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Research Article

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Assessment of Deworming and Reproductive Management Practices among Foal Owners in the Coastal Region of Gujarat, India

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ABSTRACT

The present study assessed deworming and reproductive management practices among foal owners in the coastal region of Gujarat, India. A total of 150 horse owners were selected through simple random sampling, and data were collected using a pre-tested, structured interview schedule. The findings indicated moderate adoption of reproductive management practices among the respondents. Pedigree breeding was practiced by 80.00% (120/150) of respondents, while 62.00% (93/150) preferred pedigree-based selection, indicating awareness of selective breeding. Heat detection was primarily based on vulvar winking (39.33%; 59/150) and behavioral signs. Natural mating was the predominant breeding method (72.67%; 109/150), whereas artificial insemination was adopted by only 11.33% (17/150) of respondents. Approximately 52.67% (79/150) considered 30–35 months to be the appropriate age at first covering, while most respondents reported 4–6 days as the preferred breeding period and two services per estrous cycle. Pregnancy diagnosis was practiced by 79.33% (119/150) of respondents. Regarding deworming, 75.33% (113/150) of horse owners reported regular deworming, with most following an interval of 3–6 months. Regular deworming of foals was reported by 53.33% (80/150) of respondents. Considerable variation was

observed in deworming frequency, including fortnightly (46.67%; 70/150) and monthly (39.33%; 59/150) schedules. These findings indicate variation in parasite-control practices and suggest for greater emphasis on strategic, evidence-based deworming to reduce the risk of inappropriate anthelmintic use and potential development of anthelmintic resistance. Overall, the study demonstrated moderate adoption of recommended reproductive and deworming practices and promoting evidence-based parasite-control programmers may contribute to improved equine health and welfare in the region.

Keywords: Equine management; deworming; reproductive management; horse husbandry; parasite control; equine welfare; Gujarat; India

1. INTRODUCTION

Horses (*Equus ferus caballus*) have historically played a vital role in human civilization, contributing to transportation, agriculture, warfare, and socio-cultural traditions. In modern times, their roles have evolved toward recreation, sports, ceremonial activities, and livelihood support in rural economies (Fraser, 1992; McGreevy, 2004). In India, particularly in coastal regions of Gujarat, horses continue to hold significant importance in traditional events, tourism, and smallholder production systems. Despite their continued relevance, equine management practices in many areas remain largely traditional and are often not aligned with scientific recommendations (Singh et al., 2012; Pal et al., 2017).

Proper management of horses, especially during early life stages, is essential for ensuring optimal growth, health, and future performance. Foals represent a critical stage in equine production systems, where appropriate deworming and reproductive management practices play a key role in reducing morbidity and mortality. Scientific practices such as strategic deworming schedules,

46 proper breeding management, timely pregnancy diagnosis, and adequate care during foaling are
47 crucial for maintaining reproductive efficiency and overall herd health (McGreevy, 2007; Waran,
48 2007). However, the adoption of these practices is influenced by multiple factors including
49 awareness levels, socio-economic status, and access to veterinary services (Upadhyay et al., 2014;
50 Meena et al., 2019).

51 Deworming is an essential component of preventive healthcare in horses, as parasitic infestations
52 significantly affect growth, feed efficiency, and general health, particularly in young animals.
53 Inadequate or irregular deworming practices can lead to severe health complications such as colic,
54 weight loss, and poor development in foals (Matthews, 2014). Similarly, reproductive management
55 practices—including selection of breeding stock, heat detection, pregnancy care, and foaling
56 management—are critical determinants of reproductive success and sustainability of equine
57 enterprises (Waran, 2007; Noakes et al., 2018). Animal welfare has gained increasing attention in
58 recent years, emphasizing the importance of both physical and physiological well-being. In foals
59 and breeding mares, welfare is closely linked to proper nutrition, healthcare, housing, and
60 management during gestation and early life (Lesimple, 2020). Poor management practices,
61 including neglect of deworming schedules, inadequate reproductive care, and substandard housing,
62 can compromise animal welfare and productivity. In developing regions such as India, several
63 constraints hinder the adoption of improved deworming and reproductive management practices.
64 These include lack of technical knowledge, limited availability of veterinary services, high cost of
65 feed and healthcare inputs, and inadequate extension support systems (Kumar et al., 2015; Yadav
66 et al., 2020). Additionally, traditional beliefs and lack of awareness among horse owners often
67 result in suboptimal management practices, further affecting the health and productivity of foals
68 (Meena et al., 2019). Although studies on equine management and welfare are available globally,

region-specific information on deworming and reproductive management practices among foal owners in coastal Gujarat is limited. The unique socio-economic and agro-climatic conditions of this region necessitate a focused investigation to understand existing practices and associated constraints.

