Field assessment and association of the management factors affecting Egyptian working donkeys in brick kilns factories

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ABSTRACT:

Egyptian donkeys are corner stone element of labors in brick kilns factories. The study aims to assess all field variables related to working conditions of working donkeys including the health risk factors, welfare regulations and applying welfare strategies to improve the quality of life of donkeys in brick kilns as well as within communities. The study variables were collected from 84 donkeys extended to include representative random samples of 11 brick kilns. The body condition score ranged from 1 to 4 (1.66±0.365). 67 ± 0.33 (n = 80) of kiln donkeys have wounds, and the most serious wound is a beating wound (37 ± 3.7). Other wounds are related to the harness, such as the breeching (8 ± 1.97), saddle (36 ± 2.17) and neck collar (41 ± 2.00). A poor body condition was seen in almost 35 % of kiln donkeys. The study emphasized the variations in the level of welfare associated with the donkeys in each kiln, along with differences found in the management practices. This with no doubt helped in better understanding of why some kilns have better working environments than others. Future studies could possibly measure the attitudes of donkey handlers in relation to overall donkey welfare. Based on the findings of the current study, we can probably design an effective educational program for the El-Saf brick kilns, which can be applied to all Egyptian Brick kilns.

Keywords: Donkeys, Brick kilns, Working animals, Wounds.

INTRODUCTION

Donkeys have great significant value in different economic activities of the human civilizations existence. Donkey is main working equids in developing countries. High percentage of people in these countries depend on donkey to sustain their lives. The donkey is the most suitable animal for agriculture purposes, transportation, and different industries. 95% of the world donkey population are in developing countries, Leeb et al., (2003), Burn et al., (2010 a). These working donkeys are facing many welfare problems associated with their living environment and working conditions. Some of these are health problem, difficult working conditions, and improper handling of handlers towards their donkeys. The wound and skin lesions are mostly common welfare problems facing the working donkey in Egypt. These wounds and physical injuries are attributes to improper tying and unfit different parts of the harness such as the pack saddle, breeching, and neck collar. Housing conditions are usually unhealthy and donkeys suffer from aggressive behavior (Farhat, et al, 2020). Moreover, Burn et al., (2010 b) stated that these poor working conditions lead the donkeys to show bad feelings, such as a fearing, sadness, aggressive behaviors and depression, especially in African and Middle East countries. The poor welfare was usually correlated to both poor working_conditions and to lack of enough knowledge of husbandry (Tesfaye and Curran, 2005). Oussat, (2006) reported that donkeys are domesticated in Egypt of about 3000–4000BC. The current study discusses a significant problem, where there is an increasing in Egyptian human population in the recent years which trigger the increase of the demand for bricks. Despite the modern mechanization in brick kilns, the contributions of donkey are still very important in brick production in Egyptian brick kilns, that was the main reason for the outline of the current study. The Egyptian Society for the Protection and Welfare of Working Animals (ESPWWA) is working for 90 kilns in El-Wadi, where the donkeys are main working equids (Farhat et al, 2020). In these brick kilns, donkeys are responsible for the transportation of green unburned bricks from the store area to the ovens by pulling heavy loaded cart, under this environment, donkeys confront multiple practices that need to be assessed. They are facing many problems such as; malnutrition and absent of veterinary services, hardworking, pulling heavy cart with poor quality and unfit harnesses that lead to poor body condition, different types of wound and physical injuries, lameness and gait abnormality, hooves deformities, abnormal behaviors, and other diseases (Pearson and Krecek, 2006). Furthermore, the poor of the donkey's welfare in the brick kilns has negative impact on the health of these donkeys and lives of their handlers (Curran, et al., 2005), unfortunately the owners of the brick

kilns treat donkeys as machines with a low economic value; most of donkey's handlers are children who have not enough knowledge and skills to properly handle their donkeys (Farhat et al, 2020). The ESPWWA staffs are facing loads of challenges to evaluate the donkeys working and environmental conditions in brick kilns. As far as we know, researches with this regard are very rare in Egypt. The current study focused on evaluating the majority of variables that have an impact on working donkeys' environments and identifying the meaningful risk factors association between these variables in El-Wadi.

