ergonomic interventions to reduce the incidence of musculoskeletal problems among poultry and other farm workers.

Poultry workers' perceptions are based on sparse empirical data, making it difficult to create awareness of the health risks of WMDs associated with poultry farming occupations and to develop and implement interventions in Nigeria. Kaka et al. (2016) explained occupational musculoskeletal discomfort among animal butchers in Kano Metropolis, Nigeria, where most work-related musculoskeletal injuries were cumulative illnesses caused by extended exposure to loads of varying intensities at work. Milania et al. (2021) observed that many poultry farms

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choose less ergonomic workstations when creating their workspaces, which may increase the risk of WMDs. Hence, further studies in this area will contribute to the literature and draw policymakers' and employers' attention.

This study aims to assess the ergonomic risk of musculoskeletal discomfort among poultry workers in Nigeria using a combined CMDQ and REBA tool. Although ergonomic assessment tools such as CMDQ and REBA have been applied across various occupational sectors, the combined application of CMDQ and REBA remains limited in poultry farming in Nigeria. Therefore, the combined use of these ergonomic tools will advance the literature in the agricultural sector of developing countries and provide data-driven recommendations for safer poultry operations in Nigeria.

Literature Review

The science of work, known as ergonomics, is concerned with how humans interact with the workplace, including operational tools, as found in poultry farming (Korhan, 2023). Magri et al. (2021) noted that poultry operations expose workers to unhealthy conditions such as physical, chemical, biological, ergonomic, and psychological risks, and they used quantitative and qualitative approaches to analyse semi-structured questionnaires distributed to 58 workers. It was found that 61% of workers suffered some type of accident, while 34% lacked personal protective equipment, and 41% were unable to perform activities because of ill health. However, the present study assessed musculoskeletal discomfort using the CMDQ, a validated self-reported discomfort assessment tool, while the ergonomic postural risk of poultry workers was assessed using REBA, a postural risk assessment tool.

Employees who perform repetitive jobs involving lifting, bending, and twisting may develop long-standing work-related musculoskeletal discomfort caused by ergonomic risks (Chen et al., 2017). In Northern Thailand, a cross-sectional descriptive study was conducted to evaluate the prevalence of Work-related Musculoskeletal Pain (WMSP) among seventy-eight selected poultry slaughterhouse workers, comprising 40 women and 38 men. The study used standardized Nordic musculoskeletal questionnaires and reported WMSP prevalence in the shoulders, wrists/hands, lower back, and neck regions irrespective of sex (Hancharoenkul et al., 2023). The present study is being conducted in South-West Nigeria to evaluate the ergonomic risk of musculoskeletal discomfort among poultry workers involved in poultry activities, excluding slaughtering.

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Chen et al. (2017) observed that workers place themselves at immediate risk of falling when adopting awkward positions, such as standing on a ladder to perform high-height installations and bird feeding. In order to create and implement effective preventive strategies, an understanding of ergonomic risk factors in the workplace is necessary, since poultry operations require different body postures to handle a variety of activities (Khan et al., 2019).

Wang et al. (2012) studied nine poultry worker positions, which included removing the hanging feeder's base, using a water wand for shed cleaning, removing faeces with a shovel, spreading rice hulls on the floor, attaching the base to a hanging feeder, unloading boxes of chicks, releasing chicks, and inspecting chicks, while the present study considers 72 poultry workers engaged in bird feeding, cage cleaning, and egg picking to assess ergonomic risks and musculoskeletal discomfort during poultry operations.

Yazdanirad et al. (2022) performed a cross-sectional study involving three hundred steel factory workers with different job tasks in Iran by distributing the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), and prediction was carried out using a modified Rapid Entire Body Assessment tool for the collected data. Li et al. (2020) noted that evaluating the possible risk of musculoskeletal discomfort in the workplace through working posture is costly and time-demanding and therefore adopted a postural assessment tool with the aid of a quick-capture technique built on convolutional pose machines to assess tedious activities causing musculoskeletal discomfort among workers. Yoon et al. (2016) evaluated the work demands of three different vehicle assembly lines using a Rapid Entire Body Assessment tool to design a work rotation plan that reduces musculoskeletal discomfort among automobile workers. Jahanimoghadam et al. (2018) observed incorrect working postures among dentists, which were considered causes of musculoskeletal discomfort, and used a postural risk assessment tool to evaluate ninety selected dentists. Hence, the REBA assessment tool is being adopted in the present study.