Therefore, the present study was undertaken to assess the deworming and reproductive management practices adopted by foal owners in the coastal regions of Gujarat and to identify the major constraints affecting their adoption. The findings of this study are expected to provide valuable insights for developing targeted extension strategies and improving the health, productivity, and welfare of equines in the region.

2. MATERIALS AND METHODS

The present study was conducted in the coastal and southern region of Gujarat, India. The study area included seven districts, namely Surat, Navsari, Valsad, Dang, Tapi, Bharuch, and Narmada, which lie predominantly south of the Narmada River. The climatic conditions, combined with moderate to high humidity, support diverse livestock and equine activities, particularly those associated with rural livelihoods, ceremonial functions, tourism, and transport purposes.

2.1 Sampling Procedure

A proportionate random sampling technique was adopted to select horse owners across the study districts, with sample allocation based on the district-wise horse population reported in the 20th Livestock Census (Department of Animal Husbandry and Dairying, 2019). A sampling frame was developed using district veterinary records, and respondents were selected through randomisation. The final sample size of 150 was determined to ensure adequate representation and to capture variability in equine management practices and associated constraints across the study area.

2.2 Selection of Districts

The study was conducted in seven districts of South Gujarat. The selection was based on the presence and distribution of horse populations as reported in the 20th Livestock Census. District-wise horse population data were used to identify equine-dense regions for inclusion in the study.

The district-wise horse population in the study area is presented in Fig. 1.

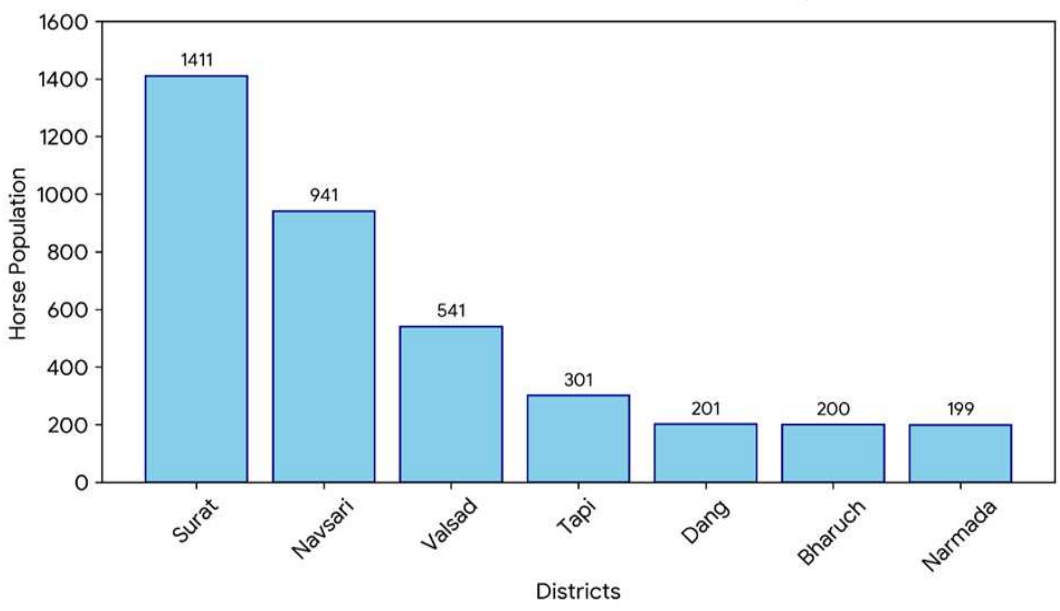


Fig. 1. The district-wise horse population in South Gujarat, India
***Source**: 20th Livestock Census (2019).*

2.3 Selection of Respondents

A total of 150 horse owners were selected from seven districts of South Gujarat using proportionate random sampling based on the estimated horse population in each district. The sampling design ensured that the number of respondents selected from each district was proportional to its share of the total horse population, thereby improving representativeness. A sampling frame of horse owners was prepared with the assistance of local veterinary officers, livestock records, and village-

level informants. Respondents were then selected from this list using standard randomisation procedures. The sampling strategy was designed to capture variability in equine management systems and constraints across the study area, considering differences in:

a) horse breeds (indigenous and recognized breeds such as Kathiawadi and Marwari),
b) management systems (stall-fed, semi-intensive, and extensive), and
c) usage patterns (transport, agricultural, ceremonial, and recreational purposes).

