

A Study on the Impact of Introduction of Improved Pack Saddle on Harness Related Wound on Donkey in Adulala and Ada Districts, Ethiopia

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Abstract

A study was conducted on the impact of introduction of improved pack saddle on harness related wound on donkey in Adulala and Ada districts of Bishoftu, Ethiopia, during the period from November, 2013 through April, 2014. A total of 160 donkey's owners were sampled and interviewed and their donkeys were observed for any abnormality on contact part of body to IPS. Descriptive statistics for the common impact of improved pack saddle on harness related wound of working donkeys were calculated using Statistical Software which called SPSS version 20.0. Chi square and $P < 0.05$ was used to determine the association of variables. No significant relationship (p -value 0.85) between materials used to prepare IPS and type of work taken from donkey using IPS. Use of IPS in working donkeys showed very favorable impact, as there was no sign of occurrence of any abnormality in 87.5% of working donkey used IPS and only slight hair removal from wither area in 8.8%, wound on wither area in 1.3%, scar on pelvic bone in 0.6% and scar on ribs area in 1.3% working donkeys were observed. There was significant relationship (p value 0.01) between area where lesion formed and material used to prepare IPS. The impact of water fetching and crop transportation on working donkeys was highest (35.7%) in both type of work, followed by sand carrying (14.2%), and wood carrying (7.1%) and charcoal carrying (7.1%). There was no significant relationship (p -value 0.35) between work type and lesion, wound or scar formation. Significance difference (p -value 0.01) between material used to prepare IPS and their cleanness was observed. The IPS made from sisal sac with wheat straw were easy to maintain and clean (75.5%) followed by fertilizer sac with wheat straw (19.9%) and clothes (2.6%). The IPS made from sisal sac with wheat straw (77.3%) were more durable (>1 year) than fertilizer sac with wheat straw (20.3%) and fertilizer sac with teff straw (2.0%) than these IPS made from clothes. (0.7%) which were less durable (<1 year). It was recommended that improved pack saddle made from sisal sac with wheat straw should be used to reduce harness related adverse impact causing hair removal, wounds or scars formation on working donkeys.

Keywords: Ada • Adulala • Back sore • Donkey • Harness • Improved back saddle

Introduction

In Ethiopia donkeys have been used as beasts of burden for a long time and still render their valuable services mostly as pack animals throughout the country, especially in areas where modern means of transportation are absent, unaffordable or inaccessible. Donkeys play an important role in communities of rural area providing transport at low cost.

They can be used for various agricultural operations such as carrying water, building materials, transport of agricultural products to household, carrying charcoal and cereal to market. The efficient use of working animals depends on how they are connected to materials they are carrying, and how well they have been trained and are managed or how they are using harness [1].

A properly designed, well-fitted and comfortable harness allows the working animal to carry the equipment to the best of its ability without risk of injuries. One of the harness related wound is back sore which play a great roles in hindering the optimum utilization of working donkeys in most parts of Ethiopia. It is a very painful inflammatory process occurring in the back region of the working donkeys due to various reasons and manifested by erythematous area with hair loss and progressive papular, vesicular, pustular and acne like changes develop into a phlegmon and finally become necrotic.

Previously traditionally constructed wooden saddles were constantly put on the back of and strongly tied to the body by plastic rope, which causes persistent irritation and injuries. Improved pack saddle development trials were undertaken by the Donkey health and welfare project, donkey sanctuary in two phases in Ethiopia to tackle

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the problem of back sore on working donkeys. In the first phase, 360 saddles of three prototypes, namely: Bishoftu prototype, Indian prototype and Adigudom prototype were made and distributed to donkey owners and tested.

In the second phase, based on the performance results of the first phase and recommendations of donkey owners, the production and testing of Adigudom prototype was discontinued, the Bishoftu and Indian prototype were combine to produce a more efficient hybrid saddles: named therapeutic saddle and tested.

The production and promotion of Bishoftu saddle with some modification was undertaken. The performance measurement criteria employed were prevention of wound development for the Bishoftu saddle and success and progress in wound healing for the therapeutic saddle. Developing improved pack saddle from locally available materials is one output from the project. Placed between the donkey's back and the load, absorbent sisal sacking material is used for the lower surface of the saddle and fertilizer sac for the top. The sisal surface, placed directly onto the donkeys back absorbs sweat and reduces rubbing.

