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Are Individuals Who Engage in Cruelty to Dairy Cattle More Likely to Exhibit Human-Directed Aggression?

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ABSTRACT: Animal cruelty can take many forms such as neglect, intentional abuse, animal sexual assault, or animal hoarding. It falls on the spectrum of antisocial behaviours such as serial murder, rape, intimate partner violence. While previous research has explored the association between animal cruelty and various forms of human-directed violence, little attention has been paid to the relationship between animal cruelty in dairy settings and human-directed aggression among dairy operators. The present study examined whether dairy operators working in environments characterised by animal cruelty exhibit higher levels of aggression towards humans than individuals not engaged in dairy operations. The sample for the study comprised 45 dairy operators and 45 individuals residing in the same geographical region with no involvement in dairy activities in Karnal, Haryana. Karnal was selected as a study location given its substantial dairy activity, while the dairy participants were recruited from the area surrounding Pingli Road, which includes a dairy colony with a concentration of dairy operations. Data was collected using the Buss Perry Aggression Questionnaire and an Animal Cruelty Checklist drawn from the conceptualization of animal cruelty as per Sections 11(1) and 12 of the Prevention of Cruelty to Animals Act, 1960.

It was hypothesised that individuals working in dairy farming operations would report significantly higher levels of human-directed aggression than individuals not involved in dairy farming operations. The findings indicated that individuals engaged in dairy operations have a higher propensity for human-directed aggression than those not involved in dairy operations. Furthermore, all dairy sites showed signs of animal cruelty according to the Animal Cruelty Checklist, highlighting an association between animal cruelty and elevated aggression among the operators involved in dairy operations. The study has implications for animal and societal welfare.

1. INTRODUCTION

Animal cruelty has remained an ethical issue for decades. However, a deeper analysis of this construct reveals that inflicting violence on animals is an indicator of psychological and behavioural issues. Several theories have suggested a potential link between animal cruelty and the occurrence of delinquent behaviours. Within agricultural sectors like the dairy industry, animals are frequently subjected to cruel conditions in dairies such that they experience physical and psychological harm (Jurkovich, Hejel, & Kovács, 2024). It is necessary to examine the relationship between exposure to animal cruelty experienced by the employees working in dairies and how it links to acts of aggression.

1.1 Animal Cruelty

Animal cruelty typically involves subjecting animals to conditions that cause unnecessary pain and suffering. It is defined as any deliberate action or neglect toward an animal that causes pain, suffering, or distress, often for the perpetrator's personal gratification (Aleksic et al. 2023). This cruelty can range from active acts such as stabbing, kicking, beating to passive acts such as not providing animals with food and water (Levitt et al., 2016). Cruelty can manifest in the form of neglect, severe physical

abuse, and stressful living conditions. Simple neglect involves not providing enough food, water, shelter, or care to animals due to ignorance. Intentionally withholding care or shelter and subjecting animals to harsh conditions is considered gross neglect (Lockwood, 2006). Intentional animal abuse is commonly linked to deviant crimes such as sexual assault, domestic violence and gang activity, reflecting a broader pattern of violent behavior (Lockwood, 2006). Another form of cruelty involves animal hoarding, where individuals accumulate a large number of animals without providing proper care or nutrition to them (Lorsirigool et al., 2025). Lastly, animal sexual assault is one of the most heinous crimes committed against animals which is described as humans carrying out sexual acts with animals. Cruelty to animals is a global issue which has major implications for animal welfare, individual welfare, and societal welfare.