This approach ensured a representative dataset for assessing management practices, welfare implications, and constraints affecting equine management in South Gujarat**.**

2.4 Data Collection

Primary data were collected through personal interviews using a pre-tested structured interview schedule. The questionnaire was specifically designed to obtain detailed information related to deworming and reproductive management practices among foal owners in the coastal region of Gujarat.

The schedule included the following components:

a) Socio-economic characteristics of respondents (age, education, occupation, landholding, and housing status)
b) Deworming practices (frequency, type of anthelmintic used, method of administration, and awareness regarding parasitic control)
c) Reproductive management practices (breeding methods, heat detection, pregnancy diagnosis, care of pregnant mares, and foaling management)
d) Foal-related parameters (age, sex, breed, body condition, and health status)

e) Healthcare practices (vaccination, disease management, and veterinary service utilization)
f) Constraints faced by foal owners in adopting scientific deworming and reproductive management practices

The interview schedule was validated through a pilot survey conducted on a small group of respondents prior to final data collection, and necessary modifications were made to ensure clarity, relevance, and reliability of the data.

2.5 Variables and Measurement

The variables included in the study were defined and measured as follows:

a) Housing status of respondents was categorized as own house, own farm house, rented individual house, and rented farm house.
b) Landholding was classified into four categories: landless, 1–5 bigha, 5–10 bigha, and more than 10 bigha.
c) Body Condition Score (BCS) of foals was assessed visually using a standard scoring system and categorized as poor, moderate, good, and very good based on physical appearance and fat deposition.
d) Deworming practices were evaluated based on frequency of deworming, type of anthelmintic used, method of administration, and adherence to recommended deworming schedules. Respondents were categorized into low, medium, and high adoption groups based on their level of compliance.
e) Reproductive management practices were assessed through parameters such as breeding method (natural or artificial), heat detection, pregnancy diagnosis, care of pregnant mares,

and foaling management practices. Adoption levels were classified into low, medium, and high categories based on adherence to scientific recommendations.

f) Foal-related parameters included age, sex, breed, and general health status as reported by the owners.

g) Healthcare practices such as vaccination, disease prevention, and utilization of veterinary services were recorded to understand their association with deworming and reproductive management.

h) Constraints faced by foal owners were identified and categorized into technical, economic, and infrastructural constraints affecting the adoption of improved practices.

Overall, the level of adoption of deworming and reproductive management practices was quantified using a composite scoring method based on respondents' compliance with recommended scientific practices.

2.6 Sampling Distribution

Respondents were distributed proportionately across the districts, as follows:

List 1. The district-wise distribution of respondents

Sr. No.	District	Horse Population	% Share	Sample Size (n = 150)
1	Surat	1411	37.19	56
2	Navsari	941	24.80	37
3	Valsad	541	14.26	21
4	Dang	201	5.30	8
5	Tapi	301	7.93	12
6	Bharuch	200	5.27	8

7	Narmada	199	5.24	8
Total	—	3794	100	150

Source: *Department of Animal Husbandry and Dairying (2019) and District Veterinary Records, South Gujarat*

2.7 Statistical Analysis

The collected data were coded, tabulated, and analyzed using appropriate statistical methods. Descriptive statistics, including frequencies and percentages, were used to summarized the data. The chi-square (χ^2) test was applied to examine differences in the distribution of responses across categorical variables. Statistical significance was assessed at $p < 0.05$ and $p < 0.01$. It is important to note that the chi-square test indicates whether observed frequencies differ significantly from expected frequencies; however, it does not establish causal relationships or indicate the relative practical importance of individual constraints. Therefore, the results are interpreted only in terms of distributional differences.

