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Assessment of worker performance in Babel province broiler-chicken hatcheries\ Iraq.

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Abstract:
Objective: *The purpose of this study is to assess of worker performanceinBabel private hatcheries.*
Methods*: None probabilitysampleconduct for data collection by questioner constructed for this purpose.*
Setting& Subjects: (7) hatcheries in Babylon governorate, (29) hatchery worker werestudied.
Results*: Higher rates (48.3%) of age group (21-30) year, (58.62%) for primary graduates,69% for private examination, and (18) worker were no hand washing, also, the higher rates 65.51% for eat inside hatchery, 37.93% for skin allergy, as several dermal & respiratory symptoms and diseases affects on them, also 70% for Sometimes scale of wearing many personal protective equipment's (PPE) devices. Finally, Waste disposal method used mostly by Burning, and Egg sterilized methods by spraying and Fumigation. Conclusion:nearly half of study sample areprimary graduates they didn't do personal protective measure, they had Skin allergy anddermal & respiratory symptoms. So they need more training program for up guard their performance and in protective from disease and worker hazard*
Key words: *Assessment,worker performance, broiler-chicken Hatcheries, poultry.*

I. Introduction:

Hatchery worker means an employee who rotates eggs in incubators, checks eggs, undertakes sexing, beak trimming, sorting and grading eggs and day-old poultry, fumigation, vaccination, cleaning and sanitization of hatchery incubators, hatchers and associated equipment, as well as any work undertaken by a farm hand[1].
They performs routine tasks on a poultry farm such as collecting eggs and placing them in incubators, providing poultry with feed and water, and disinfecting hatcheries to prevent disease[2].

II. Hatchery workers:

Private hatcheries administrations depends totally on worker in hatchery, as most managers of these hatcheries always don't found, they have an offices together for marketing, disinfectant, drug and vaccine demands and communicating with others of other hatcheries and poultry farms[3,4].

Workers doingby ordered operations of cleaning, washing, sterilizing and disinfecting of tools, equipment, devices as incubators, hatchers, vehicles, eggs, floors, personalprotectiveequipment **(**PPE) (gloves, apron, goggles, boots, respiratory protective mask), hands, boxes and tables, using spray, fumigating and dipping methods.

In chick production cycle workers begin with received a packaged commercial eggs prepared for hatching process, sprayed with a suitable disinfectant in receiving room put it inside an incubator for (18) day, then delivered to hatchers for (3) days with regard to temperature, humid and time conditions. After hatching the culling chicks isolated in a boxes, but leave the diseased and dead chicks, egg shells, manure, fluff inside hatcher boxes, then collected together in closely covered vehicle and transport to buried deeply or burned in incinerator outside hatchery far from a community camps, to prevent its spread and contaminate an environment[5].

They disinfected incubators, hatchers and boxes, equipment, floors, to begin a new chick production cycle. So, their work based on:
1- Maintain and facilitate the operations that convert an embryonated eggs to chicks and high rates of hatchability and chick productivity, by monitor a device works and optimize conditions required (Temperature, humid and time) for hatching, deliver eggs from incubators to hatchers, this require workers staying all over the time and this dispose there to difficulties, obstacles, risks of work in hatchery, so they make an ordered timing table of egg receiving, incubating and one-day chick hatching.
2- Prevent and decrease contamination by apply different wide-spectrum antimicrobial solutions of washing, cleaning, sterilizing and disinfecting methods inside and outside hatchery, and wear suitable PPE to prevent if they be a source or spreader of microbial contamination in hatchery, and to prevent infected with pathogens or dermal, respiratory, enteric...etc. allergies due to pathogens or chemical solutions used[6,7].

Due to importance of human source as a spreading factor of Zoonotic diseases between community and hatchery as chick production decreased (in morbidity and mortality) by contamination, visitors receive and entry to working sections prohibited in hatchery[8].Also workers and their number represent a critical factor in contaminating hatchery, as if increased it increase work cooperation and chick productivity but in contrast increase contamination and in few number contamination decreased but require a high worker performance and experience typical for high productivity, so suggested increase their performance [9,10].

III. Materials and methods:

1. Locations & Subjects:

This field research carried out during March-April\ 2014 (29n) in (7) broiler chicken hatcheries in Babel province named (1-Al-Amer (4 workers), 2-Babeil (4), 3-Chiflawi (4), 4-Al-Naser (4), 5-Asaa'd (4), 6-Al-Hadi(3) &7-Al-Anwar (6)), in average (4) workers for each, they work in changing as one stay and the other go to home.