1.1.1 Animal Cruelty in the Indian Dairy Industry

India has the largest population of dairy cattle in the world, which includes 192.49 million cows and 109.85 million buffaloes (Department of Animal Husbandry and Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, 2019). However, a large proportion of dairy cattle in India are exposed to cruel conditions leading to severe physiological distress. Empirical research carried out across various states of India in a number of socio-cultural contexts reveal that dairies are sites of rampant cruelty towards cattle. For instance, a comprehensive study conducted at marginal, small and medium dairy sites in Uttar Pradesh revealed that only 12.50% dairy farmers had acceptable welfare conditions. 88% of the farms were assessed to have “unacceptable” welfare conditions. This included housing them in unclean and insufficient spaces such that the animals find it difficult to lay down or get up, and are provided minimal access to open spaces for socialising (Rajpoot et al., 2022). Similarly, research based on site visits to 38 farms in Kerala revealed cattle are subject to nose roping with a halter affixed, i.e., tied up for the entire day with ropes tethered to rings piercing through their nasal septums (Mullan et al., 2020). Other welfare issues for cattle housed in dairies in India include lack of ready access to food and water (Mullan et al., 2020); lack of adequate housing which protected the cattle from inclement weather and severely unhygienic environments (Kamboj et al., 2022); cattle with physical injury, and appearing apathetic, listless and “depressed” (Joshi et al., 2017).

Overcrowding, heat stress, inadequate housing, and inadequate feeding have resulted in physiological and psychological issues experienced by cattle. In India, the Prevention of Cruelty to Animals Act, 1960 aims to prevent the infliction of such unnecessary pain and suffering, and the parameters for assessment of what qualifies as unnecessary have been laid out in Section 11(1) and 12 of this Principal Act. It is essential to address the pervasive issue of animal cruelty which has implications for animal welfare and animal rights. Acts of animal cruelty often serve as an indicator of broader patterns of aggression, necessitating a thorough exploration of its correlation with interpersonal violence.

1.1.2 Aggression and Interpersonal Violence

Aggression is a multidimensional construct that encompasses behaviours, emotions, and cognitions directed towards causing harm to another individual who is motivated to avoid such harm (Allen & Anderson, 2017). The Buss and Perry Aggression Questionnaire conceptualises aggression as encompassing four interrelated dimensions: physical aggression, verbal aggression, anger, and hostility (Buss & Perry, 1992). Physical and verbal aggression are the behavioural components of aggression, anger characterises its emotional component, and hostility denotes its cognitive component. These dimensions offer a broad framework for understanding aggressive tendencies and have been widely adopted in psychological research to evaluate individual differences in aggression.

Interpersonal violence represents one manifestation of aggressive behaviour and encompasses multiple forms of violent behaviours which are influenced by several factors such as mental health conditions, socioeconomic conditions, and so on. It refers to acts of violence committed by an individual or a small group, and can manifest physically, psychologically, sexually, or through neglect and deprivation. The acts of interpersonal violence can be broadly categorised into family violence and community violence. Family violence is manifested in the form of child abuse, intimate partner violence, and elder abuse. Community violence involves acquaintances or strangers and commonly occurs in institutional settings like workplaces, prisons, schools, or care facilities, and results in physical and psychological harm (Mercy et. al, 2017).

The risk factors for victims and perpetrators of interpersonal violence fall into four levels: individual, relationship, community, and societal factors. Individual factors range from having gun ownership, early developmental experiences, being a male, having a history of antisocial behaviours to experiencing substance abuse problems. Experiencing marital conflicts, associating with delinquent peers, having parental conflicts, and belonging to low socioeconomic status fall under relationship factors (Krug et

al., 2002). At the community level, the risk factors include being unemployed, experiencing social isolation and poverty, having a high population density, and access to drug trade. Lastly, the risk factors at the societal level include gender and economic inequalities, stereotypical norms promoting male dominance, and poor justice system (Krug et al., 2002).

Interpersonal violence incurs both direct and indirect costs, emphasising the need for a public health approach to effectively reduce its prevalence. Understanding the factors associated with elevated aggression may contribute to the development of preventive strategies aimed at reducing interpersonal violence and promoting societal well-being.

1.2 The Animal Cruelty-Aggression Relationship

Animal cruelty is not only a form of violent behavior in itself but also a potential indicator of other harmful behaviours such as delinquency, crime, sexual assault, etc. Numerous hypotheses have been proposed to explain the association between animal cruelty and aggressive behaviour, highlighting the broader implications of such behaviour.