3. RESULTS AND DISCUSSION

The findings indicate a moderate to high level of adoption of equine management practices among horse owners in South Gujarat. Practices such as feeding, watering, neonatal care, and de-worming were relatively well adopted, reflecting awareness of basic animal health requirements. However, areas like grazing management, fodder processing, and provision of balanced nutrition showed comparatively lower adoption, indicating scope for improvement. The observed variations in adoption may be attributed to constraints such as high input costs, limited technical knowledge, and inadequate extension services. These findings are in line with earlier reports by Boradiya et al. (2019), Patel et al. (2020), and Singh (2022), who also documented similar adoption patterns among livestock owners. Furthermore, the results highlight that proper management practices,

192 particularly in feeding, housing, and healthcare, are crucial for ensuring equine welfare, as
193 emphasized by Lesimple (2020) and McGreevy and McLean (2010).

194 ## 3.1 De-worming Practices among Horse and Foal Owners

195 The consolidated data presented in Table 1 reveal important insights into the de-worming practices
196 adopted by horse owners in the coastal region of Gujarat. A substantial majority of respondents
197 (75.33% ;113/150) reported practicing regular de-worming of horses, while 20.67 per cent (31/150)
198 followed it occasionally and only 4.00 per cent (06/150) did not adopt de-worming practices. The
199 chi-square analysis indicated a highly significant difference among the categories ($\chi^2 = 90.52$, df =
200 2, $p < 0.01$), suggesting a strong preference for systematic parasite control measures among horse
201 owners. This high level of adoption may be attributed to increased awareness regarding the adverse
202 effects of helminth infections on equine health, productivity, and performance. Similar
203 observations were reported by Lyons et al. (2008), who emphasized the widespread recognition of
204 parasite control in maintaining equine health. Kaplan and Nielsen (2010) also highlighted that de-
205 worming is a fundamental component of preventive health programs in horses. With respect to the
206 frequency of de-worming in horses, the findings indicated that 40.00 per cent (60/150) of
207 respondents practiced de-worming once in six months, followed by 36.67 per cent (55/150) who
208 adopted a three-month interval. A smaller proportion de-wormed monthly 13.33% (20/150), while
209 10.00 per cent (15/150) treated their horses only once a year. The chi-square value ($\chi^2 = 28.67$, df
210 = 3, $p < 0.01$) further confirmed significant variation in the frequency of de-worming practices.
211 The predominance of three- to six-month intervals reflects moderate awareness and practical
212 considerations such as cost and labor. These findings are in agreement with Kaplan and Nielsen
213 (2010), who advocated strategic de-worming rather than indiscriminate frequent dosing. Matthews
214 (2014) also reported that many horse owners commonly follow quarterly or biannual schedules.

In the case of foals, just over half of the respondents 53.33% (80/150) practiced regular de-worming, whereas 36.00 per cent (54/150) followed it occasionally and 10.67 per cent (16/150) did not practice de-worming. The chi-square test ($\chi^2 = 43.36$, df = 2, $p < 0.01$) revealed significant differences among the categories, indicating variability in awareness and adoption of recommended parasite control practices for young animals. These findings are consistent with Lyons et al. (2008), who reported that parasite burdens are generally higher in foals and stressed the importance of early and regular de-worming. Nielsen (2012) further emphasized the need for evidence-based parasite control programs in young horses. Regarding the frequency of de-worming in foals, the results showed that 46.67 per cent (70/150) of respondents practiced de-worming at fortnightly intervals, followed by 39.33 per cent (59/150) who treated foals once a month. Only a small proportion adopted longer intervals such as once in three months 10.67 % (16/150) or six months 3.33% (05/150), and none reported annual treatment. The chi-square analysis revealed a highly significant difference ($\chi^2 = 120.27$, df = 4, $p < 0.01$), indicating considerable variation in practices among respondents. Although frequent de-worming was commonly observed, modern parasitology recommends strategic and targeted approaches to minimize the risk of anthelmintic resistance. These findings are supported by Kaplan and Nielsen (2010) and Nielsen (2012), who cautioned against excessive and non-strategic use of anthelmintic. Similar variability in de-worming practices among equine owners has also been reported in field studies by Kumar et al. (2019) and Raza et al. (2014). Overall, the findings suggest that while a majority of horse owners in the study area recognize the importance of de-worming, there is considerable variation in the frequency and scientific appropriateness of practices, particularly in the case of foals.