MATERIALS AND METHODS

The Study Location and collected samples

The current investigation carried out in El-Wadi area, in Giza Governorate, 85 Km away from Cairo, Egypt. The number of brick kilns in this area are 90 kilns. The main working equid is the donkey. The role of these donkeys is transportation of green unburned bricks from the store area to the ovens by pulling heavy loaded cart, eleven brick kilns randomly selected. The donkeys number in these 11 kilns are 84 donkeys and all of them are male.

Physical parameters examination:

The physical examination was performed for all examined donkey and was started from the head towards the rear. The examinations are started with examining the lips, head, eye abnormalities, and any abnormal lesions in head or neck, the mouth of donkey was opened by inserting the thumb into the corner of the animal's mouth and lifted the top lip until the gums and teeth were easily examined (Fig. 1)

Three dental examination tests were performed includeing Lateral excursion test, Rostral caudal movement, and touching the buccal cavity to detect any pain reaction due to buccal ulceration or enamel point (Baker, 1998). Eye physical examination is shown in Fig.2

The number and the area of the wounds (multiply the width by length) were estimated according to Farhat et al. (2020)The wounds were divided into two groups, first group; wounds caused by harness and second group; wounds caused by beating and located in rump. Harness Wounds included saddle wound; located in points of shoulders or breast of the donkey and attributed by inadequate fitness, and/ or bad quality of neck collar. Different Skin wounds and other skin injuries were recorded (Fig. 3). The saddle wounds that located at withers and spine were caused by using pack saddle without enough padding. Shaft wound: the wound that is located at both sides of the body due to narrow, improper size cart shafts, or shafts with sharp objects. Breeching wound located under the breeching of harness. Beating wounds that are located in the hind quarters and croup of donkey were due to beating. The other wounds that are not related to previous categories were also spotted. Full lameness examinations were performed for examined donkey at walk in strait line and in a circle according to Ross and Dyson (2011).

Other physical parameters were estimated, such as age that was detected based on features of mandibular incisor occlusal surface (Easley, 2010), body conditions (BCs) that were estimated on a 5-grades scale as by Pearson and Ouassat, (2000) from 1 (poor) to 5 (obese), live body weight that was estimated from body height, heart girth was measured according to Svendson, 1997

Behavior and direct physical parameters examination:

The behavior parameters were estimated and recorded just after finishing the work according to Burn et al. (2010a), with some changes to avoid interrupting the work in the brick kilns. The spectator observed the donkey from a distance of at least 3 meters away and for up to 10 seconds and record any signs of alertness or depression. The following behaviors parameters were evaluated and recorded:

The method for assessing the behavior measurements was as follows: firstly, the observer observed the donkey from at least 3 m and for 10 seconds to assess the general attitudes of the working donkey (alert, apathetic, or depressed). Then, he walked slowly at an angle of 30° toward the head of the donkey, approximately at 30 cm from the head of the donkey, the observer recorded the reaction of the donkey at the moment that the observer stopped. the donkey's reactions that fall within the following categories were recorded: discovering, not moving, avoiding, running away, and showing an aggressive reaction. Lastly, the observer assessed the acceptance of the donkey to physical contact by putting his hand very gently under the donkey's chin, the donkey considered not acceptance to physical contact If the donkey took its head away from the hand, the observer would not pursue it and recorded the

acceptance of chin contact (acceptance or non-acceptance).

Working condition assessment:

The daily target of bricks for each kiln, number of working hours, number of working days/week, the daily walked distance by each donkey, average cart load, total weight pulled by each donkey were estimated.