1.2.1 Violence Graduation Hypothesis

The theoretical underpinnings lie in various hypotheses such as the Violence Graduation Hypothesis which suggests that animal cruelty could desensitise humans to violence in general, making them more prone to exhibiting aggressive behaviour towards individuals (Flynn, 2011). In other words, this Hypothesis holds that animal cruelty in childhood predicts violence exhibited towards humans in adulthood (Arkow, 2014; Brantley, 2007). The Hypothesis suggests a progression from aggressing against animals to performing aggressive behaviours against humans by becoming desensitized. Initially, an individual may displace anger towards a nonthreatening target such as an animal. As this behaviour becomes familiar and successful, the individual may generalise this aggression towards other animals and eventually humans. However, recent studies have critiqued this Hypothesis. Walters (2013), for instance, found that violence to humans did not follow the direction stated in the Violence Graduation Hypothesis. This is in line with other studies which concluded that other theories are required to explain the association between animal cruelty and interpersonal violence (Arluke et al., 1999; Piper, 2003). There are multiple pathways in the development of antisocial behaviour towards animals and individuals. It is important to consider social and cultural factors that contribute to the association between animal cruelty and interpersonal violence.

1.2.2 Deviance Generalization Hypothesis

Another hypothesis which suggests a potential relationship between animal cruelty and human-directed aggression is the Deviance Generalization Hypothesis. It is based on the general deviance syndrome postulated by Jessor and Jessor (1977). This Hypothesis suggests that aggressive behaviours such as animal cruelty lie on a spectrum of antisocial behaviours (Luk et al., 1999). This spectrum includes various forms of antisocial behaviours such as sexually and physically aggressive behaviours, harassment and homicide (Hartup et al., 2005). According to this Hypothesis, animal cruelty may be exhibited before or after other violent behaviours, without a specific sequence or specific direction (Turner, 2000). Extensive research has shown that individuals who engage in animal cruelty have also engaged in other antisocial behaviours (Rutter, 2003). For instance, studies have shown that about 25% of offenders who engaged in animal cruelty also have also engaged in other serious antisocial acts such as homicide, rape, assault, harassment, abduction, and property crimes (Felthous & Kellert, 1987). Substance abuse issues, such as nicotine dependence and alcohol use disorder, are also prevalent among animal abusers. Key risk factors for these behaviours include being male, coming from a lower socioeconomic status, and exhibiting early onset of aggressive behaviour (Frick & Dickens, 2006).

1.2.3 Multi-Victim Hypothesis

The Multi-Victim Hypothesis, or Multiple Victimization Hypothesis, suggests that individuals who have experienced one type of abuse are at a higher risk of perpetrating other types of abuse (Sparks, 1981). This Hypothesis is instrumental in understanding the factors and patterns which contribute to repeated victimization. In this context, contributing factors include social and environmental factors such as poverty, living in high-crime neighbourhoods and limited access to resources. Research indicates that children who have either been victims of or have witnessed interpersonal violence, are 3 times more likely to abuse animals compared to children who have not been victimised themselves (Baldry, 2003; Baldry, 2005; Becker et al., 2004).

1.2.4 Antecedent Lifestyle Hypothesis

Similar to the Deviance Generalization Hypothesis, the Antecedent Lifestyle Hypothesis also views delinquent behaviours and animal cruelty as part of a broader spectrum of violent and antisocial behaviours (Walters, 2023). This Hypothesis introduces a developmental perspective, proposing that these behaviours occur in a sequential order. Specifically, antisocial behaviours such as animal cruelty, fire setting and drug use serve as antecedent factors for delinquent and violent behaviours. Furthermore, the Hypothesis assumes that there are two latent constructs of proactive antisociality and reactive antisociality. Proactive antisociality involves forms of planned and calculated antisocial behaviours whereas reactive antisociality is exhibited in the form of reckless and impulsive antisocial behaviours (Walters, 2023). These constructs combine to form antecedent lifestyles, which can lead to delinquency and crime in the future. Additionally, the Hypothesis incorporates temperament dimensions, specifically fearlessness and disinhibition, which contribute to proactive and reactive antecedent lifestyles respectively (Walters, 2017). In short, the Antecedent Lifestyle Hypothesis suggests that antisocial behaviours fall on the spectrum of violent behaviours.