The upper fertilizer sac surface on which the load is placed is hard wearing and is also used as water proof in wet season. The logic behind improved pack saddle is to protect the spine having two strong gutters on both sides and have the load to land on the muscle over the transverse processes. It reduces the incidence of wound as well as provides aeration through a hollow between the gutters over the spines.

The impact of introduction of improved pack saddle on harness related wound of these working donkeys have not been documented and no literature is readily available on the topic of study. Therefore, the main objective of this research was to investigate the impact of introduction of improved pack saddle on harness related wound of donkeys in Adulala and Ada district central, Ethiopia [2].

Methods and Materials

Study area

The study was conducted from November, 2013 through April, 2014 in Ada and Adulala district of East Showa Zone; where awareness of using Improved Packsaddle (IPS) given by donkey Sanctuary project. Adulala and Ada districts have been areas where owners use donkeys as packing animals for transporting charcoal, fetching water, transport sand, firewood and cereals by loading on the back of the donkey. Both districts are found at surround of Bishoftu town. Bishoftu is found 45 Kms in the South Eastern part of Addis Ababa at 90 N altitude and 400 E longitudes at altitudes of 1900 meters above the sea level in central highland of Ethiopia. The area gets 866 mm annual rain fall of which 84% is in the long rainy seasons (June to September). The mean annual maximum and minimum temperature is 26°C and 14°C respectively with mean relatively humidity of 61.3%.

Study animals

The study animals were working donkeys that are used by rural household for packing by using improved pack saddle in Adulala and Ada areas. Both sex and all packing age donkeys were included

during the study. Animals were classified according Crane [8] groups as 0-5 years young, 5-10 years adult, 10-15, 15-20 and >20 years old. The body condition score of working donkey observed was also classified in 3 groups as 1.5 (poor), 2-2.5 (medium) and 3 (good) BCS.

Study designs

This study was carried out in Ada and Adulala District to assess the impact of introduction of improved pack saddle on harness related wound of working donkeys. This helps whether improved pack saddle has greatest role in reduction of occurrence of harness related wound in packing donkeys or not. Both direct observation of animal based indicators and questionnaire method of data collection format was designed and employed. Data collected from observation and questionnaires were entered into Microsoft Excel sheet and coded into categorized.

Questionnaire survey and observation

A semi structured questionnaire was designed and validated to cover a wide range of aspects including number of donkeys owned, size at house hold levels, house provision, nutrition, type of harness and its use, material used for making improved pack saddle, type of work and affordability of harness. The questions were administered to donkey owners and observations were made for donkeys to collect relevant information on the impact of introduction of improved pack saddle on harness related wound on donkey at Adulala and Ada districts.

Data analysis

Descriptive statics for the common impact of improved pack saddle on harness related wound of working donkeys were calculated using Statistical Software which called SPSS version 20.0. Graphs and table were produced using Microsoft excel. Chi square and $P < 0.05$ was used to determine the association between dependent and independent variables.

Results

General management practices and use of donkey in Ada and Adulala districts

The general management practices along with use of the donkey in the study area of Ada and Adulala districts, Ethiopia are given in Table 1. A total of 160 respondents consisting of Adulala 61 (38.1%) and Ada 99 (61.9%) donkey owners were interviewed and their donkeys were also observed for any abnormality of harness on contact part of body. This is revealed from Table 1 that in the studied area the highest proportion of 32.5% of the farmers owns 2 donkeys per house hold followed by 31.3% owns 3 donkeys, 16.9% owns a donkey, 16.3% owns 4 donkeys and 3.1% owns 5 donkeys per house hold. The majority (64.4%) of respondents purchased their donkey from market while 35.6% of the respondents reproduced donkeys at their home. In Ada and Adulala districts the practice of providing house to donkeys it was observed that 40% of the respondents provide a separate house to their donkeys followed by using a common house with cattle (36.3%), and with other equine (23.8%).

Variables		Frequency (N=160)	Percentage (%)
Number of respondent	Ada districts	99	61.9
	Adulala districts	61	38.1
Number of donkeys per house hold	1	27	16.9
	2	52	32.5
	3	50	31.3
	4	26	16.3
	5	5	3.1
Origin of animal	Purchased	103	64.4
	Reproduced offspring	57	35.6
Drinking water	Tap water	84	52.5
	Hole water	2	1.3
	Pond water	2	1.3
	River	17	10.6
	Tap water and river	54	33.8
	Pipe	1	0.6
Working age donkeys (year)	0-5	3	1.9
	05-10	38	23.8
	10-15	91	56.9
	15-20	19	11.9
	>20	9	5.6

Table 1: General management practices and use of donkey in study area.