Harness, cart, housing, feeding, watering, and roads assessment:

During the donkey's working, cleanliness, and fitness of harnesses parts (Neck collar, pack saddle and breeching harness's part) were evaluated. The maintenance of harness was given a score from 1 (bad) to 3 (good). The weight of harness was measured. Axis of the cart was evaluated and given score from 1(bad) to 3 (good). The lubrication of cart (existence or absent), wheel (empty or full) were recorded, and finally the maintenance of the cart was evaluated and given Score 1(bad) to 3 (good).

The number of bricks was counted three times; first time just after the beginning of the work, then in the middle of day, and the last estimation just before end of the work. The cleaning and slopping of road from the unloaded area to the Avon, and type of the terrain (hard or sandy) were recorded and the maintenance of the road was evaluated and given a score from 1 (bad) to 3 (good). The daily amount of the concentrate for each donkey, type of food, frequency of feeding were measured, and place of food was evaluated (Fig. 4) and given score from 1 (bad) to 3 (good). The water was assessed; (salty or sweat), (clean or dirty), and availability of water given score from 1 (not available), 2 (available just after the work), to 3 (available all the time). Housing existence measured through external yard (exist or not exist), area allocated for each donkey was measured. The wall, floor of stable, roof of stable, the ventilation inside the stable were evaluated and given score from 1 (bad) to 3 (good).

Statistical Analysis

Donkeys' working environment, body conditions, other exposure factors admitting the donkeys living conditions and the association between these factors are evaluated by implementing different types of analyses and different statistical Packages. The statistical analysis had several successive steps. First, descriptive analyses were performed with numerical variables. Central values of mean and median, as well as measures of dispersion such as variances and standard deviations/errors were calculated. Second, A chi-square test was used to explore the size of association between variables and factors. T-groups tests were performed to compare donkeys with wounds to donkeys without wounds and considered to be healthy. Third, the ANOVA and Tuckey pairwise multiple comparisons were performed to compare the impact of body condition related to different types of wounds and/or behavioral parameters, and also to detect groups that are statistically different in terms of body condition. Fourth, multiple linear regression was used to find the factors that impacted body condition. Graphical representations of the results were implemented by the used software These were Minitab version 19 (Minitab, Inc., Pennsylvania State University, PA, USA) and IRRI state version 3.6.3 (Spain, Malaysia and China cooperative proj., 2015)

RESULTS AND DISCUSSION

The current study was carried out on a representative sample of 84 working donkeys of different ages, BCs and BWs. These donkeys were working in 11 brick kilns in El- Wadi area.

In order to find out a comprehensive data picture, the collected data are subjected to descriptive statics and presented in Table (1). Results exposed the average of numerical parameters as the mean ± standard error. Donkey's age ranged from 7 (fairly young) to 21 (very old) years with the mean of (14.43 ± 0.344). The results found that large percentage of the donkeys had poor body condition score, the body condition score (BCs) ranged from 1.00 to 4.00 with mean of (2.47 ± 0.085), body weight ranged from 142.096 to 246.91 Kg, with the mean of (197.28 ± 2.69Kg), the body height ranged from 106 to 123 cm (116.44 ± 2.09cm), and heart girth from 106 to 128 cm (117.44 ± 0.447).

Perceptibly, the most important and effective factors in donkeys welfare is the body conditions and working environment injures. Thus, the incidences of BCs and different types of wounds for the 11 Kilns are statistically analyzed at the level of individual factory and is presented as the percentage ± standard error as shown in Table (2). The study statistical results found that the body conditions incidents ranged from 1.82 ± 0.12 at Al-Masryia factory up to 3.75 ± 0.163 In Zafan bricks. Besides, the prevalence skin wound incidents ranged from 85.7 up to 100, the area of wound from 1.125 ± 0.789 to 238.43 ± 129.66, the area

of harness wound from 1.125 ± 0.789 to 1.125 ± 0.789, the total No. of wound ranged from 0.25±0.164 to 6.14±2.087, and the no. of harness wound from 0.25±0.164 to 2.86±0.937. Moreover, for the serious wounds area, Table (3) shows a numerical summary of the area of the different wound types in cm^2 as the mean ± standard error for the total of the 84 donkeys in 11 kilns.