Schwartz et al. (2019) acknowledged REBA as a tool that aids in measuring and evaluating the risks associated with postures in an ergonomic workload. They studied the reliability of REBA and reported high and moderate intra- and inter-rater reliability. Balogh et al. (2025) studied the reliability and agreement between human expert raters and TuMeke Risk Suite (TMRS), an ergonomic artificial intelligence software used in assessing work demands with a postural risk assessment tool, and reported the highest intra-rater reliability for TMRS (1.0), followed by the human expert rater (0.89), while the novice rater had the lowest reliability (0.51). Agreement was found between the human expert rater and TMRS. Kumar et al. (2022)

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reviewed the use of postural risk assessment as a method for determining musculoskeletal discomfort among health professionals, exploring 11 out of 50 previous studies found in PubMed, Google Scholar, Scopus and Research Gate using relevant keywords.

Working posture is determined by the angles formed by body segments during work activities, which affect musculoskeletal loading. It demonstrates how posture and body size impact discomfort (Choi et al., 2017). Bad posture can lead to compensatory postural faults and secondary deformities, as well as high levels of fatigue and energy expenditure (Sarkar et al., 2016). Postures that are not neutral can be categorized based on several body viewpoints, including the lateral and anterior views (Anwar et al., 2022). Haekal et al. (2020) analysed the working posture of packaging operators in a pharmaceutical company using the postural risk assessment tool (REBA). In the metal casting industry, workers' body postures were studied using REBA and Rapid Upper Limb Assessment to assess low back pain, and improvements in workers' posture were recommended (Kusuma, 2020). Sathe et al. (2021) conducted a cross-sectional study of 60 street vendors to assess work posture through the REBA method. Hence, this study adopts the REBA method to assess poultry workers' musculoskeletal discomfort.

Even though poultry farming contributes significantly to the Nigerian economy, many poultry farms still lack ergonomically designed workstations. As a result, poultry workers may be compelled to adopt poor postures during various poultry operations. Also, while working, workers tend to pay little attention to the positions of their bodies as they become more focused on their tasks (Milania et al., 2021). Therefore, the use of poorly ergonomically designed poultry cages places workers at a higher risk of WMDs. In addition, the frequency of repetitive tasks resulting from manual labour, coupled with monotonous movements and extended work hours, leads to workers' weariness. This further contributes to constant muscle strain, erroneous work postures, and an accelerated rate of exhaustion. Therefore, for productive poultry operations, it is important for workers to feel comfortable, confident, and ergonomically safe (Rizkya et al., 2018). Hence, it is necessary to conduct ergonomic evaluations of employees in various work domains as a means of addressing concerns related to WMDs. By conducting adequate ergonomic assessments using various methods and tools, the possible risks associated with workers can be identified (Tee et al., 2017).

Ergonomic assessment methods have been classified into physical, cognitive, and organizational methods (Rezvanizadeh et al., 2023). Physical ergonomic evaluation involves assessing various body areas for musculoskeletal disorders and developing risk-reduction plans (Ng, 2022). Commonly used identification tools include anthropometric measurements and

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posture analysis tools. Agarwaal et al. (2016) mentioned some recognized ergonomic tools for assessing workplace-related hazards to workers, including the Exposure Quick Checklist (EQC), Manual Task Risk Assessment Tool (ManTRA), Rapid Upper Limb Assessment (RULA), Rapid Entire Body Assessment (REBA), Ovako Working Posture Assessment System (OWAS), Loading on the Upper Body Assessment (LUBA), Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), Strain Index (SI), and the National Institute for Occupational Safety and Health (NIOSH), among others. However, Muyiwa and Akanbi (2021) developed a Safe Weight of Lift with Varying Temperature (SWLwT) model to evaluate the safe weight to be lifted by manual lifting workers in order to minimize the occurrence of low back pain among construction workers in Nigeria. These models are only a few of the assessment tools available for evaluating workers' postures and workplace ergonomic hazards. However, the choice of REBA and CMDQ in the present study was based on the relevance of these tools to the research.

Komeili et al. (2025) adopted a comprehensive musculoskeletal disorders risk assessment questionnaire, REBA, and CMDQ to evaluate musculoskeletal discomfort among workers in the auto parts manufacturing industry in Tehran. Kee (2021) compared OWAS, RULA, and REBA in evaluating possible work-related musculoskeletal pain based on musculoskeletal disorders diagnosed by medical doctors. Cankaya et al. (2025) conducted an ergonomic risk assessment of musculoskeletal discomfort among final-year physiotherapy and rehabilitation students using REBA and CMDQ. Aziz & Hafidz (2024) investigated ergonomic risk and musculoskeletal disorder symptoms among engineering, science, and technology students attending online learning classes using CMDQ and REBA to assess body discomfort and sitting posture. Therefore, the postural risk assessment tool (REBA) and the self-reported discomfort assessment tool (CMDQ) have been used to assess ergonomic risk and musculoskeletal discomfort in various sectors; however, such studies remain rare in poultry farming in Nigeria.