It is necessary to examine the relevance of the hypotheses in the current context. The Violence Graduation Hypothesis assumes that there is a strong link between animal cruelty and delinquency and that aggressing against animals progresses to performing violent and delinquent behaviours. However, the direction posited by this hypothesis has not been fully established as there are very few longitudinal studies on the relationship between animal cruelty and delinquency. Studies have shown that those who perform violent actions towards individuals do not necessarily follow the pathway as stated in this Hypothesis (Piper, 2003; Walters, 2013). The Deviance Generalization Hypothesis does not posit a particular direction and posits that aggressive behaviours lie on a spectrum of antisocial behaviours. However, the spectrum of anti-social behaviours can be vast with numerous compounding variables that can be hard to control in the context of this research. The Multi-Victim Hypothesis presumes that the aggressor is a victim of or has witnessed interpersonal violence. Given the field conditions for this study, ensuring past victimisation of participants was not viable. On the other hand, the Antecedent Lifestyle Hypothesis identifies animal cruelty as one of the three key antecedent factors for future acts of human-directed aggression. The Hypothesis therefore provides the primary theoretical framework for the present study. Consistent with this framework, the present study examines whether individuals working in dairy operations characterised by observable animal cruelty exhibit higher levels of human-directed aggression than individuals not engaged in dairy operations.

1.3 Rationale

Animal cruelty is a major social and ethical concern. In dairies, animals such as cows and buffaloes often endure inhumane conditions, which manifest as neglect, abuse, maiming, mutilation, abandonment, and torture. Numerous studies have been conducted in the Western context to understand the relationship between animal cruelty and human-directed aggression. However, a major research gap exists in India, whereby there is a lack of studies which aim to examine the relationship between these variables. The association between cruelty towards cattle at dairies and human-directed aggression among individuals working in these environments remains a neglected area of research globally. Moreover, the needs of animals and humans are often pitted against each other - it has been assumed that improving the welfare of cattle has to come at the cost of upholding welfare of individuals engaged at dairies, and vice versa. Therefore, this study seeks to address an important gap by examining whether individuals working in dairy operations where animal cruelty is observed exhibit higher levels of human-directed aggression than individuals not engaged in dairy operations.

1.4 Objectives

The primary objective of the present study is to compare levels of human-directed aggression between individuals engaged in dairy operations and individuals residing in the same region who are not engaged in dairy operations. For the purpose of this study, those engaged in dairy operations include both owners and employees at dairy premises. A secondary objective is to document indicators of animal cruelty at the dairy sites where these operators work, using an observational checklist grounded in Sections 11(1) and 12 of the Prevention of Cruelty to Animals Act, 1960.

1.5 Research Hypotheses

The hypotheses of the study are:

H0: Individuals involved in dairy farm operations where animal cruelty is observed do not exhibit significantly higher levels of human-directed aggression than individuals not involved in dairy operations.

H1: Individuals involved in dairy farm operations where animal cruelty is present exhibit significantly higher levels of human-directed aggression than individuals not involved in dairy operations.

2. MATERIALS AND METHODS

2.1 Research Design

The study employs a quantitative approach to explore the relationship between animal cruelty and human-directed aggression.

2.2 Informed Consent

All participants provided written and verbal informed consent prior to data collection, and all protocols adhered strictly to ethical standards for behavioral research involving human participants.

2.3 Sample and Sampling Design

The sample consisted of 45 dairy farm operators (dairy cluster) and 45 individuals who were not engaged in dairy farm operations (non-dairy cluster) residing in Haryana. The first group consisted exclusively of dairy operators and workers actively employed in commercial dairy operations in Karnal, Haryana. Karnal was selected as the study location given its prominence as a region with substantial dairy activity in Haryana. Within Karnal, the area surrounding Pingli Road was selected purposively, as it includes a recognised dairy colony with a concentration of dairy-related operations, thereby providing an appropriate setting for recruitment of participants engaged in dairy farming. To control for confounding demographic variables that heavily influence rates of aggression and animal cruelty, a purposive sampling strategy was used to recruit the comparison group. This group consisted entirely of individuals residing within the same geographical region who had no current or past employment or exposure to the dairy operations.

The data for the dairy and the non-dairy cluster were collected from areas located within an approximately 8 km radius of Pingli Road, Karnal. This included areas such as Roop Colony, Ambedkar Nagar, Bheem Nagar, Hansi Road, Indira Colony, New Bahadur Chand Colony, Shivaji Colony, Mangal Colony and Ramesh Nagar. It was ensured that both groups were drawn from a similar geographical and socio-cultural setting.