2. Questionnaire form:

Using a questionnaire form (Fig.1), to get an information of worker performance of each worker, each form contain data onworker's demographic and health status, hatchery environment conditions& facilities. Face-to-face questions of Yes/No, multiple choice or short answers were collected, each form filled with information of one worker, then collect forms from each hatchery to make and order data in a suitabletables of results, then compare it with a standard international criteria for workerperformance in hatcheries to give a suitable recommendations for workers in this study, some parameters neglected and not used [11].

3. Statistical analysis:

Standard deviation method were applied to determine SD values, also use the percentages method to determine the ratio (part/all x 100), for most data used in present study.

Fig. (1): Questionnaire form used for assessing worker performance in Babil province hatcheries.

IV. Results:

1- worker's conditions:					
PPT: Personnel protective equipments Y: Yes N: No in: Inside out: Outside					
PPE Types used:	**Apron:**	**Boot:**	**Gloves:**	**Goggles:**	**PPE:**
Periodic Exam. types:	**Cutaneous & Eyes:**	**Respiratory:**	**Enteric:**	**Blood:**	**Others:**
Scientific level:	**Non:**	**Read\Write:**	**Primary:**	**Secondary:**	**Academic Inst.\Univ.:**
Worker's age (year):	**15-20:**	**21-30:**	**31-40:**	**41-50:**	**More:**
Number of workers:	**1-3:**	**4-6:**	**More:**		
Worker's infections:	**Before:**	**During:**	**Acute:**	**Chronic:**	**Non:**
Infection types:	**Coetaneous & Eyes:**	**Respiratory:**	**Enteric:**	**Blood:**	**Others:**

2- Hatchery conditions:					
Lab. Exam. room Y: N:		**Clinic Y: N:**		**Vaccine Y: N:**	
Periodic table Y: N:		**Periodic table Y: N:**		**Periodic table Y: N:**	
Work type:	**Stay in labor:**	**Changing to go home:**	**Period labor:**	**Monthly income:**	
Administration: in: out:		**Visitor entry: Y: N:**		**Veterinarian: Y: N:**	
Hatchery design:					
Vital hazardous sections	**Ventilation: at.synth.**	**Worker room: in: out:**	**Eating: in: out:**	**Water source:**	**Floor:**
Ventilation type: natural: Synthetic:		**Worker room: in: out:**		**Eating food: in: out:**	
Hatchery operations:	**Daily:**	**Before& after each cycle:**	**Periodically:**		
Cleaning & washing:	**Water:**	**Detergents:**	**Waste disposal: Incinerator: Burred deeply:**		
Sterilizing & disinfecting:	**Spraying:**	**Dipping:**	**Fumigating:**	**Disinfectants used: few: more:**	

Table(1):Percentages ofAge groups, Educational levels,Hand washing and Type of examination of hatchery workers.

Age groups	No.	%	Educational levels	No.	%	Hand washing				Type of examination	No.	%
						Yes	No	Total	%			
15-20	2	6.9	Read& write	1	3.44	2	0	2	6.9	Private	20	69
21-30	14	48.3	Primary	17	58.62	9	5	14	48.3	Non Private	9	31
31-40	11	37.9	secondary	6	20.68	0	11	11	37.9	Total	29	100
41-50	2	6.9	Inst.\Univ.	5	17.24	0	2	2	6.9			
Total	29	100	Total	29	100	11	18	29				
$\bar{x}$, Sd = 2.448 ±.736						x^2	df	Sig.				
						15.347	3	.002				

Table (1) shows percentages of age groups, educational level, hand washing and type of examination of hatchery workers. According to age groups, the highest rate 48.3% in (21-30) years, while the lowest in (15-20) & (41-50) year gives 6.9% for each. According to educational level, the highest rate 58.62% in Primary, while the lowest in read & write gives 3.44%. According to hand washing the highest no. (18) in those who didn't wash their hands, while the lowest (11) in those washed their hands. According to type of examination, Private gives the highest rate 69%, than non-private 31%.

Table(2):Percentages of Diseases related to work hazards andWorker eating in hatchery workers.