Method

A purposive sampling technique was adopted to distribute seventy-two questionnaires among poultry workers in poultry farms with battery cage systems arranged in two- and three-tier formations. The poultry workers performed manual operations such as bird feeding, egg picking, and poultry cage cleaning activities. Previous research in similar areas considered

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sample sizes of 60, 58, and 78 in their respective studies (Sathe et al., 2021; Magri et al., 2021; Hancharoenkul et al., 2023); thus, the sample size in this study was considered sufficient and within the range of related studies. The observation and distribution of questionnaires spanned four weeks and were carried out by four research assistants with prior knowledge of the study.

The respondents' work and socio-demographic history, such as age, gender, educational level, work experience in poultry farming, working hours, and daily task information, were collected using a socio-demographic questionnaire. The Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) was used to assess the discomfort levels of the poultry workers, while the Rapid Entire Body Assessment (REBA) was used to assess the posture and movement of the workers' body parts by observing them while performing tasks, after which appropriate scores were assigned to their postures and movements. Table 1 presents the CMDQ scoring guidelines applied in the study.

During the observation, the most accurate positions of the poultry workers were selected. The positions repeated most frequently, the longest-maintained positions, the postures that exposed workers to greater muscular activity and force exertion, and the postures shown to cause the greatest discomfort were observed. The REBA worksheet was used to score and record posture and task variables in order to evaluate the final REBA scores. The discomfort levels experienced by poultry workers were assessed using the CMDQ, which collected data from each worker. The CMDQ assessed musculoskeletal discomfort in different body regions where poultry workers experienced discomfort during the previous seven days. This study adopted descriptive statistics to present the results. Due to the exploratory nature of the study, inferential statistics were not applied; instead, worker characteristics were descriptively examined in relation to ergonomic risk variables to identify observable patterns. The research was endorsed by the Ethical Committee of the UI/UCH Research Ethics Committee at the Institute of Advanced Medical Research and Training (IAMRAT).

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Table 1
Method Scale

Items	Description
Frequency score	The assigned weighted values for the participant response for experiencing musculoskeletal disorders. 0= Never 1.5 = 1–2 times in a week 3.5 = 3–4 times in a week 5 = daily 10 = Several times daily.
Discomfort rating	The responses from the participants are assigned weighted values Slightly uncomfortable = 1 Moderately uncomfortable = 2 Very uncomfortable = 3
Interference Score	Responses from the participants are assigned weighted values. Null = 1 Interfered slightly = 2 Interfered substantially = 3
Total Score	The frequency, discomfort, and interference scores are multiplied to obtain final score.
Interpretation of Total Score	The total score is the discomfort level. This is ranked as follows: No Discomfort (Score "0") Mild (Score "1.5–4.5") Moderate (Score "5–14") Severe (Score "15–45") Very Severe (Score "60–90")

Results and discussion

Table 2 shows the gender distribution of the poultry workers, male and female 52, and 20, at 72.2 and 27.8%, respectively.

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Table 2

Poultry workers gender distribution

Gender	Frequency	Percentages (%)
Male	52	72.2
Female	20	27.8

Table 3 presents the age distribution of the poultry workers studied. From the table, 50% were between the ages of 18 and 24 years, 40.3% were between 25 and 34 years, and 9.7% were between 35 and 44 years.

Table 3

Poultry workers'age distribution

Age Distribution	Frequency	Percentages (%)
18–24	36	50.0
25–34	29	40.3
35–44	7	9.7

The educational level of the sampled poultry workers is presented in Table 4. This revealed that 56.9%, representing 41 workers, were educated to the secondary level, while 43.1%, representing 31 workers, were educated to the tertiary level. This implies that the sampled poultry workers have some level of basic education, which enabled effective communication with colleagues and with the researcher during this study. The high level of education indicates that the Nigerian poultry industry makes use of educated employees and skilled labour for its operations.

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Table 4

Poultry workers' education distribution

Education level	Frequency	Percentages (%)
Secondary	41	56.9
Tertiary	31	43.1

Table 5 presents the analysis of the poultry workers' years of experience, which shows that 18 workers had between 0 and 2 years of experience, 51 workers had between 3 and 4 years of experience, and three workers had more than five years of experience. This means there were fewer highly experienced workers in the sample, which can be attributed to the high labour turnover experienced in the sector because of the state of Nigeria's economy.