2.3.1 Inclusion Criteria

Participants were eligible for inclusion if they were either dairy farm operators or individuals not employed at dairy farm operations and were situated within an 8 km radius of the study area in Karnal.

2.4 Measures

2.4.1 The Aggression Scale

Aggression was assessed using the Aggression Scale (Buss & Perry, 1992), which consists of four subscales, i.e., Physical Aggression (PA), Verbal Aggression (VA), Hostility (H), and Anger (A). It is a 5-point Likert-type scale which includes 29 items. The scale ranges from dimensions of 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). The Physical Aggression subscale includes 9 items; the Verbal Aggression subscale includes 5 items; the Hostility subscale is composed of 8 items; and the Anger subscale includes 7 items. Two items are reverse scored. The total score is derived from the sum of the four factor scores. The internal consistency reliability of the total scale is .89 (Buss & Perry, 1992).

2.4.2 The Animal Cruelty Checklist

The Animal Cruelty Checklist is drawn from the conceptualization of animal cruelty as per Sections 11(1) and 12 of the Prevention of Cruelty to Animals Act, 1960. This Act is India's landmark national legislation enacted to prevent the infliction of unnecessary pain or suffering on animals and to amend the laws relating to the prevention of cruelty to animals nationwide.

Rather than attempting to measure subjective or self-reported behavior, this instrument was structured as a tool to objectively quantify the physical indicators of abuse and severe neglect co-occurring within the dairy and residential sites. By anchoring the tool in statutory law, the checklist evaluates cruelty based on legally defined benchmarks of welfare rather than researcher bias.

The responses are provided in binary terms (Yes or No). The presence of any of the five indicators (such as extreme tethering under Section 11) indicates the occurrence of cruelty. Other salient observations, such as probable use of oxytocin, a lactation-forcing practice falling under Section 12, were also recorded.

2.5 Procedure

The Aggression Scale was administered to assess aggression, while an observational checklist was used to document indicators of animal cruelty at dairy sites. The Aggression scale was translated into Hindi to facilitate comprehension and ensure accurate responses. The translated survey scale was sent for content validity checking to relevant experts in the field. The observational assessment was complemented by photographic documentation and involved trained researchers visiting dairy sites during operational hours to record the presence or absence of the checklist's animal cruelty indicators. Prior to data collection, informed consent was obtained from all participants, and demographic information was recorded. Upon completion of the survey, participants were thanked for their participation in the study.

3. RESULTS AND DISCUSSION

3.1 Results

The descriptive statistics of the total scores of the Aggression Scale of both the non-dairy (ND) and dairy (D) clusters is presented in Table 1.

Table 1. Descriptive Statistics of Total Scores of the Aggression Scale of both clusters

	N	Mean	Std. Deviation
Total Score-R	45	65.46	18.89
Total Score-D	45	92.20	18.50

The descriptive statistics of the four subscale scores of the Aggression Scale of both the clusters is presented in Table 2.

Table 2. Descriptive Statistics of Subscale Scores of the Aggression Scale of both clusters

	N	Mean	Std. Deviation
PA-ND	45	18.04	7.45
VA-ND	45	11.62	4.00
H-ND	45	20.84	6.56
A-ND	45	14.95	5.31
PA-D	45	29.75	7.29
VA-D	45	16.55	4.32
H-D	45	24.42	6.09
A-D	45	21.46	6.08

The results of tests of normality are presented in Table 3.

Table 3. Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total Score-ND	.13	45	.046	.88	45	.000
Total Score-D	.12	45	.071	.97	45	.561
PA-ND	.14	45	.025	.86	45	.000

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VA-ND	.14	45	.017	.91	45	.002
H-ND	.12	45	.078	.95	45	.087
A-ND	.18	45	.000	.91	45	.003
PA-D	.09	45	.200	.96	45	.185
VA-D	.14	45	.015	.97	45	.400
H-D	.09	45	.200	.96	45	.166
A-D	.11	45	.200	.98	45	.647

The results of Mann-Whitney U test applied on the total scores and subscale scores of both the clusters are presented in Table 4.