The study showed that 56 ± 3.09 of kiln donkeys suffered from different types of body wounds with a total percentage of 75%, 49 ± 3.7 had wounds caused by aggressive forces. For examples, the pack saddle wounds were 23 ± 1.77, and had wounds neck collar wound were 25 ± 3.33. These harness related wound were due to using unfit, dirty harnesses and the poor body condition of the working donkeys, as we found in this study. Moreover, wounds were found on 13.07% with mean and dispersion of 29.5 ± 2.9 of the donkeys' limbs, and of these wounds, 63.09 ± 33.9 were caused by the breeching, and 67.21 ± 32.80 were caused by the shaft of the cart. Analysis of other wounds was represented by 7.1 ± 1.74.

As a reminder, results showed that on the overall average 56 ± 3.1 % of the kilns donkeys had body condition scores of 2 and less. A t-test was used to study the association between body condition and skin wounds. A significant difference ($p < 0.01$) was found in body condition, since injured donkeys had body condition scores of less than healthy donkeys. This suggests that donkeys that received better treatment, healthier food, and improved care, had an overall better body condition and fewer injuries.

Regression techniques were used for further analysis and modeling the instantaneous relationship between the correlated trait of mean BCs and prevalence of wounds. Fig. 4 shows that there was a linear negative association between the wound prevalence and BCS in the studied 11 brick kilns. The regression equation is BCs =156.66 - 34.09 (wound prevalence), the coefficient of determination $R^2 = 0.67$. Additionally, the correlation coefficient of −0.79 was shown between body condition and wound prevalence. The coefficient of determination (r^2) is a statistic commonly used to evaluate the regression model fit, (r^2= 1 - the ratio of residual variability). When the variability of the residual values around the regression line relative to the overall variability is small, the prediction from the regression equation is reliable. In other words, if there is no relationship between the x and y, then $r^2 = 0$, and if x and y are perfectly related then there is no residual variance, and then $r^2 = 1$. In most cases, the ratio and r^2 is somewhere between these extremes (0.0 and 1.0) (Snedecor and Cochran, 1981). Therefore, the coefficient of determination (r^2) described the degree to which the data clustered around regression line and is considered as an indicator of how well the model fits the data. The coefficient of determination of the regression lines portrayed in Fig. 4 revealed that 67 of variation in the skin wounds were due to its relationship with body conditions in Bricks kilns. This suggests that donkeys that received better treatment, healthier food, and improved care, had an overall better body condition and fewer injuries.

Chi-square test was used to test the association between body conditions and the most serious wounds (Table 5).

Results implied that the neck collar, saddle, and breeching wounds were associated with the level of cleanliness ($p < 0.01$). Chi-square test found a correlation between beating wounds and saddle and breeching wounds ($p < 0.01$). The neck collar wounds were associated with the condition and fit ($p < 0.01$). significant association was found also between wounds caused by beating and the overall condition of the harness including fit, condition, and cleanliness ($p < 0.01$).

On the overall skin wound results, the current study revealed that the overall wound prevalence in working donkeys in brick kilns was greater than 81% which is by far the highest prevalence recorded compared with other studies. For example, Curran et al. reported 77.5%, Biffa and Woldemeskel reported 79.4%. Many other studies reported less than these percentages. This difference could be back to the difference in environmental conditions, type of work, and the harness system for the donkeys in brick kilns.

The previous results also showed that the frequency of the wounds found on the limbs were related to the harness quality (e.g., poor) and donkeys being overworked and overloaded. Abdela et al., (2017) reported significant association between body condition and occurrences of wounds (p-value = 0.000), and that animals with a poor body condition are more likely to be wounded than animals found to be in a good body condition. The level of severity and location of the wounds was associated with parts of the harness, BCS, and/or mistreatment. These results were in

harmony with results of Pearson et al., (2003). Current results revealed a correlation between cleanliness and wounds in the neck collar, pack saddle, and breeching with parts of the harness. Sells et al., (2009) found that the cleanliness of the pack saddles is a significant factor in developing a pack wound. A poorly designed or ill-fitted harness will result in fatigue, discomfort, or lesions on donkeys (Pritchard, 2008).