The feed provided for donkey was mostly grazing from ground (75.6%), followed by both grazing from ground and wheat bran (20%) supplement and only a few (4.4%) used wheat bran and husk to feed their donkey. The water source for drinking of working donkey was tap water (52.5%) followed by tape water and river (33.8%), river (10.6%), pond water (1.3%), hole water (1.3%) and pipe water (0.6%) were the source of watering to the donkeys in the study area. The working age of most of the donkeys (56.88%) were 10-15 years followed by 23.8% in 5-10 years, 11.9% by 15-20years, and 5.6% for more than20 years in the study area [3]. The highest proportions of donkeys (48.13%) were found with a BCS of 2.5 followed by 45.6%donkeys with a BCS of 2.0, 5.6% with BCS of 3 and 0.6% with BCS of 1.5 in the study area. Most of the donkey owners (98.8%) prepare IPS at their home based on the training given by DHWP and only 1.3% donkey's owners bought from market that fit donkeys in respective to size. The study also revealed that 90.3% donkey's owner started using IPS before one year and only 9.7% start using IPS in this year. Uses of improved pack saddles in different type of work in the study area. The purposes of using the IPS in donkeys are depicted in Figure 1. This clearly indicated that the IPS was in use for all type of work. About 45.6% of respondents used donkeys to fetch water, 16.9% for crop transportation, 17.5% for water fetch and crop transportation, 13.1% for wood carrying, 3.1% for sand carrying and

1.9% for charcoal carrying and 1.3% for water fetch, wood and charcoal.

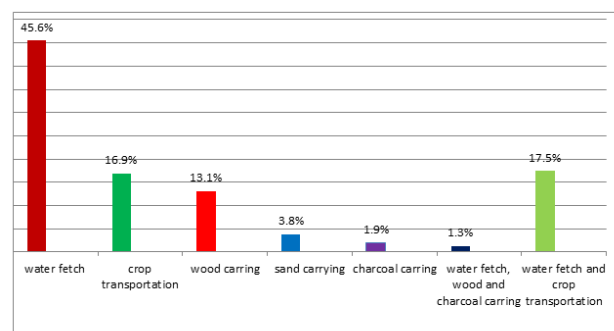


Figure 1: Uses of IPS in different type of work.

Impact of use of IPS in working donkeys

The impacts of use of IPS prepared from different type of materials on the body of donkeys are presented in Table 2. The study revealed that there was no sign of occurrence of any abnormality in 87.5% working donkey that used IPS, but slightly hair removal from wither area (8.8%), wound on wither area (1.3%), scar on pelvic bone (0.6%), and scar on ribs area (1.3%) were observed. The observation also shows that there was significant relationship (p-value 0.01) between area where wound or scar, hair removal and material used to make IPS. It is also revealed from Table2 that Sisal sac with wheat straw was the best material used to make IPS for working donkeys as there was no abnormality was observed in 114 working donkeys using IPS made up of Sisal Sac with wheat straw except one animal showed only slight impact of hair removal from the wither part of the body. The IPS made up of cloths were found to be least effective in protecting the body of the animal as out of 13 working donkeys using cloths IPS 7 animal developed problems of hair removal from wither in 2 animals, wounds on the wither in 2 animals, scar formation around pelvic bone in one animal and scar on the ribs in 2 animals.

Impact of IPS used on body parts of working donkeys

Material owner used to prepare IPS	No lesion	Slightly hair removal from wither part	Wound on wither	Scar on around pelvic	Scar on ribs area	X ²	P
Clothes	6(4.3%)	2(14.3%)	2(100%)	1(100%)	2(100%)		
Fertilizer sac and teff straw	2(1.4%)	1(7.1%)	0(0.0%)	0(0.0%)	0(0.0%)		
Fertilizer sac with wheat straw	20(14.2%)	10(71.4%)	0(0.0%)	0(0.0%)	0(0.0%)	94	0.01
Sisal sac with wheat straw	113(80.1%)	1(7.1%)	0(0.0%)	0(0.0%)	0(0.0%)		
Total	141(87.5%)	14(8.8%)	2(1.3%)	1(0.6%)	2(1.3%)		

Table 2: Impacts of material used in making improved pack saddle on working donkeys.