Table.1 De-worming Practices among Horse and Foal Owners in Coastal Gujarat (n = 150)

Parameter	Category	Frequency	Percentage (%)	χ^2 Value	df	*P*-value
De-worming in Horses	Regular	113	75.33	90.52	2	0.00
	Occasional	31	20.67			
	Not practiced	6	4.00			
Frequency of De-worming in Horses	Every month	20	13.33	28.67	3	0.00
	Once in three months	55	36.67			
	Once in six months	60	40.00			
	Once in a year	15	10.00			
De-worming in Foals	Regular	80	53.33	43.36	2	0.00
	Occasional	54	36.00			
	Not practiced	16	10.67			
Frequency of De-worming in Foals	Fortnightly (15 days)	70	46.67	120.27	4	0.00
	Once in a month	59	39.33			
	Once in three months	16	10.67			
	Once in six months	5	3.33			
	Once in a year	0	0.00			

Note: All chi-square values are statistically significant at $p < 0.01$, indicating significant variation in adoption of de-worming practices among respondents.

3.2 Reproductive Management Practices (n = 150)

The data in Table 2 shows that reproductive management practices among horse and foal owners in coastal Gujarat are moderately adopted**.** Many owners follow important practices like pedigree breeding, proper heat detection, and pregnancy diagnosis. However, most of these practices are still based on traditional knowledge rather than scientific methods**.** This indicates that while awareness is present, there is still a need to improve the use of modern and scientific reproductive techniques**.** A significant majority (80%;120/150) practiced pedigree breeding, reflecting awareness of genetic improvement. Similarly, (62%; 93/150) preferred pedigree-based selection,

while only a small proportion relied on random breeding. The chi-square results ($p < 0.001$) indicate a strong preference pattern among respondents.

Heat detection was primarily based on vulvar winking (39.33%;59/150) and behavioural signs, showing reliance on visual observation rather than scientific techniques. This aligns with findings of Singh (2022) and Patel et al. (2020), who reported similar dependence on traditional estrus detection methods. Natural mating was the dominant breeding method (72.67%; 109/150), with minimal adoption of artificial insemination (11.33%;17/150), suggesting limited access to modern reproductive technologies. These findings are consistent with Kumar et al. (2019).

The majority of respondents (52.67%;79/150) reported 30–35 months as the appropriate age for first covering, which is within the recommended range. Likewise, most preferred 4–6 days as the ideal time for covering and two coverings per cycle, indicating partial scientific awareness. Economic aspects revealed that nearly half of the respondents (49.33%;74/150) paid ₹10,000–15,000 as covering charges, highlighting the commercial importance of breeding services. A high proportion (79.33%;119/150) practiced pregnancy diagnosis, which is a positive indicator of reproductive management awareness. However, methods used may still be largely traditional, as noted in earlier studies by Raza et al. (2014). Overall, all parameters showed highly significant chi-square values ($p < 0.001$), confirming that the distribution of responses is non-random and reflects clear behavioral and management trends. Reproductive practices in the study area show good awareness in breeding decisions and pregnancy management, but limited adoption of advanced scientific techniques, emphasizing the need for improved veterinary extension and training programs.

Table 2. Reproductive Management Practices (n = 150)

Parameter	Category	Frequency	Percentage (%)	Chi-square Value	df	*P*-value
Pedigree Breeding	Yes	120	80.00	54.00	1	0.00
	No	30	20.00			
Breeding Preference	Pedigree	93	62.00	96.28	3	0.00
	Random	14	9.33			
	Selective Pure	17	11.33			
	None	26	17.34			
Heat Detection	Vulvar Winking	59	39.33	43.76	4	0.00
	Receptive Behaviour	35	23.33			
	Tail Raising	26	17.33			
	Urination/Discharge	23	15.33			
	Others	7	4.68			
Breeding Method	Natural	109	72.67	62.13	2	0.00
	Artificial Insemination	17	11.33			
	Both	24	16.00			
Age at First Covering	25–30 months	32	21.33	52.88	3	0.00
	30–35 months	79	52.67			
	>35 months	20	13.33			
	No idea	19	12.67			
Day of Covering	2–4 days	37	24.67	38.94	3	0.00
	4–6 days	70	46.67			
	6–8 days	27	18.00			
	>8 days	16	10.66			
Coverings per Cycle	One	29	19.33	41.57	3	0.00
	Two	74	49.33			
	Three	31	20.67			
	>Three	16	10.67			
Covering Charges	₹5000–10000	24	16.00	44.82	3	0.00
	₹10000–15000	74	49.33			
	>₹15000	34	22.67			
	No charges	16	10.67			
Pregnancy Diagnosis	Yes	119	79.33	51.84	1	0.00
	No	31	20.67			

Note: All chi-square (χ^2) values presented in the table are statistically significant at $p < 0.01$, indicating a highly significant variation in the adoption of reproductive management practices among respondents. This suggests that the observed differences in frequencies across categories are not due to chance but reflect true differences in knowledge, preferences, and management behavior of horse and foal owners in the study area.