Table 5

Poultry workers' work experience distribution

Poultry workers' experience Distribution	Frequency	Percentages (%)
0–2	18	25.0
3–4	51	70.8
>5	3	4.2

Table 6 shows the working hours distribution of the sampled poultry workers in this study. The participants' working hours distribution indicates that 13, 51, 6, and 2 poultry workers engaged in poultry activities for 2–4, 5–7, 8–10, and more than 11 hours per day, representing 18.1%, 70.8%, 8.3%, and 2.8%, respectively. However, very few workers engaged in poultry operations for more than 11 hours per day.

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Table 6

Poultry workers' working hours distribution

Poultry workers' working hours Distribution	Frequency	Percentages (%)
2–4	13	18.1
5–7	51	70.8
8–10	6	8.3
>11	2	2.8

Table 7 presents the daily tasks of the poultry workers. The daily task distribution of the sampled poultry workers showed that 12, 49, and 11 workers, representing 16.7%, 68.1%, and 15.2%, respectively, engaged daily in poultry cleaning, bird feeding, and egg picking.

Table 7

Poultry workers' daily task Distribution

Poultry workers' daily task Distribution	Frequency	Percentages (%)
Poultry cleaning	12	16.7
Bird feeding	49	68.1
Egg picking	11	15.2

Table 8 presents the two types of poultry cages considered in this study and their distributions across the poultry farms studied. The cages represent the working environment of the poultry workers, as the birds being cared for are kept and fed in the battery cages. The two-tier and three-tier cages accounted for 38 and 34 cages, representing 52.8% and 47.2%, respectively. The dimensions of these cages, in width by height, are 1.65 by 2 m and 1.85 by 2 m for the two-tier and three-tier cages, respectively.

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Table 8

Poultry cage type distribution

Cage type	Frequency	Percentages (%)
Two tier	38	52.8
Three tier	34	47.2

Table 9 shows the ergonomic risk variable levels found among the 72 poultry workers sampled in this study, the required actions, the number of workers represented as frequency, and the percentage of poultry workers affected. Twenty-one poultry workers were observed to experience high risk (29.1%), which requires investigation and effective changes to mitigate the risk. Two workers were experiencing low risk (2.8%), which may require changes. Forty-seven workers indicated medium risk (65.3%), which requires further investigation to affirm the observation and categorisation of the workers' risk, while two workers were experiencing very high risk (2.8%). The implication is that changes should be implemented immediately for the workers involved.

Table 9

Ergonomic variables of the poultry workers in this study

Ergonomic risk levels	Required action	Frequency	Percentage (%)
High risk	Investigate and implement change	21	29.1
Low risk	Change may be needed	2	2.8
Medium risk	Further investigation soon	47	65.3
Very high risk	Implement change immediately	2	2.8

Table 10 shows the areas of the body where the poultry workers experienced discomfort. The ratings were categorised as mild, moderate, none, and severe discomfort. The body areas studied were Left Wrist (LW), Right Wrist (RW), Right and Left Thigh (RLT), Right Forearm (RFo), Right Upper Arm (RUA), Left Foot (LF), Right Foot (RF), Right and Left Lower Leg (RLLL), Right and Left Knee (RLK), Hips and Buttocks (HB), Lower Back (LB), Upper Back (UB), Left Shoulder (LS), Right Shoulder (RS), and Neck (N).

The poultry workers indicated mild discomfort ratings of 2, 2, 2, 2, 3, 3, 2, 6, 16, 15, 17, 10, 11, 11, and 4 for LW, RW, RLT, RFo, RUA, LF, RF, RLLL, RLK, HB, LB, UB, LS, RS,

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and N, respectively. Moderate discomfort ratings were 1, 1, 1, 1, 1, 2, 9, 11, 14, 10, 8, 10, and 21 for LW, RW, RUA, LF, RF, RLLL, RLK, HB, LB, UB, LS, RS, and N, respectively, while no discomfort ratings were 69, 70, 70, 69, 68, 68, 69, 64, 45, 43, 37, 52, 53, 51, and 47 for LW, RW, RLT, RFo, RUA, LF, RF, RLLL, RLK, HB, LB, UB, LS, RS, and N, respectively. Poultry workers with severe discomfort ratings were 2, 3, and 4 for RLK, HB, and LB, respectively.