Diseases	No.	%	Worker eating	No.	%
Bronchitis Allergy	8	27.58	Inside hatchery	19	65.51
skin Allergy	11	37.93	Outside hatchery	10	34.48
Ophthalmic Allergy	6	20.68	Total	29	100
Diarrhea	4	13.79			
Total	29	100			

Table (2) shows percentages of disease related to work hazards and worker eating in hatchery workers. According to related disease, skin allergy gives the highest rate 37.93%, while the lowest 13.79% for diarrhea. According to worker eating, the highest rate 65.51% inside hatchery, while the lowest 34.48% outside it.

Table (3): Percentages of wearing PPEin hatchery workers.(N=29).

PPE	Never	%	Sometimes	%	Always	%	mean	SD.
Clothes	5	17.2	20	69	4	13.8	1.965	0.565
Boots	0	0	19	65.5	10	34.5	2.344	0.483
Gloves	8	27.6	20	69	1	3.4	1.758	0.51
Masks	5	17.2	22	72.9	2	6.9	1.488	0.557
glasses	6	20.7	20	69	3	10.3	1.896	0.557
Total	24	16.55	101	70	20	13.8	Total 145	

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Table (3) shows percentages of wear personal protective equipments (PPE) by hatchery workers. Totally, Sometimes scale gives the highest rate 70% ,while the lowest 13.8% in Always. According to equipment types, they all gives the highest rates in Sometimes scale, and the lowest rates in Always, except for boot, which gives highest rate 34.5% in Always and 0.0% in Never scales.

Table(4):The methods of waste disposal and sterilizing eggs in(7) hatcheries.

Waste disposal methods			Method of sterilizing eggs in hatcheries	No.
Hatchery	Burn	Throwing	Spray	3
Al-Amer	-	1	Snaking	1
Babel	1	-	Fumigation	3
Chiflawi	1	-	Total	7
Al-Naser	1	-		
Asaa'd	-	-		
Al-Hadi	-	1		
Al-Anwar	1	1		
Total	4	3		

Table (4) shows percentages of waste disposal method and egg sterilizing method. According to waste disposal method, (4) hatcheries burn its wastes, but (3) throwing it. According to egg sterilizing method, the highest (3) for each Spray & Fumigation application, while the lowest (1) for Snaking.Workers and managers in the poultry industry should keep zoonotic and respiratory disease riskunder review and take necessary action.

V. Discussion:

There were very little papers published on worker performance of hatcheries in the world and absent of any one in country but a standard manuals published by companies and organizations but not found in studied hatcheries. Research emphasis on poultry farms of various species and have a health and environmental importance.

This producing group in community and depend on it, although their educational and socio-economic conditions. Educational level mostly primary school graduates, so there were simple awareness, but continuous hatchery work need awareness and alarm in methods and operations as contamination, accidents and mistakes may occur in each step. And their little number tolerate them responsibility and weak training and awareness in biosecurity basics of microbial infections and chemical injuries.

Successful of work and production in hatchery depends on technical integration of well-trained workers and provide facilities to prevent exhaust energy, movement and time, then increase contamination and hazards but reduce productivity, so they must participate in community societies, activities and other hatcheries to benefit and enhance their experiences [12].Also provide manuals on their work.

Hand washing lowest, when they come in or out hatchery or move between parts, without bathing or hand washing (by water, soap and disinfectant) [13].Or foot bath, as work with water and electricity sources, cleaning, management, visitors and vehicles, also they don't wear gloves when handling with eggs and chicks.

Workers depends on in theirself-examination and treatment, due to absent of special doctor, examination room and management but they were giving a rest, and didn't record this or search on its reasons, so it was necessary to examine water, air, instruments (hatcher, incubator), equipment, important places to assess efficacy of cleaning and disinfecting.These were private (non-governmental) hatcheries, so health inspection of veterinarian (in poultry disease and vaccines) and medical specialists absent, and government didn't tolerate a financial, complications and hazards of work.Through transport hatchery wastes for disposal, it contaminate environment outside hatchery, as uncovered vehicles used, which disseminate in air and soil. Higher contamination in worker's clothes and room and they eat, drink and sleep there, also absent of baths, personal cleaning and disinfecting agents.

Their number very little, and didn't wear a suitable and standard PPE when handling with eggs, tools, equipment and operations (washing, cleaning, disinfecting) inside and outside hatchery.Diseases and obvious symptoms mostly dermal, respiratory, as they tried in long monitoring andabsence of PPE, doctor inspection, also didn't record these symptoms.Hatchery environment sanitation and prevent contamination and dissemination of infection [14], infectious diseases were recorded between hatchery and poultry workers [15].