3.3 Pregnancy, Foaling and Neonatal Care Practices (n = 150)

The findings presented in Tables 3. indicate that horse owners in the coastal region of Gujarat exhibit generally high adoption of reproductive care practices, although some gaps still persist in specific areas. A substantial majority of respondents (86.00%;119/150) adopted special care practices for pregnant mares, while only 14.00 per cent did not follow any specific care. The chi-square analysis ($\chi^2 = 75.36$, $p < 0.001$) revealed a highly significant difference, indicating strong adoption behavior. This reflects a positive attitude toward reproductive health management. Similar observations were reported by McKinnon and Voss (2011), who emphasized the importance of prenatal care in improving fertility and foal survival, and by Patel et al. (2019) and Singh et al. (2021) under Indian conditions. With respect to newborn foal care, 80.67 per cent of respondents practiced proper neonatal management, whereas 19.33 per cent did not. The chi-square value ($\chi^2 = 55.15$, $p < 0.001$) confirmed a highly significant difference between adopters and non-adopters. This suggests a fairly high level of awareness regarding neonatal care, which is crucial for foal survival, as highlighted by McCue (2014) and Jokisalo JM (2014) Comparable findings were also reported by Patel et al. (2018); Singh and Verma (2020).and Carr EA (2014)

Regarding assistance during the foaling process, the majority of respondents (66.67%;100/150) relied on trained staff, followed by veterinarians (19.33%;29/150) and self-management (14.00%;21/150). The chi-square result ($\chi^2 = 84.12$, $p < 0.001$) indicated a highly significant

variation among categories. Although staff assistance was predominant, the relatively lower involvement of veterinarians may be attributed to cost and accessibility constraints. These findings are consistent with McKinnon et al. (2011) and Ginther (2016), who reported that trained attendants commonly assist foaling, with veterinary intervention mainly during complications.

In terms of pre-foaling preparations, 59.33 per cent of respondents adopted recommended practices, while 40.67 per cent did not. The chi-square analysis ($\chi^2 = 5.31$, $p < 0.05$) showed a statistically significant difference, indicating moderate adoption levels. This suggests partial awareness among horse owners regarding scientific foaling management. Similar findings were reported by Samper (2009) and McKinnon et al. (2011), who emphasized the importance of pre-foaling preparation in reducing neonatal mortality.

Table 3. Summary of Pregnancy, Foaling and Neonatal Care Practices (n = 150)

Parameter	Category	Frequency	Percentage (%)	Chi-square Value	df	P-value
Care for Pregnant Mares	Yes	129	86.00	75.36	1	0.00
	No	21	14.00			
Care for Newborn Foals	Yes	121	80.67	55.15	1	0.00
	No	29	19.33			
Assistance during Foaling	Owner	21	14.00	84.12	2	0.00
	Veterinarian	29	19.33			
	Staff	100	66.67			
Pre-Foaling Preparations	Yes	89	59.33	5.31	1	0.021
	No	61	40.67			

Note: All chi-square (χ^2) values are statistically significant ($p < 0.05$ to $p < 0.001$), indicating significant variation in the adoption of pregnancy, foaling, and neonatal care practices among respondents.

Overall Interpretation

The study indicates a moderate to high adoption of deworming and reproductive management practices among foal owners in coastal Gujarat. Practices such as care of pregnant mares, neonatal management, and foaling assistance were well adopted, whereas deworming practices showed partial adoption with gaps in regularity and scientific scheduling. However, areas like balanced nutrition, grazing, and pre-foaling preparation require improvement due to constraints such as high cost, limited technical knowledge, and inadequate veterinary support. These findings are in agreement with earlier studies by Boradiya et al. (2019); Patel et al. (2020), and Singh (2022), who reported uneven adoption of scientific management practices. Moreover, animal welfare is closely linked to proper housing, feeding, healthcare, and reproductive management, as emphasized by Lesimple (2020) and McGreevy & McLean (2010).