Table 10

Poultry workers discomfort levels

Discomfort levels	LW	RW	RLT	RFo	RUA	LF	RF	RLLL	RLK	HB	LB	UB	LS	RS	N
Mild	2	2	2	2	3	3	2	6	16	15	17	10	11	11	4
Moderate	1			1	1	1	1	2	9	11	14	10	8	10	21
Severe									2	3	4				
None	69	70	70	69	68	68	60	64	45	43	37	52	53	51	47

Discussion

The study revealed that younger workers (18–24 years), representing 50% of the study participants, engaged in bird feeding, cage cleaning, and egg-picking operations, resulting in medium and high ergonomic risk levels (65.3% and 29.1%, respectively). This indicates that younger workers mostly fall into the medium-risk category, which may be due to higher task repetition and prolonged static postures. However, discomfort severity remained generally mild to moderate, as observed by Hancharoenku et al. (2023). This may be attributed to the age-related physical resilience of the participants.

Poultry workers with 3–4 years of working experience accounted for 70.8% of the sample. This category is likely to encounter cumulative WMD strain caused by prolonged exposure to non-neutral positions, which is indicated by the presence of high and very high REBA scores among a subset of poultry workers. This implies that increased experience does not necessarily reduce ergonomic risk when workstation design and task methods remain unchanged.

A total of 70.8% of the workers worked between 5 and 7 hours daily, followed by 18.1% who worked 2–4 hours daily. While most workers operated within 5–7 hours per day, the persistence of medium ergonomic risk suggests that task posture and repetition may be more influential than exposure duration alone. Workers who exceed 8 hours per day may experience

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increased CMDQ scores, especially in the lower back, knees, and shoulders, which have been identified in the literature as body regions susceptible to musculoskeletal discomfort.

The educational background of the participants may have contributed to the dominance of mild to moderate discomfort levels despite exposure to ergonomic risks among the poultry workers studied, with the results showing that 43.1% attained tertiary education. Although higher educational qualifications might have influenced task understanding and compliance among some poultry workers, they do not eliminate ergonomic risk in the absence of ergonomic training and workstation redesign.

The present study assessed ergonomic risks faced by poultry workers in Nigeria, particularly in relation to musculoskeletal discomfort. The postural risk assessment findings revealed that a larger proportion of the participants studied were exposed to medium and high ergonomic risk levels, which contributed to the development of WMDs, as highlighted by Magri et al. (2021), where 61% of the workers studied claimed to have experienced discomfort. The self-reported discomfort assessment tool also revealed that participants experienced severe discomfort in the knees, hips and buttocks, and lower back. The study revealed the impact of repetitive tasks, poor working postures, and inappropriate ergonomic workstation designs on worker health and productivity. Hancharoenku et al. (2023) reported mild to moderate ergonomic risk levels across body regions. This corroborates the observations of mild to severe ergonomic risks across various body regions among the poultry workers who participated in this study.

Olowogbon et al. (2021) and Ali et al. (2025) reported a high prevalence of shoulder, lower back, and upper back discomfort, as found in the present study, in which poultry workers frequently experienced discomfort in key body areas, including the lower back, upper back, shoulders, and knees. These discomfort levels varied from mild to severe, with some workers experiencing discomfort due to sustained exposure to poor ergonomic conditions. In addition, the study by Hassani et al. (2022) also supports the present findings by reporting relatively high ergonomic risk linked to the lower back, knees, neck, and upper back among Iranian and Polish workers in the meat processing industry.

Furthermore, a considerable number of poultry workers were found to spend long hours performing repetitive tasks such as feeding birds, cleaning cages, and picking eggs, which may exacerbate the risk of musculoskeletal discomfort. Speck et al. (2016) reported that long-hour activities under inadequate working postures can lead to ergonomic discomfort, thereby supporting the findings of the present study.

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Conclusion

The present study suggests the need for urgent interventions aimed at minimizing ergonomic risks among poultry farming workers in Nigeria. Therefore, to mitigate the occurrence of ergonomic risks, there may be a need to redesign workstations, provide posture training, and equip workers with appropriate ergonomic tools. Also, regular health checks should be implemented alongside wellness programs for workers to enhance overall occupational safety. Employers and policymakers should consider incorporating ergonomic best practices into poultry farming activities to improve worker productivity, reduce musculoskeletal discomfort, and promote long-term sustainability in poultry farming operations.

This research offers valuable insights into the occupational musculoskeletal discomfort challenges faced by poultry workers in Nigeria and supports the importance of proactive ergonomic assessments. Therefore, by targeting ergonomic improvements, stakeholders can provide safer working environments that not only support workers' wellness but also improve productivity and economic stability within the Nigerian poultry sector. Future research should involve a more diverse sample to improve generalizability.

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