Physical Environmental Parameters:

The environmental measurements that impact the living environment welfare as a working conditions of working donkeys in El Wadi Kilns, including the BC, are presented in Table (6). The table explains data variability and goodness-of-fit of working condition variables. The objective was to test data normality, and the amount of variability found in these variables pooled overall kilns. Results in Table (6) showed that the performance of the majority of working variables was agreed with those obtained by ( ). This is pointing out the possibility to improve the working conditions under Egyptian conditions.

The standard deviation describes where any given data point is located with respect to the population mean. Standard deviation for the majority traits showed relatively small values proportional with the associated mean, which indicated that each trait mean was gathered around the grand mean value (Table 6). The minor changes in the standard deviation across the variables may reflect the stability of the working conditions of these variables across bricks kilns. On the other hand, variables with different measurements can be compared in terms of relative variability of the coefficient of variation (CV). Data with CV of less than 10% are referred to have “low variability”. Data with CV between 10% and 20% are having “moderate variability”. Data with CV greater than 20% are having “high variability” (Snedecor and Cochran 1967). A multiple linear regression model was performed to detect the significant environmental parameters that have an impact on the welfare of donkeys in brick kilns. Body condition was used as a response variable and all other environmental parameters included in table (6) as predictor variables.

Table (7) shows the multiple regression results of the significant parameters. Body conditions were significantly affected by three parameters. These were hours worked/day, the number of donkeys working/brick kiln, and the cleanliness of the road. These variables were able to explain 69.80% (R^2 = 69.80%) of the variability seen in the body conditions. The values of median which is very closer to the mean are indicating the regular normal distribution to the variables' data. Besides, no significant difference was seen in production of bricks, and/or the number of ovens/kilns.

SUMMERY AND CONCLUSION

Number of brick kilns in Egypt is 1000 according to estimation of_(ESPWWA), the majority are located in the Giza and Qalyubia governorates. These brick kilns are not similar they are different in the working conditions of donkeys and people, status of welfare of donkey, responsibility of the owner towards these donkeys. In El-Wadi, the owners of the donkeys are usually the owners brick kiln, and the donkey handlers are children who are usually have no enough knowledge to properly handle their donkeys. Moreover, the working condition in the brick kilns make sever stress for all stakeholders, they have to work hard to achieve the daily brick production target. On the other hand, donkey wounds and physical injuries were the most common and severe problems facing the working donkeys (Birhan, et al., 2014). Although, many factors cause the wounds and skin lesions, there is little studies on the cause of the different types of wounds and association between these causes and specific environmental and working conditions under Egyptian conditions. Many causes lead to wound in the brick kilns such as improperly fitted and poor designed harnesses (saddles, collars), bad quality harness materials used to make the harness (natural and synthetic), poor handling of stakeholders to their donkeys (beating wounds), fighting between the donkeys (e.g., bites and kicks), and improper husbandry/management practices (Burn, et al., 2010). There is lack of studies about the harnesses system of working donkeys in Egyptian brick kilns. This study showed the prevalence of harness wound in working donkeys in brick kilns that was correlated with certain parts of the harness such as the pack saddle, neck collar, and breeching or the wound was caused by the shafts of the cart. These findings agreed with those obtained by Farhat *et al* (2020) under Egyptian working environments. However, it is difficult to compare the prevalence of harness wounds found in these studies with that found in other international studies due to the fact that the harness system used in Egyptian brick kilns is different from that used in other studied areas, such as Ethiopia and Morocco (Mekuria, et al.,

2017). Donkeys working in the El wadi brick kilns are found pulling overloaded carts with harnesses in poor condition and ill-fitting and the cart is poorly attached to the donkey (Fig. 4, in materials).