4.0 CONCLUSION

The present study on the assessment of deworming and reproductive management practices among foal owners in the coastal region of Gujarat revealed a moderate level of adoption of scientific equine management practices. Higher adoption was observed in hygiene, feeding, and reproductive care practices, whereas notable gaps existed in balanced nutrition, hoof care, breeding management, and preventive healthcare including systematic deworming. Major constraints affecting adoption included economic limitations, high cost of feed and veterinary services, shortage of skilled farriers, lack of technical knowledge, and inadequate extension support. These factors not only limit the adoption of improved practices but also have direct implications on equine health, productivity, and welfare.

Overall, the findings emphasize the urgent need for strengthening extension services, capacity-building programmers, improved access to veterinary care, and promotion of welfare-oriented management practices. Such interventions are essential to enhance reproductive efficiency, disease control, and overall sustainability of equine production systems in the coastal regions of Gujarat.

Recommendations

Based on the findings of the present study, the following recommendations are suggested to improve deworming and reproductive management practices among foal owners in the coastal region of Gujarat:

1. **Strengthening Extension Services**

   Regular awareness programmers, field demonstrations, and training should be conducted to educate horse owners about scientific deworming schedules, reproductive management, and overall equine care.

2. **Capacity Building of Horse Owners**

   Training programmers should focus on heat detection, breeding management, foaling care, neonatal management, and balanced feeding practices to enhance technical knowledge and skills.

3. **Improved Veterinary Infrastructure**

   Accessibility to qualified veterinarians, mobile veterinary clinics, and timely healthcare services should be enhanced, especially in remote coastal areas.

4. **Promotion of Scientific Deworming Practices**

   Awareness regarding regular deworming, proper drug rotation, and parasite control strategies should be increased to prevent disease and improve productivity.

5. **Nutritional Management Improvement**

   Farmers should be educated on balanced ration formulation, fodder processing, and proper grazing management to address nutritional deficiencies.

6. **Subsidies and Financial Support**

   Government and allied agencies should provide subsidies on feed, veterinary care, and breeding services to reduce economic constraints faced by horse owners.

7. **Encouragement of Veterinary-assisted Foaling**

   Efforts should be made to promote veterinary supervision during foaling, especially in high-risk cases, to reduce mortality rates.

8. **Welfare-oriented Management Practices**

   Emphasis should be given to improving housing, hygiene, feeding, and healthcare systems to enhance overall equine welfare.

Final Scientific Perspective

The present study on the assessment of deworming and reproductive management practices among foal owners in the coastal region of Gujarat highlights that equine management practices are largely shaped by socio-economic conditions, level of technical knowledge, and access to veterinary and extension services. Although respondents demonstrated a moderate level of adoption of reproductive care and deworming practices, significant gaps persist in systematic deworming, scientific breeding practices, balanced nutrition, and welfare-oriented management.

Key constraints such as high input costs, limited veterinary accessibility, shortage of skilled manpower, and lack of awareness continue to hinder the adoption of improved scientific practices, thereby affecting equine health and productivity.

Therefore, sustainable improvement in equine production systems in the coastal region requires integrated interventions, including farmer-oriented training programmers, strengthened veterinary and extension services, improved access to affordable inputs, and promotion of scientific and welfare-based management practices. These measures are essential for enhancing reproductive efficiency, disease control, and overall welfare of horses and foals in the study area.

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DECLARATIONS

Statement of animal Ethics

No approval from an institutional animal ethics committee was required for this study, as it was based on data collected from a consolidated database and did not involve any direct experimental procedures on animals. The study relied solely on observational and survey-based information obtained from horse owners, ensuring that no animals were subjected to handling, intervention, or treatment for research purposes.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study. The respondents were informed about the purpose of the study, and their participation was voluntary.

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The authors declare that no specific funding was received for this study.

Conflict of Interest

The authors declare no conflict of interest.

Author contributions

D.C. Moliya: Conceptualization, data collection, data analysis, and manuscript writing.

Co-authors: Supervision, review, and editing of the manuscript.

Data Availability Statement

The data generated and/or analyzed during the current study are available from the corresponding author on reasonable request. The data are not publicly available because they contain information obtained from individual respondents during the field survey.

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