Table 4. Results of Mann-Whitney U Test

Category	Group	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Z	Sig.
Total Scores	Non-Dairy	45	29.91	1346.00	311.00	-5.66	.000
	Dairy	45	61.09	2749.00			
PA Scores	Non-Dairy	45	28.50	1282.50	247.50	-6.17	.000
	Dairy	45	62.50	2812.50			
VA Scores	Non-Dairy	45	31.67	1425.00	390.00	-5.03	.000
	Dairy	45	59.33	2670.00			
H Scores	Non-Dairy	45	38.99	1754.50	719.50	-2.36	.018
	Dairy	45	52.01	2340.50			
A Scores	Non-Dairy	45	32.20	1449.00	414.00	-4.83	.000
	Dairy	45	58.80	2646.00			

The responses of the Animal Cruelty Checklist are presented in Table 5.

Table 5. Responses of the Animal Cruelty Checklist

S.No.	Indicators of the Animal Cruelty Checklist	Frequency	Percent
1.	Cattle suffering injury, infirmity or illness being used for commercial milk production	42	93.3
2.	Overcrowding of cattle in sheds/dairy structures which do not measure sufficiently in height, length and breadth to permit the cattle a reasonable opportunity for movement	22	48.9
3.	Cattle tethered with heavy chains, with short, tight ropes and/or for prolonged periods of time	45	100
4.	Cattle lacking access to water and/or clean food in sufficient quantities	45	100
5.	Signs that cattle are subject to abandonment	5	11.1

S.No.	Indicators of the Animal Cruelty Checklist	Frequency	Percent
6.	Any other observations		
a.	Probable use of oxytocin bottles, quackery was observed.	2	4.4
b.	Probable use of oxytocin bottles seen	14	31.1

3.2 Discussion

Animal cruelty is exhibited in the form of subjecting animals to degrading and inhuman conditions. Cruel acts can be active or passive in nature. Lack of provision of adequate living conditions, not providing clean food and water, subjecting them to physical and psychological harm, ignoring the needs of animals, animal abandonment, restricted movement depict animal cruelty (Levitt et al., 2016). This issue is particularly prevalent in the dairy industry. In India, studies have shown that cattle are subjected to harsh and gross conditions which leads to physical and psychological injuries such as skin infections, bloating, wounds, exhibiting apathetic and depressed behaviours. Given the lack of studies which aim to understand the relationship between animal cruelty and human-directed aggression in the Indian dairy sites, this study seeks to address this gap by examining the association between animal cruelty and aggression among dairy operators.

The study employed the Aggression Scale (Buss & Perry, 1992) and the Animal Cruelty Checklist. After collecting the data for the dairy cluster and the non-dairy (residential) cluster, data analysis was done using descriptive and inferential statistics. Observational method was used to gather information on the instances of animal cruelty present at the dairy sites. To compare the levels of aggression between the dairy cluster and the non-dairy cluster, the total scores and the subscale scores of the Aggression Scale (Buss & Perry, 1992) were analysed.

The first objective of the study was to compare levels of aggression between individuals employed in dairy operations and those who are not. The findings from Table 1 show that the total score of the dairy cluster has a higher mean value ($M = 92.20$, $SD = 18.50$) than the total score of the non-dairy cluster ($M = 65.46$, $SD = 18.89$). The descriptive analysis of the subscale scores presented in Table 2 reveals that the Physical Aggression subscale score of the dairy cluster has a higher mean value ($M = 29.75$, $SD = 7.29$) than the Physical Aggression subscale score of the non-dairy cluster ($M = 18.04$, $SD = 7.45$). The Verbal Aggression subscale score of the dairy cluster has a higher mean value ($M = 16.55$, $SD = 4.32$) than the Verbal Aggression subscale score of the residential cluster ($M = 11.62$, $SD = 4.00$). Furthermore, the Hostility subscale score of the dairy cluster has a higher mean value ($M = 24.42$, $SD = 6.09$) than the Hostility subscale score of the non-dairy cluster ($M = 20.84$, $SD = 6.56$). Lastly, the Anger subscale score of the dairy cluster has a higher mean value ($M = 21.46$, $SD = 6.08$) than the Anger subscale score of the non-dairy cluster ($M = 14.95$, $SD = 5.31$). This means that the dairy cluster has a higher cumulative score on the Aggression Scale (Buss & Perry, 1992) than the non-dairy cluster.