In conclusion, extra research are needed to understand the management, environmental, and working conditions in brick kilns to initiate a sustainable improvement working environment for brick kilns in Egypt. Current study introduced methods to measure the welfare status of the working donkeys in the El-Saf brick kilns. The study extended to include how to identify associated risk factors that compromise the donkeys working conditions. We emphasized the variations in the level of welfare associated with the donkeys in each kiln, along with differences found in the management practices. This with no doubt helped in better understanding of why some kilns have better working environments than others. The current study revealed the need to future studies to assess the attitudes of donkey handlers towards their donkeys, and their knowledge and the skills to proper handling the working donkeys in the brick kilns. Based on the findings of the current study, we can probably develop useful educational program for El-Wadi kilns, which can be used to enhance the health of working equids in all Egyptian Brick kilns.

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Table 1: Summery of descriptive Statistics of age, BCs, Girth, Height, and Weight of 84 Donkeys in 11 kilns

Variable	N	Minimum	Maximum	Mean	Std. Error	Std. Deviation
Age	84	7	21	14.43	0.344	3.152
BCs	84	1	4	2.47	0.085	0.783
Girth	84	110	136	124.46	0.645	5.910
Height	84	106	128	117.44	0.447	4.096
Weight	84	142.096	246.91	197.28	2.69	24.73

Table 2: Analysis of Body conditions BC and different wounds of the studied 11 kilns

Kiln's name	BCs	Prevalence of skin wound	Area of harness wound	Area of wound	Total No. of wound	No. Harness Wound
Abo Zafan	3.75± 0.163	25	1.125±0.789	1.125±0.789	0.25±0.164	0.25±0.164
Al Tawhed	3.1429± 0.34	28.6	11±9.02	11.85±9.86	0.57±0.369	0.43±.0297
Al Reda 1	3.11±0.11	77.8	8.44±6.97	35.66±13.91	1.44±0.338	0.44±0.176
Al Hoda 98	2.928±0.229	57.1	23.42±14.45	37.14±19.45	1.86±0.8	1.14±0.508
Al Reda 2	2.428±0.202	100	16.21±8.69	28.64±8.42	2.86±.0508	1.43±0.481
Al Rawda	2.14±0.142	85.7	45.14±19.47	52.14±23.15	2.43±.0869	1.86±0.553
Al helal	2.07±0.071	100	142.71±100.27	267.28±106.07	6.14±2.087	2.00±1.134
Al AHaram	2±0.00	100	42.42±22.121	73.85±31.23	3.71±1.085	2.00±.0724
El Salam 2	2±0.00	85.7	8.71±3.7	35.43±11.7	5.86±1.595	2.43±0.896
Al Masryia	1.818±0.12	81.8	31.27±15.65	86.9±17.05	3.73±0.648	1.09±.0392
Dahab 21	1.857±0.142	85.7	156.57±112.316	238.43±129.66	7.71±2.135	2.86±0.937

Table 3: Summery of the prevalence of different types of wounds 84 donkeys in 11 kilns

Wound type	Number injured Donkeys (%)	Mean ± SE
Skin wound	63 (75%)	56 ± 3.09
Saddle wound	31 (36.9%)	23.09 ± 1.77
Rump wound	45 (53.6%)	26.02 ± 2.42
Neck collar wound	33 (39.3%)	25 ± 3.33
Limb wound	11 (13.07%)	29.5 ± 2.9
Breeching wound	8 (9.5%)	63.09 ± 33.9
Shaft wound	3 (3.57%)	67.21 ± 32.80
Other minor wounds	3 (3.57%)	7.1 ± 1.74

Table 5: Chi Square test between the Body Condition score and Skin, Saddle, Neck collar wound, Rump, limb, breeching, shaft, and other wound, shaft, and other wounds