Materials used to make improved pack saddle and their maintenance and cleanness

The results on material used to make IPS and their maintenance and cleanness is given in Table 3.

These observations revealed that majority of the respondents (75.5%) reported that IPS made from sisal sac with wheat straw are easiest to maintain and clean followed by fertilizer sac with wheat straw (19.9%), clothes (2.6%) and fertilizer sac (2.0%).

Material used in IPS	Easy to maintain and clean (%)	Not easy to maintain and clean (%)	Total (%)	X2	P-value
Clothes	4(2.6%)	9(100.0%)	13(8.1%)		
Fertilizer sac with teff straw	3(2.0%)	0(0.0%)	3(1.9%)	107.8	0.01
Fertilizer sac with wheat straw	30(19.9%)	0(0.0%)	30(18.8%)		
Sisal sac with wheat straw	114(75.5%)	0(0.0%)	114(71.3%)		
Total	151(94.4%)	9(5.6%)	160(100.0%)		

Table3: Materials used to make improved pack saddle and their maintenance and cleanness.

Further it is revealed that IPS made from cloths is difficult to maintain and clean.

The study revealed that there was significance difference (p -value < 0.05) between material used to prepare IPS and their cleanness.

Material used to make improved pack saddle and their durability

The material used to make IPS and their durability is given table 6. About 77 % respondent that IPS made from sisal sac with wheat straw are more durable than IPS made fertilizer sac with wheat straw (20.3%), fertilizer sac with teff straw (2.0%) and clothes (0.7%).

Most of the respondent using IPS made from clothes were less durable (<1 year). The difference in durability of IPS made from different material was significant (p -value 0.01).

Material used to make IPS	Durable(> 1 year)	Less durable(<1 year)	Total	X2	P-value
Clothes	1(0.7%)	12(100%)	13(8.1%)		
Fertilizer with teff straw	3(2.0%)	0(0.0%)	3(1.9%)	146.7	0.01

Fertilizer sac with wheat straw	30(20.3%)	0(0.0%)	30(18.8%)
Sisal sac with wheat straw	114(77.0%)	0(0.0%)	114(71.3%)
Total	148(92.5%)	12(7.5%)	160(100%)

Table 4: Durability of improved pack saddles of different materials.

Discussion

A total of 160 respondents consisting of Adulala 61(38.1%) and Ada 99(61.9%) donkey's owners were interviewed and one of their donkeys was also observed for any harness related abnormality on contact part of body. Observations on general management practices along with use of the donkey in the study area of Ada and Adulala districts revealed that majority of the farmers owns 2(32.5%) to 3(31.3%) donkeys per house hold while 16.9% owns 1 donkey, 16.3% farmers own 4 donkeys and 3.1% owns 5 donkeys per house hold and most of the farmers (64.4%) purchase their donkeys from market. About 35.6% of the farmers reproduced donkeys at their home in study area. It is also revealed from Table 1 that about 40% of the farmers provide a separate house to their donkeys while about 36.3% use a common house with cattle and 23.8% uses common house with other equines. Observations on feeding practices indicate that major source of donkey feed was only grazing from ground (75.6%) and small proportion of farmers follow grazing from ground and wheat bran (20%) supplement and only a very small proportion of farmers (4.4%) uses wheat bran and husk to feed their donkey. The major water sources for drinking of working donkey were observed as tap water (52.5%), pipe water (33.75%) and river (10.63%) in the study area. The majority of respondents (56.88%) reported working age of donkeys to be 10-15 years. However, 23.8% respondents reported working age of donkeys to be 5-10 years, 11.9% reported as 15-20years, and 5.6% reported more than20 years as working age of donkeys in the study area. Observations on health status of the donkeys based on Body Condition Score (BCS) revealed that about 93.7% of the donkeys had a BCS of 2.5 (48.1%) and 2 (45.6%) indicating the medium to moderate health status of working donkeys in the study area while small proportions of (5.6%) with BCS of 3 and 0.6% with BCS of 1.5 indicated good and poor health status of working donkeys respectively in the study area. It was also observed that almost all donkey owners (98.8%) prepare IPS at their home based on the training given by Donkey Health And Welfare Project (DHWP) and only 1.3% donkey's owners purchased from market that fit donkeys in respective to size. The study also revealed that 90.3% donkey's owner started using IPS before one year and only 9.7% start using IPS in this year (Table 1). There was no relevant literature available to compare the present study results [4].