To apply inferential statistics, the data were checked for normality. The results of tests of normality presented in Table 3 reveal that the distributions of the total score and the subscale scores of Physical Aggression, Verbal Aggression, and Anger of the non-dairy cluster depart significantly from normality ($p < 0.01$). Hence, Mann-Whitney U test was employed to compare the differences between the two groups. Table 4 shows that the dairy cluster had a significantly higher total score than the non-dairy cluster, $U = 311.00$, $p < .01$. The dairy cluster had a significantly higher Physical Aggression subscale score than the non-dairy cluster, $U = 247.50$, $p < .01$. With respect to the Verbal Aggression subscale score, the dairy cluster had a significantly higher score than the non-dairy cluster, $U = 390.00$, $p < .01$. The difference between the Hostility subscale score of the dairy and non-dairy clusters was significant, $U = 719.50$, $p < .05$. Lastly, the dairy cluster had a significantly higher Anger subscale score than the non-dairy cluster, $U = 414.00$, $p < .01$. To infer, the dairy cluster exhibited significantly higher levels of aggression as compared to the non-dairy cluster. This leads to the rejection of the null hypothesis and the acceptance of the alternative hypothesis of the study.

The second objective of the study was to document indicators of animal cruelty at the dairy sites where participants in the dairy cluster worked. Studies have shown that animal cruelty is present in most of the dairy sites in India. Animal cruelty indicators such as severe injuries, bruises, bleeding, fractures, and broken tails have been observed in dairy farms (Joshi et al., 2017). Poor management by dairy owners has resulted in the ignorance of the needs of animals such that they suffered from physical and psychological issues, sometimes leading to death (Sharma et al., 2020). This is supported by extensive studies which revealed

that cows are given low space per allowance and no freedom for movement (Sharma et al., 2019). Tight and close typing of cows, limited access to clean drinking water, and improper supply of food are other indicators of animal cruelty present at the dairy units (Mullan et al., 2020).

The observations gathered from the dairy sites related to animal cruelty are presented in Table 5. It shows that 100% of the dairy sites visited exhibited signs of animal cruelty according to the Animal Cruelty Checklist. The cattle were found to be suffering from injury, infirmity or illness being used for commercial milk production in 93.3% of dairy sites. Severe overcrowding had been observed in cattle sheds leading to space restriction. This made the cattle unable to move freely in the sheds. Furthermore, sheds were not maintained properly and the cattle were living in poor and filthy conditions in dairy sites. Additionally, calves and female cattle were found to be tethered with heavy chains, with short, tight ropes and/or for prolonged periods of time in 100% of dairy sites.

No clean food and water were provided in sufficient quantities in 100% of dairy sites. Use of spurious oxytocin was observed in 31.1% of dairy sites. Misuse of oxytocin involves administering the hormone to cattle, forcing the let-down of milk. These observational findings add to the inference that there is a potential relationship between animal cruelty in dairy sites and the dairy operators' propensity for interpersonal violence. Forms of animal cruelty such as neglect of animals has been suggested to be a marker for the occurrence of psychological issues. Committing cruel actions towards animals might be an indicator of higher risk for performing serious criminal offenses such as serial murder, intimate partner violence, rape, etc. (Lockwood & Arkow, 2016). This has serious implications for animal welfare which needs to be addressed through prevention and intervention programs.

3.3 Limitations, Implications, and Future Directions

The study has some limitations which could be addressed by future research. The sample size was small which limited the use of other statistical tests. Furthermore, the presence of outliers affected the distribution such that nonparametric tests were used to analyse the data.

The study has implications for animal and society welfare. Animal cruelty and elevated levels of aggression have significant implications for both animal welfare and society. This study paves the way for extensive research in the country related to animal welfare. Interventions need to be developed at the local and national levels to improve the conditions of animals at dairy sites. The study has potential to bring awareness about the occurrence of animal cruelty in the country. Future studies could examine this relationship longitudinally, include more regions in India, and expand the sample so as to undergo cross-comparisons.