Measure	Skin wound		Saddle wound		Neck collar wound		Other wound	
BCs	Value	P value	Value	P value	Value	P value	Value	P. value
	41.670	0.000	9.160	0.030	19.680	0.000	5.090	0.170
	Rump wound		Limb wound		Breeching wound		Shaft	
	Value	P value	Value	P value	Value	P value	Value	P value
	18.710	0.000	7.940	0.050	3.790	0.290	2.390	0.500

Table 6: Table 1. Summary statistics of the working conditions of donkeys in 11 kilns

Variable	*P**	Mini.	Max.	Mean	Std. E	Std. Dev.	CV%
No. of working hours / day	0.01	5	7	5.36	0.24	0.81	4.48
No. of daily work/ week	0.22	4	6	5.64	0.24	0.81	4.26
No of donkeys working / day	0.15	4	7	5.09	0.34	1.14	6.68
The load of bricks	0.54	360	890	713.09	44.2	146.61	6.20
weight of one brick (kg)	0.32	1.6	3.8	1.85	0.2	0.67	10.81
No of journeys / day	0.12	21.43	37.16	27.14	1.52	5.03	5.60
weight of total bricks (Kg)	0.15	960	1428	1249.63	50.4	167.14	4.03
average of cart weight (Kg)	---	130	130	130	0	0	0.00
average of handler weight (Kg)	---	60	60	60	0	0	0.00
average of harness weight (Kg)	0.03	7	9	7.39	0.2	0.66	2.71
total weight in the journey with load (Kg)	0.82	1157	1625	1447.02	50.35	166.98	3.48
total weight in the journey without load (Kg)	0.08	197	199	197.39	0.2	0.66	0.10
Distance from Avon to loaded area with load	0.01	29	100	50.77	5.68	18.83	11.19
distance without load	0.22	29	100	50.77	5.68	18.83	11.19
distance of one journey	0.15	58	200	101.55	11.35	37.66	11.18
Total distance / day	0.54	1312.59	5543.50	2768.06	351.92	1167.17	12.71
Total distance / week	0.32	7875.53	22302	14855	1151.14	3817.9	7.75
Total work in complete trip (with/ without load)	0.12	971.75	1484.74	1244.8	55.46	183.94	4.46
Target of production / day	0.15	40000	140000	97600	9164.43	30394.98	9.39
Target of production for d/ day	0.55	10000	27500	19200	1481.31	4912.95	7.72

*Probability that a distribution is normally distributed using Anderson-Darling test, Min; minimum, Max; maximum, SD; standard deviation, CV; coefficient of variation

Table 7: Summary of the most effective working conditions variables containing statistical parameters, variables' coefficient and significant estimators of multiple linear regression

Mean ± SE	Median	coefficients	t-value	p-value
5.23 ± 0.19	6.000	-0.320	-2.750	0.000
5.95± 0.60	6.500	0.220	4.200	0.000
100.70±10.00	101.500	0.010	-2.400	0.031
2.52± 0.20	2.150	0.240	4.850	0.000

* and ** indicating significance level at 5% and 1% level of significance, respectively.