The IPS was used for all type of works (Figure 1). The majority of the farmers (45.6%) used IPS on working donkeys to fetch water followed by water fetch and crop transportation (17.5%), crop transportation (16.9%) and wood carrying (13.1%). A small proportion of 3.1% farmers use IPS on working donkeys for sand carrying , 1.9% for charcoal carrying and 1.3% for water fetch, wood and charcoal.

This indicated the major use of IPS in working donkeys for water fetch and crop transportation. Study revealed that 71.3% farmers used sisal sac with wheat straw in making the IPS followed by 18.7% farmers used fertilizer sac with wheat straw, 8.1% farmers used clothes and 1.9% fertilizer sac with teff straw. The higher use of sisal sac with wheat straw in making the IPS may be related to the better durability of IPS and its comfortability to the working donkeys. There was no significant relationship (p -value 0.85) between material used to prepare IPS and type of work taken from the donkey using IPS (Table 2).

The observations on impacts of use of IPS prepared from different type of materials on the body of donkeys revealed that there was no occurrence of any abnormality in 87.5% working donkey used IPS at their harness contact part, but slightly hair removal from wither area (8.8%), wound on wither area (1.3%), scar on pelvic bone (0.6%), and scar on ribs area (1.3%) were observed (Table 3). This result also depicts that occurrence of back sore reduced in about 97% by introduction of IPS. Sisal sac with wheat straw was the best material used to make IPS for working donkeys as no abnormality was observed in 114 working donkeys using IPS made up of Sisal Sac with wheat straw except one animal showed only slight impact of hair removal from the wither part of the body (Table 3). The IPS made up of cloths were found to be least effective in protecting the body of animals as out of 13 working donkeys using cloths IPS, 7 animals developed problems of hair removal from wither in 2 animals, wounds on the wither in 2 animals, scar formation around pelvic bone in one animal and scar on the ribs in 2 animals. In this study, the degree of harness related wound reduction was statistically significant (p -value 0.01) between types of material used to prepare IPS and minor hair loss, scar or wound formed. This difference is probably attributed due to the fact that the inability of fertilizer sac to absorb sweat of donkey at time of working which leads to hair removal. The IPS prepared from clothes sometimes might be immersed in the water during water fetch or at time of rainy season and become wet. This wet pack saddle material makes the hair and skin of donkeys persistently moist which facilitates its impairment by the pressure of loaded object (Table 3). 'Developing improved pack saddle from locally available materials is one output from the project. Placed between the donkey's back and the load, absorbent sisal sacking material is used for the lower surface of the saddle and fertilizer sac for the top. The sisal surface, placed directly onto the donkeys back absorbs sweat and reduces rubbing. The upper fertilizer sac surface on which the load is placed is hard wearing [5].

Observations on the type of work and its impact on the body part of working donkey using IPS was revealed that almost all type of work causes hair removal from wither area with little no scar in working donkeys with IPS. The impact of water fetching and crop transportation on working donkeys was highest (35.7%) in both type of work as it causes slight hair removal which probably due to improper usage of IPS and water added on the IPS during the work. These impacts of causing hair removal from wither area followed by

sand carrying (14.2%), and wood and charcoal carrying (1.7%). It also revealed that there was no significant relationship (p -value 0.35) between work type and lesion, wound or scar formation (Table 4). This indicated that the IPS could be used in different type of work without limited by type of work.

Conclusion

Generally, donkeys are widely used as pack animals transporting various household commodities and it was concluded from this study that the use of improved pack saddle showed very favorable impact, as there was no occurrence of abnormality in majority of working donkeys and back sore prevented almost in all. It was also observed in the present study that improved pack saddle prepared from sisal sac used almost without formation of lesion or abnormality in all types of work in addition it has more durability, easy maintenance and cleanness while the use of IPS is generally accepted by the donkey users. In line with the above concluding remarks the following recommendations are forwarded. During loading donkey owners should use improved pack saddle properly to reduce the harness related lesions that resulting in hair loss and scar formation on working donkeys. IPS made from sisal sac with wheat straw should be used as it is more durable and easy to maintain and clean than any other materials. Owners who do not use improved pack saddles are advised to adopt it. Further detailed investigation should be undertaken to find out causes of hair loss, scar and wound formation and their interaction with type of material used to prepare improved pack saddle and type of work.

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