4. CONCLUSION

The level of aggression across the domains of Physical Aggression, Verbal Aggression, Hostility and Anger has been found to be higher in the dairy cluster than the non-dairy cluster. This is supported by descriptive and inferential analyses which showed that the dairy cluster had higher total and subscale scores on the Aggression Scale (Buss & Perry, 1992) than the non-dairy cluster. Furthermore, all the indicators of the Animal Cruelty Checklist were met by the dairy sites, indicating that the cattle are subjected to widespread cruelty.

This research concludes that individuals engaged in dairy farm operations characterised by animal cruelty have higher propensity for acts of human-directed aggression and violence.

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AUTHOR CONTRIBUTIONS

Sunayana Sibal: Conceptualization, Writing - Original Draft.

Udit Raj Sharma: Methodology, Writing - Review & Editing.

Sanna Singh: Data Collection, Writing - Review & Editing.

CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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ETHICS STATEMENT

No ethical approval is required. All participants provided written and verbal informed consent prior to data collection, and all protocols adhered strictly to ethical standards for behavioral research involving human participants.

DATA AVAILABILITY STATEMENT

The authors will provide the data and material to the reviewers as and when required.

Aggression Questionnaire

(Buss & Perry, 1992) Instructions:

Using the 5 point scale shown below, indicate how uncharacteristic or characteristic each of the following statements is in describing you. Place your rating in the box to the right of the statement.

- 1 = extremely uncharacteristic of me
- 2 = somewhat uncharacteristic of me
- 3 = neither uncharacteristic nor characteristic of me
- 4 = somewhat characteristic of me
- 5 = extremely characteristic of me

- | | | | |
|-----|---|--------------------------|----|
| 1. | Some of my friends think I am a hothead | ☐ | A |
| 2. | If I have to resort to violence to protect my rights, I will. | ☐ | PA |
| 3. | When people are especially nice to me, I wonder what they want. | ☐ | H |
| 4. | I tell my friends openly when I disagree with them. | ☐ | VA |
| 5. | I have become so mad that I have broken things. | ☐ | PA |
| 6. | I can't help getting into arguments when people disagree with me. | ☐ | VA |
| 7. | I wonder why sometimes I feel so bitter about things. | ☐ | H |
| 8. | Once in a while, I can't control the urge to strike another person. | ☐ | PA |
| 9.* | I am an even-tempered person. | ☐ | A |
| 10. | I am suspicious of overly friendly strangers. | ☐ | H |
| 11. | I have threatened people I know. | ☐ | PA |
| 12. | I flare up quickly but get over it quickly. | ☐ | A |
| 13. | Given enough provocation, I may hit another person. | ☐ | PA |

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|------|---|--------------------------|----|
| 14. | When people annoy me, I may tell them what I think of them. | ☐ | VA |
| 15. | I am sometimes eaten up with jealousy. | ☐ | H |
| 16.* | I can think of no good reason for ever hitting a person. | ☐ | PA |
| 17. | At times I feel I have gotten a raw deal out of life. | ☐ | H |
| 18. | I have trouble controlling my temper. | ☐ | A |
| 19. | When frustrated, I let my irritation show. | ☐ | A |
| 20. | I sometimes feel that people are laughing at me behind my back. | ☐ | H |
| 21. | I often find myself disagreeing with people. | ☐ | VA |
| 22. | If somebody hits me, I hit back. | ☐ | PA |
| 23. | I sometimes feel like a powder keg ready to explode. | ☐ | A |
| 24. | Other people always seem to get the breaks. | ☐ | H |
| 25. | There are people who pushed me so far that we came to blows. | ☐ | PA |
| 26. | I know that “friends” talk about me behind my back. | ☐ | H |
| 27. | My friends say that I’m somewhat argumentative. | ☐ | VA |
| 28. | Sometimes I fly off the handle for no good reason. | ☐ | A |
| 29. | I get into fights a little more than the average person. | ☐ | PA |

Scoring

The two questions with the asterisk are reverse scored.

The Aggression scale consists of 4 factors, Physical Aggression (PA), Verbal Aggression (VA), Anger (A) and Hostility (H). The total score for Aggression is the sum of the factor scores.

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