Fig. 1. Mouth physical examination

Fig.2: Eye physical examinations

Fig.3: Different types of wounds; harness wound and beating wound

Fig. 4: Brick overloaded

Fig. 5: Donkeys housing and drinking water source

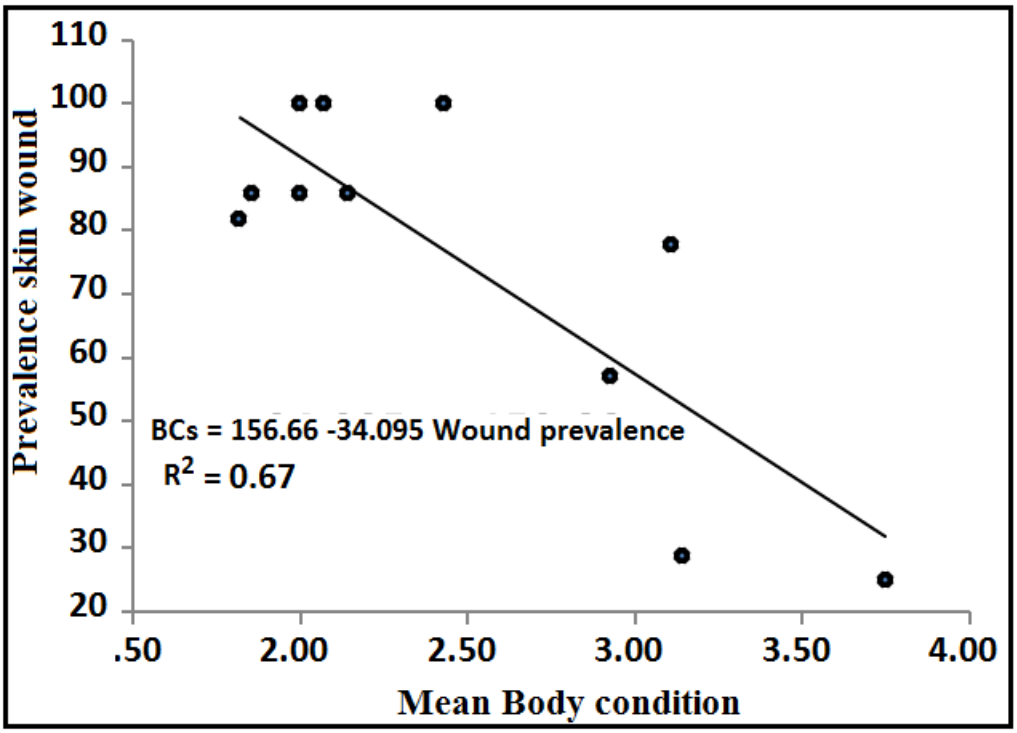

Fig. 4. Relationship between body condition and skin wounds associated with regression line

التقييم الميداني والعلاقة بين عوامل الإدارة المؤثرة على حمير العمل المصرية في مصانع الطوب

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الملخص العربي

تعتبر الحمير المصرية هي حجر الزاوية للعمالة في مصانع الطوب. هدفت الدراسة الحالية إلى تقييم جميع المتغيرات الميدانية المتعلقة بظروف عمل الحمير العاملة بما في ذلك عوامل الخطر الصحية وجوانب الرفاهية وتطبيق استراتيجيات الرفاهية لتحسين نوعية حياة الحمير في مصانع الطوب. تم جمع متغيرات الدراسة من ٨٤ حمارًا لتشمل عينات عشوائية تمثيلية من ١١ فرنًا للطوب. تراوحت درجة حالة الجسم من ١ إلى ٤ (١,٦٦ ± ٠,٣٦٥). ٦٧ ± ٠,٣٣ (ن = ٨٠) من الحمير بها جروح، وأخطر جرح هو الجروح الناتجة من الضرب (٣٧ ± ٣,٧). ترتبط الجروح الأخرى بالحزام، مثل المؤخرة (٨ ± ١,٩٧) ، السرج (٣٦ ± ٢,١٧) ، طوق العنق (٤١ ± ٢,٠٠). شوهدت حالات جسدية سيئة في ما يقرب من ٣٥٪ من الحمير المدروسة. أكدت الدراسة على الاختلافات في مستوى الرفاهية المرتبطة بالحمير في كل فرن، إلى جانب الاختلافات الموجودة في ممارسات الإدارة. ساعد هذا بلا شك في فهم أفضل لسبب وجود بيئات عمل في بعض الأفران أفضل من غيرها. يمكن أن تقيس الدراسات المستقبلية مواقف مربي الحمير فيما يتعلق برعاية الحمير بشكل عام. بناءً على نتائج الدراسة الحالية، يمكننا على الأرجح تصميم برنامج تعليمي فعال لأصحاب مصانع الطوب في الصف، والتي يمكن تطبيقها على جميع أفران الطوب المصرية.

الكلمات الاسترشادية: مصانع الطوب، الحمير، حيوانات العمل، الجروح.