Each biological aggregates (hatchery, poultry) were vulnerable and exposed to be contaminates by infections, and hatchery play an important role in influence on level of microbial challenge as it transferred through food chain to consumers [16].Dermal infections, worker's allergies occurred due to Candida fungi, then disseminated it in farm [17], and dermal test to poultry workers carried out to these transmitted through air [18], also north Carolina poultry workers emigrants exposed to many factors affects on skin [19].

Poultry workers exposed to C. jejuni infected with neurologic symptoms sequels and elevate specific antibodies, also infected by infectious zoonotic infections from dust, water, live materials, accidents and chemicals [20], and hatchery air pollutes then infect by respiratory failure symptoms and reduce lung function [21], health workers (especially nurses) also frequently exposed to chicken pox and TB [.22], and frequency of resistant MRSA in Malaysian poultry worker noses and transmit it from man to animal and reversely [23].

Poultry workers exposed to body (skeletal-muscular) disorders in upper limb due to over use of force and exposure to heat, zoonotic disease and skin injury by sharp tools [24], and infect by work difficulties (work density, farm capacity, design and conditions), with disturbed conditions produce upper limb, back and joint pains and cumulative trauma disorders (CTDs). Their deaths occurs when exposed to retroviruses and Marek's disease virus that occurred and disseminated naturally to cause poultry cancer, other studies occurred in farmers, veterinarian and ecologists increase Hemophilia, lymph, Cervical and Ovary cancers [25].

They eat and sleep inside hatchery, their room, clothes, then increase risks of water, food and tools exposure to contaminated infections andchemicals hazard. They didn't wear PPE and absent, which makes to protect and isolate worker's body from the external infectious and chemical injuries, facilitate cleaning and disinfecting continuous operations inside hatchery and clean, disinfect and replace it continuously.Most private hatcheries didn't tolerate provide it to their workers and they didn't replace it daily, absent of First aid box, feet and hand bath in hatchery door steps for visitors and workers as its importance in hatchery hygiene.

Waste disposal by burning and burring in places outside hatchery, but its transport occur in unhealthy conditions, as uncovered vehicles unsuitable and far of incinerator or dipping increase pathogen dissemination in environment (air, soil), especially if it lie beneath a community.

Also there were a disposed vessels, tools, plastic and metallic wastes, also plants and dense trees found around hatchery, that bring birds, insects and rodents (pests), which be risk in transmit diseases and a source of hatchery environment contamination [26].

Received eggs washed (cleaned), then disinfected by spraying and fumigation, and many studies proved that microbes penetrate and pass through egg shell especially when use air vacuum apparatus to transport eggs, causing embryonic deaths and reduce productivity [27,28].

VI. Conclusions:

1. Enrollment of the productive age group in community for hatchery works although their financial, socio-economic conditions.
2. They attend to private dependence in examination and treatment of symptoms and infections. So specialist doctors, examination room, managers, manuals and First aids box not found there.
3. PPE not found, their clothes didn't cleaned or replaced daily, and weak awareness in bio-security basics, and lack any training skills on their work, but they monitor, record and timing all routine operations in hatchery.
4. They don't bath daily, nor after moving between parts, didn't full door step foot disinfectant, or wash their hands.
5. Dropping of waste transport operations for burning or burring, far away, and there is no covered standard vehicles prevent disseminates of pathogens from falling wastes. Also, sterilizing eggs by spraying increase risks of microbes pass through egg shell causing embryonic infection and death then reduce productivity.
6. The highest rates showed in (21-30) years age group gives 48.3%, Primary graduates 58.62%, non-hand washers (18), Private examination 69%, Skin allergy 37.93%, methods of waste disposal by burning and egg sterilizing by apply spray and fumigation.

VII. Recommendations:

1. It is necessary to provide workers in each part of hatchery to prevent frequent movement between it, also one-flow work and air to reduce contamination.
2. Elevate worker performance in operating (washing-cleaning, disinfecting, receive eggs, incubating & hatching, and provide chicks), to reduce risks of accidents and contamination then enhance productivity.
3. Interesting in hatchery environment sanitation and provide work facilities, also healthy waste disposal and egg sterilization methods, that reduce contamination then increase productivity.
4. Adopt periodical examination of workers and take sample from hatchery to assess cleaning, disinfecting operations, then provide First aid box and treatments, specialist doctors& examination room.

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